Karlsruher Institut für Technologie

Business Engineering (B.Sc.)

Winter Term 2011/2012
Long version
Date: 30.08.2011

Faculty of Economics and Business Engineering

KIT - University of the State of Baden-Wuerttemberg and
National Research Center of the Helmholtz Association

www.kit.edu

Publisher:

Fakultät für Wirtschaftswissenschaften

Department of Economics and Business Engineering
Karlsruhe Institute of Technology (KIT)
76128 Karlsruhe
www.wiwi.kit.edu

Contact: modul@wiwi.kit.edu

Contents

1 Structure of the Bachelor Programme in Business Engineering (B.Sc.)

The bachelor programme in Business Engineering (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.

Business Engineering (B.Sc.)

Core Programme

Semester	BA	EC	INFO	OR	ENG	MATH	STAT
1	Acc 4 CP	EC 1 5 CP	Progr 5 CP		Material Science 2,5 CP	Math 1 7 CP	
	BA A 3 CP				Mass and Energy Bal. 2,5 CP		
2	BA B 4 CP	EC 2 5 CP	Info 1 5 CP	OR 1 4,5 CP		Math 2 7 CP	Stat 1 5 CP
3	BA C 4 CP		Info 2 5 CP	OR 2 4,5 CP	Eng. Mechanics 2,5 CP	Math 3 7 CP	Stat 2 5 CP
					Electr. Eng 2,5 CP		
	Internship 8 CP						

Specialization Programme

	Compulsory						Elective	
4	BA	EC	INFO	OR	ING	Seminar + KS	BA/ENG	Elective
5	9 CP	9 CP	9 CP	9 CP	9 CP	6 + 3 CP	9 CP	9 CP
6	Bachelor Thesis 12 CP							

182 CP
(Core Programme + Specialization Programme + Bachelorarbeit)

Figure 1: Structure of the Bachelor Programme(Recommendation)

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.

2 Key Skills

The bachelor programme Business Engineering (B.Sc.) at the Faculty of Economics and Business Engineering 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

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. A list of recommended courses and seminars will be published online for the additive acquisition. This list is coordinated with the House of Competence. Students may choose freely among the offered courses of HoC. Note that within the elective area Culture-Politics-Science-Engineering no course can be taken with its contents too close to the lectures of your own study programme.

Art der Schlüsselqualifikation	Bachelorstudium						
	Grundprogramm			Vertiefungsprogramm			
	REWE BWL A	BWLB,C VWL I,II	Tutoren-programm	BWL, VWL, INFO	Seminar	Bachelor-arbeit	Betriebs-praktikum
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)*	(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

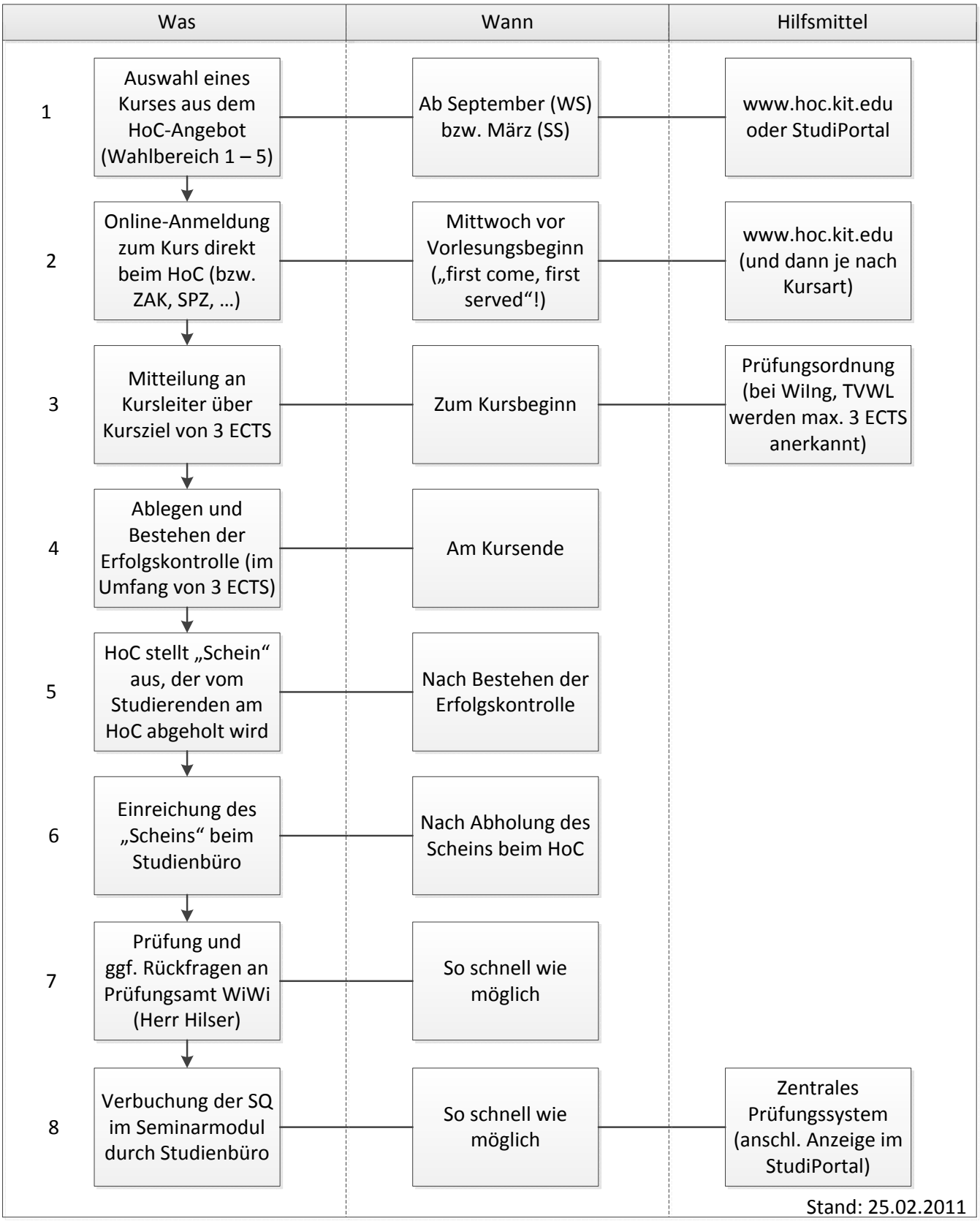

Figure 3: Process of gaining additive key skills

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 hanbook 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://zvwgate.zvw.uni-karlsruhe.de/download/leitfaden_studierende.pdf

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

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

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.

WI3STAT - Statistical Applications of Financial Risk Management (S. 52)

Anmerkungen

The course Bank Management and Financial Markets, Applied Econometrics [2520355] will not be offered any more from summer term 2013 on. The examination will be offered latest until summer term 2012.
The course Economics III: Introduction in Econometrics [2520016] will not be offered any more from summer term 2013 on. The examination will be offered latest until summer term 2012.

WI3INGMB8 - Emphasis in Fundamentals of Engineering (S. 77)

Anmerkungen

The course *Material Science II for Business Engineers* [2126782] remains in this module. The credits for all lectures of this module have been changed from 4,5 to 5 CP.

WI3INGBGU2 - Foundations of Guided Systems (S. 86)

Empfehlungen

It is recommended to choose the Master-module *Logistics and Management of Guided Systems* [WW4INGBGU7] or the Bachelor-Module *Foundations of Guided Systems* [WW3INGBGU2].

2540524 - Bachelor Seminar in Information Engineering and Management (S. 124)

Anmerkungen

The conditions for participating in the seminar were changed.

2520016 - Economics III: Introduction in Econometrics (S. 354)

Anmerkungen

The course Economics III: Introduction in Econometrics [2520016] will not be offered any more from summer term 2013 on. The examination will be offered latest until summer term 2012.

2520355 - Bank Management and Financial Markets, Applied Econometrics (S. 126)

Anmerkungen

The course Bank Management and Financial Markets, Applied Econometrics [2520355] will not be offered any more from summer term 2013 on. The examination will be offered latest until summer term 2012.

5 Modules (Foundation)

5.1 All Subjects

Module: Business Administration [WI1BWL]

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

ECTS Credits	Cycle	Duration
15	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2600002	Financial Accounting and Cost Accounting (p. 280)	2/2	W	4	T. Lüdecke
2600023	Business Administration and Management Science A (p. 104)	2	W	3	M. Ruckes, Ch. Weinhardt, H. Lindstädt
2600024	Business Administration and Management Science B (p. 105)	2/0/2	S	4	M. Ruckes, Th. Lützkendorf, Ch. Weinhardt, W. Fichtner, F. Schultmann
2600026	Business Administration and Management Science C (p. 106)	2/0/2	W	4	M. Ruckes, M. Uhrig-Homburg

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: *Financial Accounting and Cost Accounting* [25002/25003] and *Business Administration and Management Science A* [2600023]
2nd term: *Business Administration and Management Science B* [25024/25025]
3rd term: *Business Administration and Management Science C* [25026/25027]

Learning Outcomes
The student

- has core skills in business administration in particular with respect to decison 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.

Module: Economics [WI1VWL]

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

ECTS Credits	Cycle	Duration
10	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2600012	Economics I: Microeconomics (p. 352)	3/0/2	W	5	G. Liedtke
2600014	Economics II: Macroeconomics (p. 353)	3/0/2	S	5	B. Wigger

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 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 looks at the dynamics of economic processes.

Content

Module: Introduction to Informatics [WI1INFO]

Coordination: Hartmut Schmeck, Rudi Studer, Detlef Seese
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Informatics

ECTS Credits	Cycle	Duration
15	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2511000	Introduction to Programming with Java (p. 265)	3/1/2	W	5	D. Seese
2511010	Foundations of Informatics I (p. 191)	2/2	S	5	R. Studer, E. Simperl
2511012	Foundations of Informatics II (p. 192)	3/1	W	5	H. Schmeck

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 (120 min)
  The successful completion of the compulsory tests in the computer lab is prerequisited 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 successfull 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

Module: Introduction to Operations Research [WI1OR]

Coordination: Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Operations Research

ECTS Credits	Cycle	Duration
9	Every 2nd term, Summer Term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2550040	Introduction to Operations Research I (p. 152)	2/2/2	S	4.5	S. Nickel, O. Stein, K. Waldmann
2530043	Introduction to Operations Research II (p. 153)	2/2/2	W	4.5	S. Nickel, O. Stein, K. Waldmann

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.

Module: Mass and Energy Balances for Reacting Systems [WI1ING1]

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

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
22130	Mass and Energy Balances for Reacting Systems (p. 334)	2/0	W	2.5	P. Pfeifer, B. Kraushaar-Czarnetzki

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

Module: Material Science [WI1ING2]

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

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2125760	Material Science I (p. 363)	2/1	W	2.5	M. Hoffmann

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 assessment procedures of each course of this module is defined for each course separately.
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
The student

- knows and understands the correlation between atomic structure, microstructure and related macroscopic properties (e.g. mechanical or electrical behaviour)
- has basic knowledge on materials development and characterization

Content

- Atomic structure and interatomic bonding
- Structure of crystalline solids
- Imperfections in solids
- Mechanical behaviour
- Physical properties
- Solidification
- Thermodynamics of heterogeneous systems
- Phase diagrams
- Ferrous alloys

Module: Engineering Mechanics [WI1ING3]

Coordination: Carsten Proppe
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2161208	Engineering Mechanics I (p. 339)	1/0.5	W	2.5	C. Proppe

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 assessment procedures of each course of this module is defined for each course separately.
The overall grade of the module is the grade of the written examination.

Conditions
None.

Learning Outcomes
The student

- knows and understoods the basic elements of statics,
- is able to solve basic problems in statics indipendently.

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

Module: Electrical Engineering [WI1ING4]

Coordination: Wolfgang Menesklou
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
23223	Electrical Engineering I (p. 162)	2/2	W	2.5	W. Menesklou

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 assessment procedures of each course of this module is defined for each course separately.
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.

Module: Mathematics [WI1MATH]

Coordination: Günter Last
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Mathematics

ECTS Credits	Cycle	Duration
21	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
01350	Mathematics I (p. 233)	4/2/2	W	7	G. Last, Folkers, Klar
01830	Mathematics II (p. 234)	4/2/2	S	7	G. Last, Folkers, Klar
01352	Mathematics III (p. 235)	4/2/2	W	7	G. Last, Folkers, Klar

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.
It is strongly recommended to attend the courses in the following sequence: *Mathematics I* [01350], *Mathematics II* [01830] *Mathematics III* [01352]

Learning Outcomes

Content

Module: Statistics [WI1STAT]

Coordination: Steffi Höse
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Statistics

ECTS Credits	Cycle	Duration
10	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2600008	Statistics I (p. 329)	4/0/2	S	5	S. Höse
2600020	Statistics II (p. 330)	4/0/2	W	5	S. Höse

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 1* [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

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 importand discrete and continuous distributions, covariance and correlation, convolution and limit distributions
C. Theory of estimation and testing: suffiency of statistics, point estimation (optimality, ML-method), internal estimations, theory of tests (optimality, most important examples of tests)

6 Modules (Specialization)

6.1 Business Administration

Module: Strategy and Organization [WI3BWLUO1]

Coordination: Hagen Lindstädt
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2577900	Management and Strategy (p. 344)	2/0	S	4	H. Lindstädt
2577902	Managing Organizations (p. 255)	2/0	W	4	H. Lindstädt
2577907	Special Topics in Management: Management and IT (p. 323)	1/0	W/S	2	H. Lindstädt

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 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 completion of the module *Business Administration* [WI1BWL]. For exceptions see remarks below.

Learning Outcomes

Content

Remarks
See German version.

Module: Management Accounting [WI3BWLIBU1]

Coordination: Marc Wouters
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

ECTS Credits	Cycle	Duration
9		

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
	Introduction to Management Accounting (p. 151)	4	W	6	M. Wouters
2577916	Seminar Management accounting for industrial engineers (p. 284)	2	W/S	3	M. Wouters

Learning Control / Examinations
See the information for the separate courses.
The 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
The course “Introduction to Management Accounting” and the seminar “Management Accounting for Industrial Engineers” are compulsory and must be examined.

Recommendations
Participation in the course “Introduction to Management Accounting” before the seminar “Management Accounting for Industrial Engineers”.

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

Content
The module consists of a core course Introduction to Management Accounting, where the emphasis is on structured learning of management accounting techniques. In the seminar, students need to focus on a particular topic and further develop their own understanding and write a paper. Additional courses can be added to broaden the understanding of finance and accounting topics.

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

- 2530216 Financial Management
- 2530210 Interne Unternemungsrechnung

Module: Industrial Production I [WI3BWLIIP]

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

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2581950	Fundamentals of Production Management (p. 196)	2/2	S	5.5	F. Schultmann
2581960	Material Flows in Industrial Production (p. 333)	2/0	W	3.5	F. Schultmann, M. Fröhling
2581996	Logistics and Supply Chain Management (p. 225)	2/0	W	3.5	F. Schultmann

Learning Control / Examinations
The module contains “Fundamentals of Production Management” [2581950] and one optional course. The examination will be in form of individual written exams acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.
The overall modular grade is calculated by weighing the individual grades with the according credit points. The grade will be truncated after the first decimal. Additional results may be considered on request.Assessment procedures are described separately for each course of the module.

Conditions
Specific precondition for “Business Engineering” (B.Sc.) and “Economics Engineering” (B.Sc.): Successful passing of the module “Business Administration” [WI1BWL]. For exceptions see remarks below.
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” [WW4BWLIIP2] and/or “Industrial Production III” [WW4BWLIIP6].

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.

Remarks
See German version.

Module: Energy Economics [WI3BWLIIP2]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2581010	Introduction to Energy Economics (p. 154)	2/2	S	5.5	W. Fichtner
2581012	Renewable Energy Sources - Technologies and Potentials (p. 169)	2/0	W	3.5	R. McKenna
2581005	Corporate Governance in Energy Economics (p. 343)	2/0	S	3,5	H. Villis
2581959	Energy Policy (p. 166)	2/0	S	3.5	M. Wietschel

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 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 completion of the module *Business Administration* [WI1BWL].
For exceptions see remarks below.
The lecture *Introduction into Energy Economics* [2581010] has to be examined.

Learning Outcomes

Content
Introduction to Energy Economics
Renewable Energies
Corporate Governance in Energy Economics
Energy Policy

Remarks
See German version.

Module: Essentials of Finance [WI3BWLFBV1]

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

ECTS Credits	Cycle	Duration
9	Every 2nd term, Summer Term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2530575	Investments (p. 219)	2/1	S	4.5	M. Uhrig-Homburg
2530216	Financial Management (p. 182)	2/1	S	4.5	M. Ruckes

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 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 completion of the module *Business Administration* [WI1BWL].

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.

Module: Risk and Insurance Management [WI3BWLFBV3]

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

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2550055	Principles of Insurance Management (p. 261)	3/0	S	4.5	U. Werner
2530326	Enterprise Risk Management (p. 167)	3/0	W	4.5	U. Werner

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 completion of the module *Business Administration* [WI1BWL].

Learning Outcomes
See German version.

Content
See German version.

Module: Insurance Markets and Management [WI3BWLFBV4]

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

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2550055	Principles of Insurance Management (p. 261)	3/0	S	4.5	U. Werner
2530323	Insurance Marketing (p. 211)	3/0	W/S	4.5	U. Werner
2530050	Private and Social Insurance (p. 262)	2/0	W	2.5	W. Heilmann, Klaus Besserer
2530350	Current Issues in the Insurance Industry (p. 143)	2/0	S	2.5	W. Heilmann
2530353	International Risk Transfer (p. 215)	2/0	S	2.5	W. Schwehr
INSGAME	Insurance Management Game (p. 345)	0/2	S	3	U. Werner

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 completion of the module *Business Administration* [WI1BWL].

Learning Outcomes
See German version.

Content
See German version.

Remarks
The course *Insurance Marketing* [2530323] is offered irregularly. For further information, see: http://insurance.fbv.kit.edu/
This module was formerly named *Insurance Management*.

Module: Topics in Finance I [WI3BWLFBV5]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2530210	Management Accounting (p. 218)	2/1	S	4.5	T. Lüdecke
2530232	Financial Intermediation (p. 183)	3	W	4.5	M. Ruckes
2530550	Derivatives (p. 147)	2/1	S	4.5	M. Uhrig-Homburg
2530296	Exchanges (p. 137)	1	S	1.5	J. Franke
2530299	Business Strategies of Banks (p. 186)	2	W	3	W. Müller
2530570	International Finance (p. 216)	2	S	3	M. Uhrig-Homburg, Walter
2540454	eFinance: Information Engineering and Management for Securities Trading (p. 150)	2/1	W	4.5	R. Riordan
2561129	Specific Aspects in Taxation (p. 325)	3	W	4,5	B. Wigger, A. Bader

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 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 completion of the module *Business Administration* [WI1BWL].
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.

Module: Topics in Finance II [WI3BWLFBV6]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2530210	Management Accounting (p. 218)	2/1	S	4.5	T. Lüdecke
2530232	Financial Intermediation (p. 183)	3	W	4.5	M. Ruckes
2530550	Derivatives (p. 147)	2/1	S	4.5	M. Uhrig-Homburg
2530296	Exchanges (p. 137)	1	S	1.5	J. Franke
2530299	Business Strategies of Banks (p. 186)	2	W	3	W. Müller
2530570	International Finance (p. 216)	2	S	3	M. Uhrig-Homburg, Walter
2540454	eFinance: Information Engineering and Management for Securities Trading (p. 150)	2/1	W	4.5	R. Riordan
2561129	Specific Aspects in Taxation (p. 325)	3	W	4,5	B. Wigger, A. Bader

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 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 completion o the module *Business Administration* [WI1BWL].
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

Module: eBusiness and Service Management [WI3BWLISM1]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2540466	eServices (p. 171)	2/1	S	5	C. Weinhardt, G. Satzger, F. Habryn
2590452	Management of Business Networks (p. 227)	2/1	W	4.5	C. Weinhardt, J. Kraemer
2540454	eFinance: Information Engineering and Management for Securities Trading (p. 150)	2/1	W	4.5	R. Riordan
2540478	Special Topics in Information Engineering & Management (p. 321)	3	W/S	4.5	C. Weinhardt

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
Successful completion of the module *Business Administration* [WI1BWL].

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 tradingprovides theoretically profound and also practical-oriented background about the functioning of international financial markets. The focus is placed on the economic and technical design of markets as information processing systems.
In “eServices” the increasing impact of electronic services compared to the traditional services is outlined. The Information- und Communication Technologies enable the provision of services, which are mainly characterized by interactivity and individuality. This course provides basic knowledge about the development and management of ICT-based servies.
The theortic fundamentals of Information Engineering and Management can be enriched by a practical experience in Special Topics in Information Engineering and Management. Any practical Seminar at the IM can be chosen for the course Special Topics in Information Engineering and Management.

Remarks
All practical Seminars offered at the IM can be chosen for *Special Topics in Information Engineering & Management*. Please update yourself on www.iism.kit.edu/im/lehre

Module: Supply Chain Management [WI3BWLISM2]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2590452	Management of Business Networks (p. 227)	2/1	W	4.5	C. Weinhardt, J. Kraemer
2540496	Management of Business Networks (Introduction) (p. 228)	2	W	3	C. Weinhardt, J. Kraemer
2550486	Facility Location and Strategic Supply Chain Management (p. 327)	2/1	S	4.5	S. Nickel
2118078	Logistics - Organisation, Design, and Control of Logistic Systems (p. 222)	3/1	S	6	K. Furmans
2118090	Quantitative Methods for Supply Chain Risk Management (p. 275)	3/1	W	6	A. Cardeneo
2550488	Tactical and Operational Supply Chain Management (p. 338)	2/1	W	4.5	S. Nickel

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 completion of the module *Business Administration* [WI1BWL].

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.

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

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2540454	eFinance: Information Engineering and Management for Securities Trading (p. 150)	2/1	W	4.5	R. Riordan
2511402	Intelligent Systems in Finance (p. 213)	2/1	S	5	D. Seese
2530550	Derivatives (p. 147)	2/1	S	4.5	M. Uhrig-Homburg
2530296	Exchanges (p. 137)	1	S	1.5	J. Franke
2530570	International Finance (p. 216)	2	S	3	M. Uhrig-Homburg, Walter

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 completion of the module *Business Administration* [WI1BWL].

Learning Outcomes
The students

- are able to understand and analyse the value creation chain in stock broking,
- are able to adequatly 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 addtion the course Derivatives offers an insight into future and forward contracts as well as the assesment of options. Exchanges and International Finance are also alternatives which provide a suplementary understanding for capital markets.
Information management topics are in the focus of the lecture “eFinance: information engineering and management for securities trading”. For the functioning of the international finance markets, it is necessary that there is an efficient information flow. Also, the regulatory frameworks play an important role. In this context, the role and the functioning of (electronic) stock markets, online brokers and other finance intermediaries and their platforms are presented. Not only IT concepts of German finance intermediaries are presented, but also international system approaches will be compared. The lecture is supplemented by speakers from the practice (and excursions, if possible) coming from the Deutsche Börse and the Stuttgart Stock Exchange.

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

Module: CRM and Service Management [WI3BWLISM4]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2540508	Customer Relationship Management (p. 144)	2/1	W	4,5	A. Geyer-Schulz
2540522	Analytical CRM (p. 109)	2/1	S	4,5	A. Geyer-Schulz
2540520	Operative CRM (p. 252)	2/1	W	4,5	A. Geyer-Schulz

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 leture is examined by a written exam (according to Section 4(2), 1 of the examination regulation) and by succcessful completion of exercises (according to Section 4 (2), 3 of the examination regulation).
The grades of the individual lectures consists of the grade of the written exam (approximately 90 percent resp. 100 of 112 points) and of the exercise performance (approximately 10 percent resp. 12 of 112 points). In the case of passing the written exam (50 points) the points of the exercise performance will be added to the points of the written exam. The assessment procedures are described for each course of the module seperately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
Successful completion of the module *Business Administration* [WI1BWL].

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 comapany,
- 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 implmentation 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 loyality, . . .) and for the improvement of services. A requirement for this is the tight integration of operative systems with a data warehouse, the development of customer-oriented and flexible reporting systems, and – last but not least – the application of statistical methods (clustering, regression, stochastic models, . . .).

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

Module: Specialization in Customer Relationship Management [WI3BWLISM5]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2540522	Analytical CRM (p. 109)	2/1	S	4,5	A. Geyer-Schulz
2540520	Operative CRM (p. 252)	2/1	W	4,5	A. Geyer-Schulz
26240	Competition in Networks (p. 368)	2/1	W	4,5	K. Mitusch
2540466	eServices (p. 171)	2/1	S	5	C. Weinhardt, G. Satzger, F. Habryn

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 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 completion of the module *Business Administration* [WI1BWL] is required.
- 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, analsis 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. Regaring 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 loyality, . . .). 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 transfering data from the operative systems into the data warehouse is known as the ETL process (Extraction / Translation / Loading). The process of modelling a data-warehouse as well as the so-called extraction, translation, and loading process for building and maintaining a data-warehouse are discussed in-depth. The data-warehouse serves as a base for flexible management reporting. In addition, various statistic methods (e.g. cluster analysis, regression analysis, stochastic models, . . .) are presented which help in computing suitable key performance indicators or which support decision-making.
Regaring the opervative 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 managament, permission marketing, . . .)
- Customer service processes (sales force management, field services, call center management, . . .)

Module: Sustainable Construction [WI3BWLOOW1]

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

ECTS Credits	Cycle	Duration
9	Every 2nd term, Winter Term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26404w	Design, Construction and Assessment of Green Buildings I (p. 128)	2/1	W	4,5	T. Lützkendorf
2585404/2586404	Sustainability Assessment of Construction Works (p. 129)	2/1	S	4,5	T. Lützkendorf

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2), 1 o. 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 final grade of the module is the average of the grades of each course weighted by the credits and truncated after the first decimal.
It is possible to include the grade of a seminar paper, dealing with a topic from the area of sustainable construction, into the final grade of the module (according to Section 4(2), 3 of the examination regulation). The seminar has a weight of 20 percent.

Conditions
Successful completion o the module *Business Administration* [WI1BWL].

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.

Module: Real Estate Management [WI3BWLOOW2]

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

ECTS Credits	Cycle	Duration
9	Every 2nd term, Winter Term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26400w	Real Estate Management I (p. 277)	2/2	W	4,5	T. Lützkendorf
2585400/2586400	Real Estate Management II (p. 278)	2/2	S	4,5	T. Lützkendorf

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2), 1 o. 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 of each course weighted by the credits and truncated after the first decimal.
The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (REM I and REM II) happen in the same semester in which the lectures take place. Therefore, REM I exams currently only take place in the winter semester and REM II exams take place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.
It is possible to include the grade of a seminar paper, dealing with a topic from the area of sustainable construction, into the final grade of the module (according to Section 4(2), 3 of the examination regulation). The seminar has a weight of 20 percent.

Conditions
Successful completion of the module *Business Administration* [WI1BWL].

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.

Module: Foundations of Marketing [WI3BWLMAR]

Coordination: Bruno Neibecker
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2572177	Brand Management (p. 230)	2/1	W	4.5	B. Neibecker

Learning Control / Examinations
The assessment consists of a general written exam according to §4 Abs. 2, Nr. 1 of examination regulation. The written exam has a duration of 120 min. and contains topics from the main lecture [2572150] as well as from the chosen lectures [2571154], [2571156], [2572177]. The examination is offered every semester. Re-examinations are offered at every ordinary examination date and has to be absolved within one year.
The overall grade for the module is the average of the grades for each course weighted by the credits of the course.
It is recommended, to attend more lectures than required to fulfill 9 CP as it is possible to examine in these additional lecutres and influence the final grade positively.

Conditions
Successful completion of the module *Business Administration* [WI1BWL].

Learning Outcomes

Content

6.2 Economics

Module: International Economics [WI3VWL3]

Coordination: Jan Kowalski
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Economics

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2560254	International Economic Policy (p. 217)	2/1	S	5	J. Kowalski
2560259	Managenment and Organisation of Projects in Developing Countries (p. 229)	2/1	W	5	N. Sieber
2561252	International Economics (p. 120)	2/1	W	4,5	J. Kowalski

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 offerd at every ordinary examination date. The assessment procedures are described for each course of the module seperately.
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.
Note the changes in course offering under "remarks".

Conditions
Successful completion of the module *Economics* [WW1VWL].

Learning Outcomes
The students

- obtain comprehensive knowledge on open global economy
- becom experts in dealing with the complex world-wide markest, and are able to react to the challenges of the global economy

Content
Problems of the internationalisation of economic activities, European institutions and programs, as well as questions of the less developed contries and development policy.

Remarks
The module is not offered any more. Please see German version for details.

Module: Economic Policy I [WI3VWL8]

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

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2561252	International Economics (p. 120)	2/1	W	4,5	J. Kowalski
26240	Competition in Networks (p. 368)	2/1	W	4,5	K. Mitusch
2560280	Basic Principles of Economic Policy (p. 156)	2/1	S	4,5	I. Ott

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 offerd at every ordinary examination date. The assessment procedures are described for each course of the module seperately.
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
The course “Basic Principles of Economic Policy” is compulsory and must be examined.

Recommendations
Prior attendance of the basic courses “Microeconomics” and “Macroeconomics” is required.

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

Remarks
The module is added in SS 2011 and replaces the module International Economics [WI3VWL3].

Module: Microeconomic Theory [WI3VWL6]

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

ECTS Credits	Cycle	Duration
9	Every 2nd term, Summer Term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2520527	Advanced Topics in Economic Theory (p. 102)	2/1	S	4.5	C. Puppe, M. Hillebrand, K. Mitusch
2520517	Welfare Economics (p. 371)	2/1	S	4.5	C. Puppe
2520525	Game Theory I (p. 326)	2/2	S	4.5	N.N.
26240	Competition in Networks (p. 368)	2/1	W	4,5	K. Mitusch

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 seperately.
The overall grade of the 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, there might be taken optional term paper in the field of economics (ie, on the chairs Puppel, or at Berninghaus resp. at the IWW) within the module (according to Section 4(2), 3 of the examination regulation). The submission of the term paper is only admitted until the end of the following semester in which the last exam of the Economics-Module was absolved. It does not apply for term papers which are already taken in the Seminar Module. For more information, please visit the homepage of the Chair (http://vwl1.ets.kit.edu/).

Conditions
Successful completion of the module *Economics* [WW1VWL].

Learning Outcomes

Content

Module: Macroeconomic Theory [WI3VWL8]

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

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2520543	Theory of Economic Growth (p. 355)	2/1	S	4,5	M. Hillebrand
25549	Theory of Business Cycles (p. 220)	2/1	W	4.5	M. Hillebrand

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 seperately.
The overall grade of the 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, there might be taken optional term paper in the field of economics (ie, on the chairs Puppel, or at Berninghaus resp. at the IWW) within the module (according to Section 4(2), 3 of the examination regulation). The submission of the term paper is only admitted until the end of the following semester in which the last exam of the Economics-Module was absolved. It does not apply for term papers which are already taken in the Seminar Module. For more information, please visit the homepage of the Chair (http://vwl1.ets.kit.edu/).

Conditions
Successful completion of the module *Economics* [WW1VWL].

Recommendations
Grundlegende mikro- und makroökonomische Kenntnisse, wie sie beispielsweise in den Veranstaltungen *Volkswirtschaftslehre I (Mikroökonomie)* [2600012] und *Volkswirtschaftslehre II (Makroökonomie)* [2600014] vermittelt werden, werden vorausgesetzt. Aufgrund der inhaltlichen Ausrichtung der Veranstaltung wird ein Interesse an quantitativ-mathematischer Modellierung vorausgesetzt.

Learning Outcomes

Content

Module: Public Finance [WI3VWL9]

Coordination: Berthold Wigger
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Economics

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2560120	Public Revenues (p. 249)	2/1	S	4,5	B. Wigger, Assistenten
2561129	Specific Aspects in Taxation (p. 325)	3	W	4,5	B. Wigger, A. Bader

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 offerd at every ordinary examination date. The assessment procedures are described for each course of the module seperately.
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 completion of the module *Economics* [WW1VWL].

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

Learning Outcomes

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.

6.3 Statistics

Module: Statistical Applications of Financial Risk Management [WI3STAT]

Coordination: Markus Höchstötter
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Statistics

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2521325	Statistics and Econometrics in Business and Economics (p. 328)	2/2	W	4.5	W. Heller
2520016	Economics III: Introduction in Econometrics (p. 354)	2/2	S	5	M. Höchstötter
2520355	Bank Management and Financial Markets, Applied Econometrics (p. 126)	2/2	S	5	K. Vollmer
2520375	Data Mining (p. 145)	2	W	5	G. Nakhaeizadeh

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 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 completion of the module Statistics [WI1STAT].

Learning Outcomes

Content

Remarks
The course Bank Management and Financial Markets, Applied Econometrics [2520355] will not be offered any more from summer term 2013 on. The examination will be offered latest until summer term 2012.
The course Economics III: Introduction in Econometrics [2520016] will not be offered any more from summer term 2013 on. The examination will be offered latest until summer term 2012.

6.4 Informatics

Module: Emphasis Informatics [WI3INFO1]

Coordination: Hartmut Schmeck, Andreas Oberweis, Detlef Seese, Rudi Studer, Stefan Tai
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Informatics

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2511020	Advanced Programming - Java Network Programming (p. 266)	2/1/2	S	5	D. Seese, D. Ratz
2540886/2590886	Advanced Programming - Application of Business Software (p. 267)	2/1/2	W	5	A. Oberweis, S. Klink
2511030	Applied Informatics I - Modelling (p. 111)	2/1	W	5	A. Oberweis, R. Studer, S. Agarwal
2511032	Applied Informatics II - IT Systems for e-Commerce (p. 112)	2/1	S	5	S. Tai
2511102	Algorithms for Internet Applications (p. 103)	2/1	W	5	H. Schmeck
2511300	Knowledge Management (p. 370)	2/1	W	5	R. Studer
2511400	Complexity Management (p. 141)	2/1	S	5	D. Seese
2511206	Software Engineering (p. 318)	2/1	S	5	A. Oberweis, D. Seese
2511100	Efficient Algorithms (p. 148)	2/1	S	5	H. Schmeck
2511500	Service Oriented Computing 1 (p. 311)	2/1	W	5	S. Tai
Platzhalter	Special Topics of Applied Informatics (p. 322)	2/1	W/S	5	A. Oberweis, H. Schmeck, D. Seese, R. Studer, S. Tai

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 singled partial exam the respective minimum requirements has to be achieved.

- Partial exam I: *Advanced Programming - Java Network Programming* [25889] or alternativly *Advanced Programming - Application of Business Software* [2540886/2590886]
- 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 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
Either the course *Advanced Programming - Java Network Programming* [25889] or the course *Advanced Programming - Application of Business Software* [2540886/2590886] has to be attended. Only one of the two courses can be taken.

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

Module: Electives in Informatic [WI3INFO2]

Coordination: Hartmut Schmeck, Andreas Oberweis, Detlef Seese, Stefan Tai, Rudi Studer
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Informatics

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2511030	Applied Informatics I - Modelling (p. 111)	2/1	W	5	A. Oberweis, R. Studer, S. Agarwal
2511032	Applied Informatics II - IT Systems for e-Commerce (p. 112)	2/1	S	5	S. Tai
2511102	Algorithms for Internet Applications (p. 103)	2/1	W	5	H. Schmeck
2511100	Efficient Algorithms (p. 148)	2/1	S	5	H. Schmeck
2511200	Database Systems (p. 146)	2/1	S	5	A. Oberweis, Dr. D. Sommer
2511400	Complexity Management (p. 141)	2/1	S	5	D. Seese
2511402	Intelligent Systems in Finance (p. 213)	2/1	S	5	D. Seese
2511206	Software Engineering (p. 318)	2/1	S	5	A. Oberweis, D. Seese
2511300	Knowledge Management (p. 370)	2/1	W	5	R. Studer
2511304	Semantic Web Technologies I (p. 282)	2/1	W	5	R. Studer, S. Rudolph, E. Simperl
2511500	Service Oriented Computing 1 (p. 311)	2/1	W	5	S. Tai
Platzhalter	Special Topics of Applied Informatics (p. 322)	2/1	W/S	5	A. Oberweis, H. Schmeck, D. Seese, R. Studer, S. Tai

Learning Control / Examinations
The assessment is carried out as two partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.
The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.
When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
None.

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

6.5 Operations Research

Module: Applications of Operations Research [WI3OR5]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2550486	Facility Location and Strategic Supply Chain Management (p. 327)	2/1	S	4.5	S. Nickel
2550488	Tactical and Operational Supply Chain Management (p. 338)	2/1	W	4.5	S. Nickel
2550490	Software Laboratory: OR Models I (p. 319)	1/2	W	4.5	S. Nickel
2550134	Global Optimization I (p. 187)	2/1	W	4.5	O. Stein
2550662	Simulation I (p. 315)	2/1/2	W	4.5	K. Waldmann

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 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
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.

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 service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.
This module considers several areas of Supply Chain Management. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities like production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of Supply Chain Management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints.
Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Management, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

Remarks
The planned lectures and courses for the next three years are announced online.

Module: Methodical Foundations of OR [WI3OR6]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2550111	Nonlinear Optimization I (p. 247)	2/1	S	4.5	O. Stein
2550113	Nonlinear Optimization II (p. 248)	2/1	S	4.5	O. Stein
2550134	Global Optimization I (p. 187)	2/1	W	4.5	O. Stein
2550136	Global Optimization II (p. 188)	2/1	W	4.5	O. Stein
2550486	Facility Location and Strategic Supply Chain Management (p. 327)	2/1	S	4.5	S. Nickel
2550679	Markov Decision Models I (p. 332)	2/1/2	W	5	K. Waldmann

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 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
At least one of the lectures *Nonlinear Optimization I* [2550111] and *Global Optimization I* [2550134] has to be examined.

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.

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: Karl-Heinz Waldmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Operations Research

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2550679	Markov Decision Models I (p. 332)	2/1/2	W	5	K. Waldmann
2550662	Simulation I (p. 315)	2/1/2	W	4.5	K. Waldmann
2550665	Simulation II (p. 316)	2/1/2	S	4.5	K. Waldmann
2550111	Nonlinear Optimization I (p. 247)	2/1	S	4.5	O. Stein
2550488	Tactical and Operational Supply Chain Management (p. 338)	2/1	W	4.5	S. Nickel

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 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
None.

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:
Stochastic Decision Models I: Markov Chains, Poisson Processes.
Simulation I: Generation of random numbers, Monte Carlo integration, Discrete event simulation, Discrete and continuous random variables, Statistical analysis of simulated data.
Simulation II: Variance reduction techniques, Simulation of stochastic processes, Case studies.

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

6.6 Engineering Sciences

Module: Introduction to Technical Logistics [WI3INGMB13]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2117051	Material Flow in Logistic Systems (p. 231)	3/1	W	6	K. Furmans
2118097	Warehouse and Distribution Systems (p. 221)	2	S	4	M. Schwab, J. Weiblen
2117056	Airport Logistics (p. 226)	2	W	4	A. Richter
2118085	Automotive Logistics (p. 224)	2	S	4	K. Furmans
2118089	Industrial Application of Material Handling Systems in Sorting and Distribution Systems (p. 113)	2	S	4	J. Föller
2118094	Information Systems and Supply Chain Management (p. 208)	2	S	4	C. Kilger
2117500	Energy efficient intralogistic systems (p. 165)	2	W	4	F. Schönung
2117095	basics of technical logistics (p. 197)	3/1	W	4	M. Mittwollen, V. Madzharov
2117096	elements and systems of technical logistics (p. 164)	3/1	W	6	M. Mittwollen, V. Madzharov

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 completion of the engineering modules of the core programm.

Learning Outcomes
The student aquires

- 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.

Remarks
The courses *Basics of Technical Logistics* and *Elements and Systems of Technical Logistics* are new in WS 2011/12 and are enhanced in content against the former course *Technische Logistik I* [2117081 and 2117082] (not longer available).

Module: Automotive Engineering [WI3INGMB5]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2113805	Basics of Automotive Engineering I (p. 189)	4	W	6	F. Gauterin, Unrau
2114835	Basics of Automotive Engineering II (p. 190)	2	S	3	F. Gauterin, Unrau
2115817	Project Workshop-Automative Engineering (p. 268)	3	W/S	4.5	F. Gauterin
2113814	Fundamentals for Design of Motor-Vehicle Bodies I (p. 200)	1	W	1.5	Bardehle
2114840	Fundamentals for Design of Motor-Vehicle Bodies II (p. 201)	1	S	1.5	Bardehle
2114093	Fluid Power Systems (p. 184)	2	W	3	M. Geimer
2114092	CAN-Bus Release Control (p. 139)	2	S	3	M. Geimer

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 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 completion of the engineering modules of the core programm.

Recommendations
Knowledge of the content of the courses *Engineering Mechanics I* [2161208], *Engineering Mechanics II* [8001092] and *Basics of Automotive Engineering I* [2113805], *Basics of Automotive Engineering II* [2114835] is helpful.

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

Module: Handling Characteristics of Motor Vehicles [WI3INGMB6]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2113806	Vehicle Comfort and Acoustics I (p. 176)	2	W	3	F. Gauterin
2114825	Vehicle Comfort and Acoustics II (p. 177)	2	S	3	F. Gauterin
2113807	Handling Characteristics of Motor Vehicles I (p. 173)	2	W	3	H. Unrau
2114838	Handling Characteristics of Motor Vehicles II (p. 174)	2	S	3	H. Unrau
2115817	Project Workshop-Automative Engineering (p. 268)	3	W/S	4.5	F. Gauterin
2113816	Vehicle Mechatronics I (p. 175)	2	W	3	Ammon
21850	Driving Dynamics Evaluation within the Global Vehicle Simulation (p. 172)	2/0	S	3	Schick

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 completion of the engineering modules of the core programm.

Recommendations
Knowledge of the content of the courses *Engineering Mechanics I* [2161208], *Engineering Mechanics II* [2162226] and *Basics of Automotive Engineering I* [2113805], *Basics of Automotive Engineering II* [2114835] is helpful.

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

Module: Vehicle Development [WI3INGMB14]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2115817	Project Workshop-Automative Engineering (p. 268)	3	W/S	4.5	F. Gauterin
2113816	Vehicle Mechatronics I (p. 175)	2	W	3	Ammon
21812	Fundamentals in the Development of Commercial Vehicles I (p. 202)	1	W	1.5	Zürn
21844	Fundamentals in the Development of Commercial Vehicles II (p. 203)	1	S	1.5	Zürn
21810	Fundamentals in the Development of Passenger Vehicles I (p. 204)	1	W	1.5	Frech
21842	Fundamentals in the Development of Passenger Vehicles II (p. 205)	1	S	1.5	Frech
2114843	Basics and Methods for Integration of Tires and Vehicles (p. 199)	2	S	3	Leister
2114095	Simulation of coupled systems (p. 314)	2	S	3	M. Geimer

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 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 completion of the engineering modules of the core programm.

Recommendations
Knowledge of the content of the courses *Engineering Mechanics I* [2161208], *Engineering Mechanics II* [2162226] and *Basics of Automotive Engineering I* [2113805], *Basics of Automotive Engineering II* [2114835] is helpful.

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

Module: Mobile Machines [WI3INGMB15]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2114093	Fluid Power Systems (p. 184)	2	W	3	M. Geimer
2114095	Simulation of coupled systems (p. 314)	2	S	3	M. Geimer
2114092	CAN-Bus Release Control (p. 139)	2	S	3	M. Geimer
2113073	Mobile Machines (p. 241)	4	W	6	M. Geimer
21812	Fundamentals in the Development of Commercial Vehicles I (p. 202)	1	W	1.5	Zürn
21844	Fundamentals in the Development of Commercial Vehicles II (p. 203)	1	S	1.5	Zürn

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 seperately.

Conditions
Successful completion of the engineering modules of the core programm.

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.

Module: Rail System Technology [WI3INGMB25]

Coordination: Peter Gratzfeld
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every 2nd term, Winter Term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2115919	Rail System Technology (p. 125)	2	W/S	3	P. Gratzfeld
2115995	Project Management in Rail Industry (p. 270)	2	W	3	P. Gratzfeld
2115996	Rail Vehicle Technology (p. 281)	2	W/S	3	P. Gratzfeld

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

Conditions
Successful completion of the engineering modules of the core programm.

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)

Module: Combustion Engines [WI3INGMB16]

Coordination: Heiko Kubach
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2133101	Combustion Engines A (p. 346)	4/2	W	9	Spicher
2134135	Combustion Engines B (p. 347)	2/1	S	5	Spicher
2134137	Engine Measurement Technologies (p. 243)	2	S	4	Bernhardt
21112	Supercharging of Internal Combustion Engines (p. 118)	2	S	4	Golloch
21114	Simulation of Spray and Mixture Formation in Internal Combustion Engines (p. 317)	2	W	4	Baumgarten
21134	Methods in Analyzing Internal Combustion (p. 238)	2	S	4	Wagner
2133109	Motor Fuels for Combustion Engines and their Verifications (p. 132)	2	W	4	Volz

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 seperately.
The overall grade of the module is the weighted average of the grades for each course and truncated after the first decimal.
The weighting factors are:

- *Combustion Engines A* [2133101]: 6
- *Combustion Engines B* [2134135]: 4
- all the rest: 3

Conditions
Successful completion of the engineering modules of the core programme.
The course *Combustion Engines A [2133101]* is obligatory.

Recommendations
Knowledge in the area of thermodynamics is helpful.

Learning Outcomes

Content

Module: Combustion Engines I [WI3INGMB18]

Coordination: Heiko Kubach
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2133101	Combustion Engines A (p. 346)	4/2	W	9	Spicher

Learning Control / Examinations
The assessment of the module is carried out by a written examination about the lecture *Combustion Engines A* [2133101] (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

Content

Module: Combustion Engines II [WI3INGMB19]

Coordination: Heiko Kubach
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2134135	Combustion Engines B (p. 347)	2/1	S	5	Spicher
21112	Supercharging of Internal Combustion Engines (p. 118)	2	S	4	Golloch
2133109	Motor Fuels for Combustion Engines and their Verifications (p. 132)	2	W	4	Volz
2134138	Internal Combustion Engines and Exhaust Gas Aftertreatment Technology (p. 193)	2	S	4	Lox
21134	Methods in Analyzing Internal Combustion (p. 238)	2	S	4	Wagner
2134137	Engine Measurement Technologies (p. 243)	2	S	4	Bernhardt
21114	Simulation of Spray and Mixture Formation in Internal Combustion Engines (p. 317)	2	W	4	Baumgarten

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 seperately.
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* [WI3INGMB18]. The module is passed only after the final partial exam of *Combustion Engines I* is additionally passed.
The course *Combustion Engines B* [2134135] has to be attended.

Recommendations
Basic skills in the subject of Thermodynamics are recommended.

Learning Outcomes

Content

Module: Engine Development [WI3INGMB17]

Coordination: Heiko Kubach
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
18	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2133101	Combustion Engines A (p. 346)	4/2	W	9	Spicher
2134135	Combustion Engines B (p. 347)	2/1	S	5	Spicher
21112	Supercharging of Internal Combustion Engines (p. 118)	2	S	4	Golloch
21114	Simulation of Spray and Mixture Formation in Internal Combustion Engines (p. 317)	2	W	4	Baumgarten
21134	Methods in Analyzing Internal Combustion (p. 238)	2	S	4	Wagner
2133109	Motor Fuels for Combustion Engines and their Verifications (p. 132)	2	W	4	Volz
2134138	Internal Combustion Engines and Exhaust Gas Aftertreatment Technology (p. 193)	2	S	4	Lox
2134137	Engine Measurement Technologies (p. 243)	2	S	4	Bernhardt

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 seperately.
The overall grade of the module is the weighted average of the grades for each course and truncated after the first decimal.
The weighting factors are:

- *Combustion Engines A* [21101]: 6
- *Combustion Engines B* [21135]: 4
- all the rest: 3

Conditions
Successful completion of the engineering modules of the core programme.
The courses *Combustion Engines A [21101]* and *Combustion Engines B [21135]* are obligatory and have to be attended.

Recommendations
Knowledge in the area of thermodynamics is helpful.

Learning Outcomes

Content

Module: Production Engineering I [WI3INGMB10]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2149657	Manufacturing Engineering (p. 181)	4/1	W	9	V. Schulze
2150660	Integrated Production Planning (p. 212)	4/2	S	9	Lanza, Gisela
2149901	Machine Tools and Industrial Handling II (p. 367)	2/1	W	4,5	Munzinger

Learning Control / Examinations
Module exams take the form of written examinations (as per §4(2), 1 SPO [study and examination regulations]) about the different lectures and seminars of the module. Exams can be taken each semester during the lecture-free period and can be retaken at every official examination date. Performance assessments will be completed for every lecture and seminar of the module. The overall grade will be created from the grades of the partial examinations weighted with the respective CPs. Optionally, the module grade can be improved by writing a seminar paper (as per §4(2), 3 SPO [study and examination regulations]) at wbk Institute of Production Science

Conditions
Prerequisites for admission to examination:

- *Manufacturing Technology* [2149657]: Successfull Completion of the modules *Material Science* [WI1ING2] and *Engineering Mechanics* [WI1ING3]
- *Integrated Production Planning* [2150660]: None.
- *Machine Tools 1 and 2* [2149900 and 2149901]: Successful completion of the module *Electrical Engineering* [WI1ING4].

Learning Outcomes
The student

- knows and understands the content covered by the selected lectures and seminars of the module *Production Engineering I* (manufacturing engineering, organisation and planning, machine tools and robots),
- is able to use that knowledge in a targeted way for an efficient production engineering in the selected area.

Content
This module from the field of engineering science covers the basic aspects of production engineering, including one of the three subject areas manufacturing engineering, machine tool and handling technology and organisation and planning. For the module *Production Engineering I*, one subject area is required.

Module: Production Engineering II [WI3INGMB4]

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

ECTS Credits	Cycle	Duration
18	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2149657	Manufacturing Engineering (p. 181)	4/1	W	9	V. Schulze
2150660	Integrated Production Planning (p. 212)	4/2	S	9	Lanza, Gisela
2149901	Machine Tools and Industrial Handling II (p. 367)	2/1	W	4,5	Munzinger

Learning Control / Examinations
Module exams take the form of written examinations (as per §4(2), 1 SPO [study and examination regulations]) about the different lectures and seminars of the module. Exams can be taken each semester during the lecture-free period and can be retaken at every official examination date. Performance assessments will be completed for every lecture and seminar of the module. The overall grade will be created from the grades of the partial examinations weighted with the respective CPs. Optionally, the module grade can be improved by writing a seminar paper (as per §4(2), 3 SPO [study and examination regulations]) at wbk Institute of Production Science.

Conditions
Prerequisites for admission to examination:

- *Manufacturing Technology* [21657]: Successfull Completion of the modules *Material Science* [WI1ING2] and *Engineering Mechanics* [WI1ING3]
- *Integrated Production Planning* [21660]: None.
- *Machine Tools 1 and 2* [2149900 and 2149901]: Successful completion of the module *Electrical Engineering* [WI1ING4].

Learning Outcomes
The student

- knows and understands the content covered by the selected lectures and seminars of the module *Production Engineering II* (manufacturing engineering, organisation and planning, machine tools and robots),
- is able to use that knowledge in a targeted way for an efficient production engineering in the selected areas.

Content
This module from the field of engineering science covers the basic aspects of production engineering, including two of the three subject areas manufacturing engineering, machine tool and handling technology and organisation and planning. For the *Production Engineering II* module two subject areas are required.

Module: Production Engineering III [WI3INGMB7]

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

ECTS Credits	Cycle	Duration
27	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2149657	Manufacturing Engineering (p. 181)	4/1	W	9	V. Schulze
2150660	Integrated Production Planning (p. 212)	4/2	S	9	Lanza, Gisela
2149901	Machine Tools and Industrial Handling II (p. 367)	2/1	W	4,5	Munzinger

Learning Control / Examinations
Module exams take the form of written examinations (as per §4(2), 1 SPO [study and examination regulations]) about the different lectures and seminars of the module. Exams can be taken each semester during the lecture-free period and can be retaken at every official examination date. Performance assessments will be completed for every lecture and seminar of the module. The overall grade will be created from the grades of the partial examinations weighted with the respective CPs. Optionally, the module grade can be improved by writing a seminar paper (as per §4(2), 3 SPO [study and examination regulations]) at wbk Institute of Production Science.

Conditions
Admission requirements for the module examinations:

- *Manufacturing Engineering* [21657]: Successful completion of modules *Materials Science* [WI1ING2] and *Engineering Mechanics* [WI1ING3]
- *Integrated Production Plannning* [21660]: None.
- *Machine Tools 1 and 2* [2149900 and 2149901]: Successful completion of the module *Electrical Engineering* [WI1ING4].

Learning Outcomes
The student

- knows and understands the content covered by the lectures and seminars of the module (manufacturing engineering, organisation and planning, machine tools and robots),
- is able to use that knowledge in a targeted way for an efficient production engineering.

Content
This module from the field of engineering science covers the basic aspects of production engineering, including manufacturing engineering, machine tools and handling technology and organisation and planning. For the module *Production Engineering III* all three subject areas are required.

Module: Manufacturing Engineering [WI3INGMB23]

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

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2149657	Manufacturing Engineering (p. 181)	4/1	W	9	V. Schulze

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.
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 the wbk. The term paper may not be convalidated in the seminar module.

Conditions
None.

Learning Outcomes

Content

Remarks
New module in winter term 2010/11.

Module: Specialization in Production Engineering [WI3INGMB22]

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

ECTS Credits	Cycle	Duration
9	Every term	

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2149667	Quality Management (p. 274)	2	W	4	Lanza, Gisela
2149669	Materials and Processes in Automotive Lightweight Construction (p. 232)	2	W	4	Haepp
2150681	Metal Forming (p. 342)	2	S	4	Herlan
2150683	Instrumentation and Control Technologies for Production Systems (p. 331)	2	S	4	Gönnheimer
2149655	Gear Cutting Technology (p. 351)	2	W	4	Felten
2149904	Automated Production Line (p. 123)	2	S	4	J. Fleischer

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.
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
It is only possible to choose this module in combination with the module *Manufacturing Engineering* [WI3INGMB23] **or**/**and** *Integrated Production Planning* [WI3INGMB24] **or**/**and** *Werkzeugmaschinen und Handhabungstechnik* [WI3INGMB32]. The module is passed only after the final partial exam of one of the above modules is additionally passed.

Learning Outcomes

Content

Remarks
New module in winter term 2010/11.

Module: Integrated Production Planning [WI3INGMB24]

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

ECTS Credits	Cycle	Duration
9	Every 2nd term, Summer Term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2150660	Integrated Production Planning (p. 212)	4/2	S	9	Lanza, Gisela

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.
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
None.

Learning Outcomes

Content

Remarks
New module in winter term 2010/11.

Module: Machine Tools an Industrial Handling [WI3INGMB32]

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

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2149902	Machine Tools an Industrial Handling (p. 366)	4/2	W	9	J. Fleischer

Learning Control / Examinations
The assessment is carried out as written exam of 120 min (according to Section 4(2),1 of the examination regulation) of the course of this module. The assessment procedures are described for each course of the module seperately. The overall grade of the module is the grade for the written exam. 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
None.

Learning Outcomes
The student

- has knowledge about the application of machine tools.
- comprehends the assembly and the operation purpose of the major components of a machine tool.
- is able to apply methods of selection and assessment of production machines to new tasks.
- is able to assess the dimensioning of a machine tool.

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.

Remarks
The module is new in winter term 2011/12.

Module: Emphasis in Fundamentals of Engineering [WI3INGMB8]

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

ECTS Credits	Cycle	Duration
9	Every 2nd term, Summer Term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2162226	Engineering Mechanics II (p. 340)	2/1	S	5	C. Proppe
23224	Electrical Engineering II (p. 163)	2/1	S	5	W. Menesklou
2126782	Material Science II for Business Engineers (p. 364)	2/1	S	5	M. Hoffmann

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 seperately.
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
The corresponding course of the fundamental studies to each course in this module has to be completed succesfully.

Learning Outcomes
The learning objectives are given in the individual descriptions of the courses.

Content

Remarks
The course *Material Science II for Business Engineers* [2126782] remains in this module. The credits for all lectures of this module have been changed from 4,5 to 5 CP.

Module: Emphasis Material Science [WI3INGMB9]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2178643	Constitution and Properties of Wear Resistant Materials (p. 117)	2	S	4	Ulrich
2125755	Introduction in Ceramics (p. 155)	2	W	4	M. Hoffmann
2126775	Structural and Functional Ceramics (p. 335)	2	S	4	M. Hoffmann
2174576	Systematic Selection of Materials (p. 336)	2/1	S	5	Wanner
2181612	Physical Basics of Laser Technology (p. 257)	2/1	W	5	Schneider
2173590	Polymerengineering I (p. 258)	2	W	4	P. Elsner
2174596	Polymerengineering II (p. 259)	2	S	4	P. Elsner
21715	Failure of Structural Materials: Fatigue and Creep (p. 349)	2	W	4	Gruber
21711	Failure of Structural Materials: Deformation and Fracture (p. 350)	2	W	4	Weygand
2174574	Materials of Leightweight Construction (p. 362)	2	S	4	Weidenmann
2173553	Material Science and Engineering III (p. 365)	4/1	W	6	Wanner
2126749	High Performance Powder Metallurgy Materials (p. 273)	2	S	4	R. Oberacker
2126782	Material Science II for Business Engineers (p. 364)	2/1	S	5	M. Hoffmann

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 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
The course *Material Science I* [2125760] has to be completed successfully.

Recommendations
It is recommended to have natural science basic knowledge.

Learning Outcomes
The student understands and could explain

- microstructure property relationships for the most relevant material classes
- is able to select propriate materials with respect to given technical applications

Content

Module: Product Lifecycle Management [WI3INGMB21]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2121350	Product Lifecycle Management (p. 263)	3/1	W	6	J. Ovtcharova
2121366	Product Lifecycle Management in the Manufacturing Industry (p. 264)	2/0	W	4	G. Meier
2122387	Computer Integrated Planning of New Products (p. 279)	2/0	S	4	R. Kläger
2122371	Efficient Creativity - Processes and Methods within the Automotive Industry (p. 149)	2	S	4	Lamberti

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 seperately.
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
Successful completion of the engineering modules of the core programm.

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.

Module: Microsystem Technology [WI3INGMBIMT1]

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

ECTS Credits	Cycle	Duration
9		

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2141861	Basics of microsystemtechnology I (p. 194)	2	W	3	A. Last
2142874	Basics of microsystem technology II (p. 195)	2	S	3	A. Last
2143875	Practical training in basics of microsystem technology (p. 260)		W/S	3	A. Last
2142890 / 2142891	Physics for Engineers (p. 256)	2/2	S	6	P. Gumbsch, A. Nesterov-Müller, D. Weygand, A. Last
2143892	Selected Topics of Optics and Microoptics for mechanical engineers (p. 119)	2	W/S	3	T. Mappes
2142883	BioMEMS II (Microsystem Technology for Life-Sciences and Medicine; part II) (p. 134)	2	S	3	A. Guber
2142879	BioMEMS III (Microsystem Technology for Life-Sciences and Medicine; part III) (p. 135)	2	S	3	A. Guber
2142881	Microactuation (p. 240)	2	S	3	M. Kohl
2143500	Chemical, physical and material science aspects of plastics in the micro technology (p. 140)	2	W/S	3	M. Worgull, D. Häringer, H. Moritz
2141865	Novel Actuators and Sensors (p. 246)	2	W	3	M. Kohl, M. Sommer
2143876	Nanotechnology with clusters (p. 244)	2	W	3	J. Gspann
	Bionics for Engineers and Natural Scientists (p. 136)	2	S	3	H. Hölscher, S. Walheim
23486 / 23487	Optoelectronic Components (p. 254)	2 / 1	S	4,5	W. Freude

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
This module cannot be combined with the module Microsystem Technology in the Master studies.
The course Basics of microsystemtechnology I [2141861] is compulsory and must be examined.

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.

Remarks
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.

Module: Electrical Power Engineering [WI3INGETIT1]

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

ECTS Credits	Cycle	Duration
18	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
23391/23393	Systems for Electrical Energy (p. 160)	2/1	S	4,5	T. Leibfried
23371/23373	Power Network Analysis (p. 131)	2/2	W	6	T. Leibfried
23356	Energy Generation (p. 170)	2/0	W	3	B. Hoferer
23390	Power Transformations (p. 116)	2	S	3	Schäfer
23382	Technique of Electrical Installation (p. 159)	2	S	3	Kühner
23396	Automation of Power Grids (p. 121)	2/0	S	3	Eichler

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
The engineering science modules of the fundamental studies have to be completed successfully.

Learning Outcomes
The student

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

Remarks
The course *Power Network Analysis* was formerly known as *Electric Power System Engineering I.*
The module is not offered any more. Please see German version for details.

Module: Power Networks [WI3INGETIT3]

Coordination: Thomas Leibfried, Bernd Hoferer
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject:

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
23391/23393	Systems for Electrical Energy (p. 160)	2/1	S	4,5	T. Leibfried
23371/23373	Power Network Analysis (p. 131)	2/2	W	6	T. Leibfried

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
The engineering science modules of the fundamental studies have to be completed successfully.

Learning Outcomes
The student

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

Remarks
The module is new in winter term 2010/11 and replaces the former module *Electrical Power* [WI3INGETIT1].
Credits of the course *Power Network Analysis* have been changed to 6.

Module: Energy Generation and Network Components [WI3INGETIT4]

Coordination: Thomas Leibfried, Bernd Hoferer
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject:

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
23356	Energy Generation (p. 170)	2/0	W	3	B. Hoferer
23390	Power Transformations (p. 116)	2	S	3	Schäfer
23382	Technique of Electrical Installation (p. 159)	2	S	3	Kühner
23396	Automation of Power Grids (p. 121)	2/0	S	3	Eichler

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.

Learning Outcomes
The student

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

Remarks
The module is new in winter term 2010/11 and replaces parts of the former module *Electrical Power* [WI3INGETIT1].

Module: Control Engineering [WI3INGETIT2]

Coordination: Mathias Kluwe
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every 2nd term, Summer Term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
23155	System Dynamics and Control Engineering (p. 337)	2/1	S	4.5	S. Hohmann
23168	Modelling and Identification (p. 242)	2/1	S	4.5	S. Hohmann

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
The engineering science modules of the fundamental studies have to be completed successfully.
The courses are to be attended in the following sequence:

1. *System Dynamics and Control Engineering* [23155]
2. *Modelling and Identification* [23168]

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.

Remarks
The cycle for the lecture *System Dynamics and Control Engineering [23155]* has been changed from winterterm into summerterm.

Module: Fundamentals of Spatial and Infrastructural Development [WI3INGBGU1]

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

ECTS Credits	Cycle	Duration
9	Every 2nd term, Summer Term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
19027	Transportation Planning and Traffic Engineering Basics (p. 348)	2/0	S	3	P. Vortisch, B. Chlond
19026	Design Basics in Highway Engineering (p. 130)	1/1	S	3	R. Roos
19028	Spatial Planning and Planning Law (p. 276)	1/1	S	3	D. Engelke, Heberling

Learning Control / Examinations
The assessment of the module is carried out as a general written examination (120 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 examinationgrade an additional oral examination (according to §4(2), 2 of the examination regulation) is offered in the same examination periode.
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 completion of the engineering modules of the core programm.

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

Module: Foundations of Guided Systems [WI3INGBGU2]

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

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
19066	Basics of Ground Born Guided Systems (p. 198)	3/1	S	6	M. Weigel
19306	Railway Logistics, Management and Operating - Part I (p. 158)	2	W	3	E. Hohnecker

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
The engineering science modules of the fundamental studies have to be completed successfully.

Recommendations
It is recommended to choose the Master-module *Logistics and Management of Guided Systems* [WW4INGBGU7] or the Bachelor-Module *Foundations of Guided Systems* [WI3INGBGU2].

Learning Outcomes

Content

Remarks
see German version

Module: Fundamentals of construction [WI3INGBGU3]

Coordination: Fritz Gehbauer
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
0170409	Construction Technology (p. 127)	4	S	6	S. Gentes
0170106	Project Management (p. 269)	1/1	W	3	H. Schneider

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Module: Understanding and Prediction of Disasters I [WI3INGINTER1]

Coordination: Ute Werner
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
3201	Generically Meteorology /Climatology II (p. 108)	3/1	S	5.5	Orphal
03203	Meteorological Measurements (p. 210)	2	S	3.5	Kottmeier
03013	Meteorological Natural Hazards (p. 237)	2	W	3.5	Kottmeier, Kunz
04013	Tectonic Stress in Petroleum Rock Mechanics (p. 341)	1/1	W	3	Müller
GEOD-BFB-1	Remote Sensing (p. 178)	3/2/1	S	7	Hinz, Weidner
20241/42	Remote Sensing Systems (p. 179)	1/1	S	2	Hinz, Weidner
20243/44	Remote Sensing Methods (p. 180)	2/1	S	2	Hinz, Weidner
20245	Hauptvermessungsübung III (p. 206)	0/1	S	1	S. Hinz, Weidner
20712/13	Introduction to GIS for students of natural, engineering and geo sciences (p. 157)	2/2	W	4	Rösch
19055	Hydraulic Engineering and Water Ressource Management I (p. 361)	2/2	W	6	F. Nestmann
19632	Natural Disaster Management (p. 245)	1	W/S	1.5	N.N.
10557	Introduction to Engineering Geology and Hydrogeology (p. 185)	2	S	3	T. Liesch, P. Blum

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2), 1-3 of the examination regulation) of the single courses/exams 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 completion of the engineering science moduls of the core program.
In Remote Sensing, *Remote Sensing Systems* [20241] and *Remote Sensing Methods* [20243] can be chosen as a minimal combination, but it is strongly recommended to choose the comprehensive combination *Remote Sensing* [GEOD-BFB-1], which includes *Remote Sensing Systems* [20241], *Remote Sensing Methods* [20243] and *Hauptvermessungsübung* III [20245].
There are **no singular exams** for *Remote Sensing Systems* [20241] and *Remote Sensing Methods* [20243].
Therefore it is only possible to choose **either** *Remote Sensing* [GEOD-BFB-1] **or** one of the courses *Remote Sensing Systems* [20241], *Remote Sensing Methods* [20243] *or Hauptvermessungsübung* III [20245] (because they are already included).

Learning Outcomes
See German version.

Content
See German version.

Remarks
In agreement with the coordinator of the module other suitable courses than the ones displayed can be taken.

Module: Understanding and Prediction of Disasters II [WI3INGINTER2]

Coordination: Ute Werner
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
3201	Generically Meteorology /Climatology II (p. 108)	3/1	S	5.5	Orphal
03203	Meteorological Measurements (p. 210)	2	S	3.5	Kottmeier
03013	Meteorological Natural Hazards (p. 237)	2	W	3.5	Kottmeier, Kunz
04013	Tectonic Stress in Petroleum Rock Mechanics (p. 341)	1/1	W	3	Müller
GEOD-BFB-1	Remote Sensing (p. 178)	3/2/1	S	7	Hinz, Weidner
20241/42	Remote Sensing Systems (p. 179)	1/1	S	2	Hinz, Weidner
20243/44	Remote Sensing Methods (p. 180)	2/1	S	2	Hinz, Weidner
20245	Hauptvermessungsübung III (p. 206)	0/1	S	1	S. Hinz, Weidner
20712/13	Introduction to GIS for students of natural, engineering and geo sciences (p. 157)	2/2	W	4	Rösch
19055	Hydraulic Engineering and Water Ressource Management I (p. 361)	2/2	W	6	F. Nestmann
19632	Natural Disaster Management (p. 245)	1	W/S	1.5	N.N.
10557	Introduction to Engineering Geology and Hydrogeology (p. 185)	2	S	3	T. Liesch, P. Blum

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2), 1-3 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 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 completion of the engineering science moduls of the core program.
In Remote Sensing, *Remote Sensing Systems* [20241] and *Remote Sensing Methods* [20243] can be chosen as a minimal combination, but it is strongly recommended to choose the comprehensive combination *Remote Sensing* [GEOD-BFB-1], which includes *Remote Sensing Systems* [20241], *Remote Sensing Methods* [20243] and *Hauptvermessungsübung* III [20245].
There are **no singular exams** for *Remote Sensing Systems* [20241] and *Remote Sensing Methods* [20243].
Therefore it is only possible to choose **either** *Remote Sensing* [GEOD-BFB-1] **or** one of the courses *Remote Sensing Systems* [20241], *Remote Sensing Methods* [20243] *or Hauptvermessungsübung* III [20245] (because they are already included).
It is only possible to choose this module in combination with the module *Understanding and Prediction of Disasters I*. The module is passed only after the final partial exam of *Understanding and Prediction of Disasters I* is additionally passed.

Learning Outcomes
See German version.

Content
See German version.

Remarks
In agreement with the coordinator of the module other suitable courses than the ones displayed can be taken.
The module is offered as an extension module to *Understanding and Prediction of Disasters I* from winter term 2010/11 on, therefore credit points were reduced to 9. Together with *Understanding and Prediction of Disasters I* it is still possible to gain 18 credit points in total in the field of Understanding and Prediction of Disasters.

Module: Understanding and Prediction of Disasters III [WI3INGINTER5]

Coordination: Ute Werner
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
3201	Generically Meteorology /Climatology II (p. 108)	3/1	S	5.5	Orphal
03013	Meteorological Natural Hazards (p. 237)	2	W	3.5	Kottmeier, Kunz
03203	Meteorological Measurements (p. 210)	2	S	3.5	Kottmeier
04013	Tectonic Stress in Petroleum Rock Mechanics (p. 341)	1/1	W	3	Müller
GEOD-BFB-1	Remote Sensing (p. 178)	3/2/1	S	7	Hinz, Weidner
20241/42	Remote Sensing Systems (p. 179)	1/1	S	2	Hinz, Weidner
20243/44	Remote Sensing Methods (p. 180)	2/1	S	2	Hinz, Weidner
20245	Hauptvermessungsübung III (p. 206)	0/1	S	1	S. Hinz, Weidner
20712/13	Introduction to GIS for students of natural, engineering and geo sciences (p. 157)	2/2	W	4	Rösch
19055	Hydraulic Engineering and Water Ressource Management I (p. 361)	2/2	W	6	F. Nestmann
19632	Natural Disaster Management (p. 245)	1	W/S	1.5	N.N.
10557	Introduction to Engineering Geology and Hydrogeology (p. 185)	2	S	3	T. Liesch, P. Blum

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2), 1-3 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
In Remote Sensing, *Remote Sensing Systems* [20241] and *Remote Sensing Methods* [20243] can be chosen as a minimal combination, but it is strongly recommended to choose the comprehensive combination *Remote Sensing* [GEOD-BFB-1], which includes *Remote Sensing Systems* [20241], *Remote Sensing Methods* [20243] and *Hauptvermessungsübung* III [20245].
There are **no singular exams** for *Remote Sensing Systems* [20241] and *Remote Sensing Methods* [20243].
Therefore it is only possible to choose **either** *Remote Sensing* [GEOD-BFB-1] **or** one of the courses *Remote Sensing Systems* [20241], *Remote Sensing Methods* [20243] *or Hauptvermessungsübung* III [20245] (because they are already included).
It is only possible to choose this module in combination with the module *Understanding and Prediction of Disasters II*. The module is passed only after the final partial exam of *Understanding and Prediction of Disasters II* is additionally passed.

Learning Outcomes
See German version.

Content
See German version.

Remarks
In agreement with the coordinator of the module other suitable courses than the ones displayed can be taken.
The module is offered as an extension module to *Understanding and Prediction of Disasters II* from winter term 2010/11 on, therefore credit points were reduced to 9. Together with *Understanding and Prediction of Disasters I and II* it is still possible to gain 27 credit points in total in the field of Understanding and Prediction of Disasters.

Module: Safety Science I [WI3INGINTER3]

Coordination: Ute Werner
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
19315	Safety Management in Highway Engineering (p. 312)	1	W	2	M. Zimmermann
2117061	Safety Engineering (p. 313)	2	W	4	H.-P. Kany
21037	Industrial Safety and Environmental Management (p. 207)	2	S	4	Zülch, Kiparski
2109030	Occupational Health and Safety Management and Systems (p. 114)	1	W	2	Zülch
20101	Fire safety in buildings (p. 138)	2	S	2	P. Pannier

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2), 1-3 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 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 completion of the engineering modules of the core program.

Learning Outcomes
See German version.

Content
See German version.

Remarks
In agreement with the coordinator of the module other suitable courses than the ones displayed can be taken.
From the winter term 2010/2011 on, the lecture *Safety Engineering* has 3 credit points.

Module: Safety Science II [WI3INGINTER4]

Coordination: Ute Werner
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
19315	Safety Management in Highway Engineering (p. 312)	1	W	2	M. Zimmermann
2117061	Safety Engineering (p. 313)	2	W	4	H.-P. Kany
21037	Industrial Safety and Environmental Management (p. 207)	2	S	4	Zülch, Kiparski
2109030	Occupational Health and Safety Management and Systems (p. 114)	1	W	2	Zülch
siwi_wahl	Additional Course Safety Sciences (p. 168)		W/S	2-9	U. Werner
20101	Fire safety in buildings (p. 138)	2	S	2	P. Pannier

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2), 1-3 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 seperately.
In addition to the detailed displayed courses further suitable courses of the necessary credit amounts must be taken in agreement with the coordinator of the module to complete the module. On top of the minimum requirements, suitable courses can be chosen accordingly.
The 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
It is only possible to choose this module in combination with the module *Safety Science I*. The module is passed only after the final partial exam of *Safety Science I* is additionally passed.
Successful completion of the engineering modules of the core program

Learning Outcomes
See German version.

Content
See German version.

Remarks
From the winter term 2010/2011 on, the lecture *Safety Engineering* has 3 credit points.
The module is offered as an extension module to *Safety Science I* from winter term 2010/11 on, therefore credit points were reduced to 9. Together with *Safety Science I* it is still possible to gain 18 credit points in total in the field of safety sciences.

Module: Extracurricular Module in Engineering [WI3INGAPL]

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

ECTS Credits	Cycle	Duration
9		

Learning Control / Examinations
The assessment of the module is determined by the respective module corrdinator. 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
None.

Learning Outcomes

Content

6.7 Law

Module: Elective Module Law [WI3JURA]

Coordination: Thomas Dreier
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Law

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24012	Civil Law for Beginners (p. 133)	4/0	W	4	T. Dreier, P. Sester
24016	Public Law I - Basic Principles (p. 250)	2/0	W	3	I. Spiecker genannt Döhmann
24520	Public Law II - Public Economic Law (p. 251)	2/0	S	3	I. Spiecker genannt Döhmann

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 seperately.

- *Civil Law for Beginners*: written exam (90 min)
- *Public Law I/II*: overall written exam (120 min)

The 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

Content

6.8 Sociology

Module: Sociology/Empirical Social Research [WI3SOZ]

Coordination: Gerd Nollmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Sociology

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
11005	Social structures of modern societies (p. 320)	2	W	4	G. Nollmann
spezSoz	Special Sociology (p. 324)	2	W/S	2	G. Nollmann, Pfadenhauer, Pfaff, Haupt, Grenz, Eisewicht, Kunz
SozSem	Projectseminar (p. 271)	2	W/S	4	Bernart, Kunz, Pfaff, Haupt, Grenz, Eisewicht

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 seperately.
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.

Module: Qualitative Social Research [WI3SOZ2]

Coordination: Gerd Nollmann, Pfadenhauer
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Sociology

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
n.n.	Interpretative Social Research Methods (p. 239)	2/0	W	4	Pfadenhauer
spezSoz	Special Sociology (p. 324)	2	W/S	2	G. Nollmann, Pfadenhauer, Pfaff, Haupt, Grenz, Eisewicht, Kunz
n.n.	Explorative-interpretative Project Seminar (p. 272)	2/0	W/S	4	Pfadenhauer, Kunz, Grenz, Eisewicht

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
The lecture *Interpretative Social Research Methods* [n.n.] has to be completed successfully.

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 thaught 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-interpreative methods in which 2 or 4 credits have to be obtained (6 credits needed in course and project course combined).

6.9 General Modules

Module: Seminar Module [WI3SEM]

Coordination: Studiendekan (Fak. f. Wirtschaftswissenschaften)
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject:

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
SemAIFB1	Seminar in Enterprise Information Systems (p. 283)	2	W/S	3	R. Studer, A. Oberweis, T. Wolf, R. Kneuper
SemAIFB2	Seminar Efficient Algorithms (p. 285)	2	W/S	3	H. Schmeck
SemAIFB3	Seminar Complexity Management (p. 295)	2	W/S	3	D. Seese
SemAIFB4	Seminar Knowledge Management (p. 298)	2	W	3	R. Studer
SemAIFB5	Seminar eOrganization (p. 287)	2	S	3	S. Tai
2530293	Seminar in Finance (p. 290)	2	W/S	3	M. Uhrig-Homburg, M. Ruckes
SemFBV1	Seminar in Insurance Management (p. 299)	2	W/S	3	U. Werner
SemFBV2	Seminar in Operational Risk Management (p. 300)	2	W/S	3	U. Werner
2577915	Seminar: Management and Organization (p. 309)	2	W/S	3	H. Lindstädt
2577916	Seminar Management accounting for industrial engineers (p. 284)	2	W/S	3	M. Wouters
2572197	Seminar in strategic and behavioral marketing (p. 301)	2	W	3	B. Neibecker
SemIIP	Seminar in Ergonomics (p. 302)	2	W/S	3	A. Wollert, C. Harbring
SemIIP2	Seminar in Industrial Production (p. 293)	2	W/S	3	F. Schultmann, M. Fröhling, T. Comes
SemEW	Seminar Energy Economics (p. 286)	2	W/S	3	W. Fichtner, P. Jochem, A. Eßer-Frey, M. Genoese
2540524	Bachelor Seminar in Information Engineering and Management (p. 124)	2	W/S	3	A. Geyer-Schulz
SemIW	Seminar Information Engineering and Management (p. 294)	2	W/S	3	C. Weinhardt
2585420/2586420	Topics of Sustainable Management of Housing and Real Estate (p. 115)	2	W/S	3	T. Lützkendorf
SemWIOR3	Seminar in Experimental Economics (p. 304)	2	W/S	3	
SemWIOR2	Seminar Economic Theory (p. 369)	2	W/S	3	C. Puppe
SemIWW2	Seminar in International Economy (p. 291)	2/0	W/S	3	J. Kowalski
SemIWW3	(p. 292)	2	W/S	3	I. Ott
2560130	Seminar Public Finance (p. 288)	2	W/S	3	B. Wigger, Assistenten
2560263	Seminar on Network Economics (p. 306)	2	W/S	3	K. Mitusch
2561209	(p. 307)		W/S	3	
2550131	Seminar in Continous Optimization (p. 305)	2	W/S	3	O. Stein
SemWIOR1	Seminar Stochastic Models (p. 297)	2	W/S	3	K. Waldmann
2550491	Seminar in Discrete Optimization (p. 303)	2	W/S	3	S. Nickel
2590470	Seminar Service Science, Management & Engineering (p. 296)	2	W/S	3	C. Weinhardt, G. Satzger, R. Studer, S. Nickel

SemING	Seminar in Engineering Science (p. 209)	2	W/S	3	Fachvertreter ingenieurwissenschaftlicher Fakultäten
SemIFL	Seminar Conveying Technology and Logistics (p. 289)	2	W/S	3	K. Furmans
21690sem	Seminar paper “Production Engineering” (p. 310)	2	W/S	3	V. Schulze, Lanza, Munzinger
SemMath	Seminar in Mathematics (p. 236)	2	W/S	3	Fachvertreter der Fakultät für Mathematik
RECHT	Seminar: Legal Studies (p. 308)	2	W/S	3	Inst. ZAR
SQ HoC1	Elective “Culture - Policy - Science - Technology” (p. 358)	meist 2	W/S	3	House of Competence
SQ HoC2	Elective “Workshops for Competence and Creativity” (p. 357)	meist 2	W/S	3	House of Competence
SQ HoC3	Elective Foreig Languages (p. 356)	2-4	W/S	2-4	House of Competence
SQ HoC4	Elective “Personal Fitness & Emotional Competence” (p. 359)	k.A.	W/S	2-3	House of Competence
SQ HoC5	Elective “Tutor Programmes” (p. 360)	k.A.	W/S	2 / 3	House of Competence

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 examintaion regulation). A detailed description of every singled assessment is given in the specific course characerization.
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 Business Engineering 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 School of Economics and Business Engineering (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 School of Economics and Business Engineering. 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 [HoC1-5]. Students may choose freely among the offered courses of HoC. **Note that within the elective area Culture-Politics-Science-Engineering no course can be taken with its contents too close to the lectures of your own study programme**. More detailled information can be found at the course descriptions and on http://www.hoc.kit.edu/sq-wahlbereiche.

Learning Outcomes
The student

- investigates with a selected topic in a special subject,
- analyses and discusses topically issues in the course and within the final term paper,
- discusses, presents und 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 detailled description o these qualifications is given in the section “Key Qualifications” of the module handbook.
Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: http://www.wiwi.kit.edu/2361.php.

Module: Internship [WI3EXPRAK]

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

ECTS Credits	Cycle	Duration
8		

Learning Control / Examinations
The assessment is carried out by the evidence of completed full-time internships of at least eight weeks a 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 (weakly)
* Working interruption, indicating the vacation and sick days
* Department
* Headwords to the activitis

2. Information on to the presentation:

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

Conditions
Internships, that were completed even before studying may be recognized, if the criteria for recognition are met. After recognition of the compulsory internship, there can be taken a semester off for a voluntary, student-related internship. The possibility is particularly interesting in view of the master programme, which requires internships of at least 12 weeks.
If the compulsory internship is absolved within the Bachelor Programme and if it takes at least 14 weeks, students may request tuition exemption, when at least 8 weeks of the internship takes place in the lecture time.
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 Business Engineering and get to know the professional requirements,
- gain a general insight into the operations of a company,
- identify companies coplexitity and developing knowledge and skills, which faciliate the understanding of operational sequencences,
- 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 business engineering.
A commercial internship provides an insight into business or administrative processes of business transactions. Therefor departments such as controlling, organizing, marketing and planning appear particularly suitable.
Work experiences in the departments of engineering, work preparation and provision of material or IT cover more technical aspects of the internship. But work experiences in an engineering firm go with a technical internship.
It remains the companies and interns left, which stations and areas the intern will eventually go through. But the focus should always be in accordance with operational realities of the company.

Remarks
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.

It is recommended to do the internship before start of study.

Module: Bachelor Thesis [WI3THESIS]

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

ECTS Credits	Cycle	Duration
12		

Learning Control / Examinations
The Bachelor Thesis is a written exam which shows that the student can autonomously investigate a scientific problem in Business Enginieering. 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 School of Economics and Business Engineering, or, after approval by at least one examiner of another faculty. The examiner has to be involved in the degree programme. Involved in the degree programme are the persons that coordinate a module or a lecture of the degree programme.
The regular processing time takes three months. On a reasoned request of the student, the examination board can extend the processing time of a maximum of on month. If the Bachelor Thesis is not completed in time, this exam is “failed”, unless the student is not being responsible (eg maternity leave).
With consent of the examinor 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 examinor 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

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 examinor. The topic has to be related to Business Engineering and has to refer to subject-specific or interdisciplinary problems.

7 Courses

7.1 All Courses

Course: Advanced Topics in Economic Theory [2520527]

Coordinators: Clemens Puppe, Marten Hillebrand, Kay Mitusch
Part of the modules: Microeconomic Theory (p. 49)[WI3VWL6]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	en

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content
The focus of the course is the modern economic theory of (general) equilibrium. The course is divided into three parts. The first part introduces the microeconomic foundations of general equilibrium á la Debreu (”The Theory of Value”, 1959) and Hildenbrand/Kirman (”Equilibrium Analysis”,1988). The second part considers dynamic (stochastic) equilibrium models with a particular focus on the overlapping generations model which lie at the heart of modern macroeconomics. The third part deals with asymmetric information and introduces the basic models based on Akerlof’s “Market for Lemons.” The course is largely based on the textbook “Microeconomic Theory” (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green

Literature
The course is based on the excellent textbook “Microeconomic Theory” (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green

Course: Algorithms for Internet Applications [2511102]

Coordinators: Hartmut Schmeck
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter term	en

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination (called “bonus exam”, 45 min) (according Section 4(2), 3 of the examination regulation).
The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None.

Learning Outcomes
The students will learn to master methods and concepts of essential algorithms within Internet applications and to develop capabilities for innovative improvements. The course aims at teaching advanced concepts for the design and application of algorithms with respect to the requirements in networked systems. Based on a fundamental understanding of taught concepts and methods the students should be able to select appropriate concepts and methods for problem settings in their future professional life, and - if necessary - customize and apply them in an adequate way. The students will be capable to find appropriate arguments for their chosen approach to a problem setting.
In particular, the student will

- know the structure and elementary protocols of the Internet (TCP/IP) and standard routing algorithms (distance vector and link state routing),
- know methods of information retrieval in the WWW, algorithms for searching information and be able to assess the performance of search engines,
- know how to design and use cryptographic methods and protocols to guarantee and check confidentiality, data integrity and authenticity,
- know algorithmic basics of electronic payment systems and of electronic money.

Content
Internet and World Wide Web are changing our world, this core course provides the necessary background and methods for the design of central applications of the Internet. After an introduction into Internet technology the following topics are addressed: information retrieval in the www, structure and functioning of search engines, foundations of secure communication, electronic payment systems and digital money, and - if time permits - security architectures.

Media
Powerpoint slides with annotations on graphics screen, access to Internet resources, recorded lectures

Literature

- Tanenbaum: Computer Networks, 4th edition, Prentice-Hall 2003.
- Baeza-Yates, Ribeiro-Neto: Modern Information Retrieval. Addison-Wesley, 1999.
- Wobst: Abenteuer Kryptologie : Methoden, Risiken und Nutzen der Datenverschlüsselung, 3rd edition. Addison-Wesley, 2001.
- Schneier: Applied Cryptography, John Wiley, 1996.
- Furche, Wrightson: Computer money : Zahlungssysteme im Internet [Übers.: Monika Hartmann]. - 1. Aufl. - Heidelberg : dpunkt, Verl. für Digitale Technologie, 1997.

Elective literature:

- Further references will be given in the course.

Course: Business Administration and Management Science A [2600023]

Coordinators: Martin E. Ruckes, Ch. Weinhardt, H. Lindstädt
Part of the modules: Business Administration (p. 17)[WI1BWL]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.
The assessment takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
This lecture introduces the student to the discipline of business administration and management science. Due to this the student is equipped to become familiar with all their different fields very efficiently and effectively. Moreover, this lecture gives some kind of orientation among these fields.
After this, foundations of management and organization as well as information engineering and management are taught.

Content
The following topics are treated:

- Introduction to business administration and management science
- Foundations of management and organization
- Information engineering and management

Literature
Further literature references are announced in the materials to the lecture.

Course: Business Administration and Management Science B [2600024]

Coordinators: Martin E. Ruckes, Th. Lützkendorf, Ch. Weinhardt, W. Fichtner, F. Schultmann
Part of the modules: Business Administration (p. 17)[WI1BWL]

ECTS Credits	Hours per week	Term	Instruction language
4	2/0/2	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) according to Section 4(2), 1 of the examination regulation.

Conditions
None.

Learning Outcomes
The target of this course and the tutorials of this course are the basic points of marketing, production economics and information engineering and management.
After this basic course students have to be familiar with these three topics in Business Administration and Management Science.

Content
The course is made up of the following topics:
1. Marketing:
Marketing is an organizational function to handle situations, activities, and processes for creating, communicating, and delivering value to customers in a best way. (Customer) relationship management comprises collecting, aggregating, and analyzing information (e.g., developments in the society, changing conditions of markets, alterations w.r.t. buying behavior) to benefit different target groups.
Main topics will deal with market research and optimized application of marketing mix instruments with emphasis on “marketing and the web”,”innovation management”, and “international marketing”.
2. Production economics
In the part of production economics the student will learn basics in the field of production theory, procurement and resource aquisitions, production and operations management and industrial engineering.
Aspects of electrical engineering industry, technological foresights, construction industry and real estate markets will be treated.
3. Information engineering and management
In today’s economy, information is a competetive factor that calls for an interdisciplinary investigation from economics and business administration, informatics and law. In this part of the lecture, selected topics from information engineering and management and their impact in market competition are presented
Topics include:

- trends of information engineering and management
- definition of data, information and knowledge
- information in a company as factor of production and competitive factor
- information processing: from agent to business networks
- corporate networks
- service value networks
- complex service auction
- market engineering
- social networks and services
- grid und cloud computing
- dynamic pricing
- fundamentals of trading and market efficiency on stock exchanges

Literature
Further literature references are announced in the materials to the lecture.

Remarks
Important announcement: for the summer term 2012 this lecture will be modified. It is expected that this lecture will then only cover the fields of marketing and production economics.
Key qualifications can be shown in an active participation through presentations of solutions and discussions in the tutorials which accompany the course.
Each part of the course is taught by instructors specialised in the field of that part.

Course: Business Administration and Management Science C [2600026]

Coordinators: Martin E. Ruckes, Marliese Uhrig-Homburg
Part of the modules: Business Administration (p. 17)[WI1BWL]

ECTS Credits	Hours per week	Term	Instruction language
4	2/0/2	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The goal of this course and the tutorials of this course is to equip students with the fundamentals and basics in the fields of management and organization, investment und finance and the german specific term controlling. After this course students have to be familiar with these three topics in business administration and management science.

Content
1. Management and Organization
A) Foundations of Management
B) Foundations of Strategic Management

- Process of Strategic Management
- Strategic Analysis using the SWOT Framework
- Formulating Strategic Options
- Evaluation and Choice

C) Foundations of Organization

- Why do Organizations exist?
- Objectives, Measures and Conditions of Managing Organizations
- Level 1: Division of Labour and Design of Departments
- Level 2: Choosing the Hierarchical Structure
- Level 3: Coordination and Formalization

D) Agency-theoretic Foundations:

- Organization under Asymmetric Organization
- Three Types of Informational Asymmetries
- Type 1: Hidden Intention and Holdup
- Type 2: Hidden Characteristics and Adverse Selection
- Type 3: Hidden Action and Moral Hazard

2. Investment and Finance
This part of the course deals with the fundamentals of capital market theory und provides a modern introduction to the theory und practice of capital raising and capital budgeting.
These topics are covered:

- Valuation of financial und real investments
- Portfolio theory
- Pricing in financial markets
- Theory and practice of corporate finance
- Arbitrage

3. Controlling
Planning, control (e. g. monitoring), organization, leadership and information systems are the core elements of a business management system. These fields have to be coordinated with one another to achieve the corporate goals in an optimal way. This coordinating function is the main task of the german specific term controlling. Thus, controlling fulfils the coordinating task within the management system in an essential way.
These topics are covered:

- Fundamentals of controlling und its context

- Instruments of controlling for business planning and control/monitoring (selected operational instruments, benchmarking as a tactical instrument and portfolio analysis as a strategic instrument)
- Instruments of controlling for information systems (performance indicators und reporting)

Literature
Extensive bibliographic information will be given in the materials to the lecture.

Remarks
Important announcement: for the winter term 2012/2013 this lecture will be modified. It is expected that this lecture will then cover the fields of investment and finance as well as managerial accounting.
Key qualifications can be shown in an active participation through presentations of solutions and discussions in the tutorials which accompany the course. Each part of the course is taught by instructors specialised in the field of that part.

Course: Generically Meteorology /Climatology II [3201]

Coordinators: Orphal
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
5.5	3/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written test according to Section 4(2), 3 of the examination regulation.

Conditions
None.

Learning Outcomes

Content

Remarks
For further information, see http://www.imk.uni-karlsruhe.de/english/17.php.

Course: Analytical CRM [2540522]

Coordinators: Andreas Geyer-Schulz
Part of the modules: CRM and Service Management (p. 41)[WI3BWLISM4], Specialization in Customer Relationship Management (p. 42)[WI3BWLISM5]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Summer term	de

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

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 25) from excersise work will be added. The grades of this lecture are assigned following the table below:

Grade	Minimum points
1.0	113
1.3	106
1.7	99
2.0	92
2.3	85
2.7	78
3.0	71
3.3	64
3.7	57
4.0	50
4.7	40
5.0	0

Conditions
None.

Recommendations
We expect knowledge about data models and the UML modelling language concerning information systems.

Learning Outcomes
The Student

- understands the principal scientific methods from statistics and informatics used in analytical CRM and their application to enterprise decision problems and independently applies these methods to standard cases,
- understands the components for creating and managing a data warehouse from operative system sources including the processes and steps involved and applies these methods to a simple example, and
- uses his knowledge to conduct a standard CRM analysis on enterprise data for a busines decision problem and deduces and justifies a recommendation for appropriate action.

Content
The course Analytical CRM deals with methods and techniques for analysis concerning the management and improval of customer relationships. Knowledge about customers is aggregated and used for enterprise decision problems like product line planning, customer loyality, etc. A necessary precondition for these analyses is the transformation of data stemming from operative systems into a common data warehouse that assembles all necessary information. This requires transformation of data models and processes for creating and managing a data warehouse, like ETL processes, data quality and monitoring. The generation of customer oriented and flexible reports for different business purposes is covered. The course finally treats several different statistical analysis methods like clustering, regression etc. that are necessary for generating important indicators (like customer lifetime value, customer segmenatation). As external data source, customer surveys are introduced.

Media
slides

Literature
Ponnia, Paulraj. Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals. Wiley, New York, 2001.
Duda, Richard O. und Hart, Peter E. und Stork, David G. Pattern Classification. Wiley-Interscience, New York, 2. Ausgabe, 2001.

Maddala, G. S. Introduction to Econometrics. Wiley, Chichester, 3rd Ed., 2001.
Theil, H. Principles of Econometrics. Wiley, New York, 1971.

Course: Applied Informatics I - Modelling [2511030]

Coordinators: Andreas Oberweis, Rudi Studer, Sudhir Agarwal
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter term	de

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

Conditions
None.

Learning Outcomes
Basic knowledge about the strengths and weaknesses of various modeling approaches including their application areas.

Content
In the context of complex information systems, modelling is of central importance, e.g. – in the context of systems to be developed – for a better understanding of their functionality or in the context of existing systems for supporting maintenance and further development.
Modelling, in particular modelling of information systems, forms the core part of this lecture. The lecture is organized in two parts. The first part mainly covers the modelling of static aspectes, the second part covers the modelling of dynamic aspects of information systems.
The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and description logics as a means of modelling static aspects will be explained. This will be complemented by the relational data model and the systematic design of databases based on ER models. For modelling dynamic aspects, different types of petri-nets as well as well as event driven process chains together with their respective analysis techniques will be introduced.

Media
Slides.

Literature

- Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
- R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education, 4. Aufl., 2004, ISBN 0321204484.
- W. Reisig. Petri-Netze, Springer-Verlag, 1986.

Elective literature:

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- Staab, Studer: Handbook on Ontologies, Springer, 2003
- J.L. Peterson: Petri Net Theory and Modeling of Systems, Prentice Hall, 1981.
- Franz Baader, Diego Calvanese, Deborah McGuinness, Daniele Nardi, Peter Patel-Schneider. The Description Logic Handbook - Theory, Implementation and Applications, Cambridge 2003.

Course: Applied Informatics II - IT Systems for e-Commerce [2511032]

Coordinators: Stefan Tai
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written examination (60 min) according to Section 4 (2),1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
Knowledge of content of the courses *Foundations of Informatics I* [2511010] and *Foundations of Informatics II* [2511012] is expected.

Learning Outcomes
The student learns about IT methods and systems in support of modern electronic commerce. The student should be able to select, asess, design, and apply these methods and systems in a context-sensitive manner.

Content
The course introduces methods and systems in support of electronic commerce, including the topics:

- application architectures (incl. client server architectures)
- document description and exchange (incl. XML)
- enterprise middleware (incl. CORBA, Messaging Middleware, Java Enterprise Edition)
- Web services and SOA

Media
Slides, internet resources.

Literature
Tba in the lecture.

Course: Industrial Application of Material Handling Systems in Sorting and Distribution Systems [2118089]

Coordinators: J. Föller
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

Conditions
None.

Learning Outcomes
The course provides basics of sorting techniques.

Content

- Operation characteristics, classification, configuration, dimensioning, cost consideration, sorting systems
- Relevant regulations, modern control and drive concepts

Course: Occupational Health and Safety Management and Systems [2109030]

Coordinators: Zülch
Part of the modules: Safety Science II (p. 92)[WI3INGINTER4], Safety Science I (p. 91)[WI3INGINTER3]

ECTS Credits	Hours per week	Term	Instruction language
2	1	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Remarks
For further information, see http://www.ifab.uni-karlsruhe.de/747.php

Course: Topics of Sustainable Management of Housing and Real Estate [2585420/2586420]

Coordinators: Thomas Lützkendorf
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment of this course is (according to §4(2), 3 SPO) in form of an examination of the written seminar thesis and a presentation.

Conditions
None.

Learning Outcomes

- Students autonomously compile a paper treating of a marked-off subject within the area of real estate economics respectively sustainable construction, and present their results within the seminar.
- Therefore they master the principles of scientific writing, especially research, reasoning and citation, as well as handling information suspiciously.
- Through own and observed experiences they develop the ability to hold scientific presentations, including technical, formal, rethorical and didactical aspects.

Content
The seminar deals with changing up-to-date topics concerning Real Estate Economics or Sustainable Construction.
Current topics and schedules are announced at the beginning of term.

Media
A reader dealing with the basics of scientific writing is provided (in german language).

Course: Power Transformations [23390]

Coordinators: Schäfer
Part of the modules: Electrical Power Engineering (p. 81)[WI3INGETIT1], Energy Generation and Network Components (p. 83)[WI3INGETIT4]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20 min) taking place at the beginn of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every summer semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The goal is to relay theoretical fundamentals about Power Transformers and its applications.
Main topics are the physical fundamentals and their application in transformer precalculation and design. Based on that the different variations in design and the various applications are discussed. Finally future trends and research and development activities in the field of power transformers are presented.

Content
The lectue is divided into the following clauses

- Applications and design variations of power transformers
- Components and design of power transformers
- Working principle of power transformers and shunt reactors. Induction law and its application for the precalculation of transformers. The magnetic field in iron coress, core designs, variations and air gaps in magnetic circuits. Magnetic materials and their properties, application in transformers and shunt reactors. Main and stray flux in transformers and calculation of the equivalent circuit. Stresses inside transformers during inrush and short circuits.
- Winding connections and vector groups of transformers,three phase power system, connected voltages and line to earth voltage, description of three phase systems, parallel connection of transformers.
- Precalculation of transformers.
- Losses in transformers and its origins in core and in the windings. Possible measures to influence loss generation. Cooling systems and its applications.
- High voltage DC transformers
- Factory testing of transformers. Persformance of type tests, standard test and special tests.
- Ovaerload capability of transformaer. Controlled overloading and emergency overload.
- Cervive and monitoring.
- Future trends and research and development activities.

Media
The material is distributed during any lecture

Remarks
The course consists of seven lecture blocks and one factory visit. Date and time is announced on the blackboards.

Course: Constitution and Properties of Wear Resistant Materials [2178643]

Coordinators: Ulrich
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Conditions
The course *Material Science I* [21760] has to be completed beforehand.

Recommendations
Basic knowledge of natural science and knowledge of the content *Material Science II* [21782] is recommended.

Learning Outcomes
Students shall become familiar with the constitution, properties and changing properties of the most important groups of materials. With this basic knowledge they shall be able to decide about the technical and economical application of materials.

Content
After presentation of a general overview, concepts of surface modification (optimisation of microstructure and surface reactions) will be shown as well as innovative coating concepts (dispersion-, composite material-, gradient-, multilayer, super lattice-, solid solution strengthening, metastable- and nano-crystalline coatings).
During realisation of these coating concepts different coating materials will be used:
Metallic alloy and metal-based materials, hard alloy and composite materials, metallic, covalent and heteropolar hard materials as well as ceramic and novel, metastable materials.
This will be followed by lectures on the methods of surface modification

1. mechanical: milling, blasting
2. thermal: melting, heat treatment, quench hardening
3. thermochemical: diffusion, heat treatment
4. ion implantation

and of coating: (mechanical, thermal, mechanothermal, electrochemical, CVD, PVD)
Afterwards, methods of characterisation of surfaces, thin films and bulk materials will be presented, based on the constitution (element-, phase and structure analyses), structure (macro-, micro- and nano structure, texture), properties (hardness, adhesion, toughness) and tribological behaviour of the material.
At the end of the lecture, the status quo of industrial coatings for tools and components as well as the latest developments of coating technology will be discussed.

Literature
Elective literature:

- F.-W. Bach: Moderns Surface Technology, Wiley-VCH, Weinheim, 2006

Course: Supercharging of Internal Combustion Engines [21112]

Coordinators: Golloch
Part of the modules: Engine Development (p. 69)[WI3INGMB17], Combustion Engines II (p. 68)[WI3INGMB19], Combustion Engines (p. 66)[WI3INGMB16]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) according to Section 4 (2), 2 of the examination regulation. The grade of the exam is included in the overall grade of the module with a weighting factor of 3.

Conditions
The course *Combustion Engines A* [21101] has to be completed beforehand.

Learning Outcomes

Content

Course: Selected Topics of Optics and Microoptics for mechanical engineers [2143892]

Coordinators: Timo Mappes
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment will consist of a oral exam (20 min) (following §4 (2), 2 of the examination regulation.

Conditions
none

Recommendations
none

Learning Outcomes

- knows the basics of linear optics
- understands the optical effects used for technical measurements
- judges upon the technical capabilities of selected optical instruments
- has the basic knowlegde to fabricate macroscopic and microscopic optical elements
- may select appropriate microscopic contrast techniques for technical questions

Content
The first part of the lecture deals with:

- laws of optics
- linear optics
- abberations of opt. systems
- wave optics & polarization

Based on the introduction to the basics in the first part, the second half of the lecture deals with the discussion of

- optical instruments
- contrast enhancement
- optical position control

Different fabrication methods for macroscopic and microscopic optical elements are discussed

Media
Lecture script as *.pdf

Literature
Hecht Eugene: **Optik**; 4., überarb. Aufl.; Oldenbourg Verlag, München und Wien, 2005

Course: International Economics [2561252]

Coordinators: Jan Kowalski
Part of the modules: Economic Policy I (p. 48)[WI3VWL8], International Economics (p. 47)[WI3VWL3]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes

Content

Literature
Elective literature:

- Siebert H., Außenwirtschaft. Fischer-Verlag 1994
- Burda; Wyplosz. Makroökonomik. Vahlen 1994
- Krugman, P.,Obstfeld, M.;Internationale Wirtschaft, 8. Auflage, Peartson Studium 2009

Course: Automation of Power Grids [23396]

Coordinators: Eichler
Part of the modules: Electrical Power Engineering (p. 81)[WI3INGETIT1], Energy Generation and Network Components (p. 83)[WI3INGETIT4]

ECTS Credits	Hours per week	Term	Instruction language
3	2/0	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20 min) taking place at the beginn of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every summer semester. Re-examinations are offered at every ordinary examination date.

Conditions
Basic knowledge of power transmission and distribution; basic knowledge of IT

Learning Outcomes
Understand methods, equipment, standards, current and future technology, state-of-the-art and trends of power systems control from a global (i.e. worldwide) perspective
Digital design fundamental lecture. Focus of the lecture are formal, methodical and mathematic fundamentals for the design of digital systems. Based on these, technical implementation of digital systems is elaborated, especially the design of standard digital building blocks and more complex systems based on these.

Content
This lecture presents an introduction to the important theoretical fundamentals of digital system design, which is scheduled for the students in the first semester of Electrical Engineering. Since the lecture can not be based on student's knowledge of circuit technology, it focuses on abstract models for behaviours and structures. In addition the lecture will also relay the fundamentals, which are needed in other lectures.
At first the lecture delves into important conceptual information and shows that digital system design represents a special technical solution for the treatment of information. After this the concept of a system will be introduced and illustrated that complex systems require a hierarchical partitioning in order to be able to understand and design them. Based on this it can be concluded then that system design can be understood as a repeated transformation from descriptions of behaviour to descriptions of structure.
The terms message and signal are subject matter of a further chapter. Starting from time and amplitude continuous signals, simple time and value discrete binary signal representations will be introduced, as well as more complex signal forms derived from binary signals.
The representation of information by signals presupposes or implies an "agreement of allocation" between distinguishable elements of information representation and signal representation, the so-called codes. Therefore the lecture delivers the fundamental concepts of codes & coding and describes a few important classes & types of codes, which serve some of the following uses: analog/digital conversion for interfaces, error detection & error correction for numerical purposes, and optimal representation of information and/or signals. Code conversion and related topics finalize the consideration of this topic.
Formal and mathematical fundamentals will be treated in an extensive chapter. To begin the subject matter of the lecture is comprised of sets and quantities, the operations on these quantities, as well as the relations between set elements.
Afterwards several fundamentals of graph theory are introduced. It will be shown that logic algebra can serve as a basis for special Boolean algebra. Building upon the associated rules the concept of switching functions, their graphical representation and classification, the standard theories, and important basis systems for the representation of Boolean expressions will be derived and considered. Expansion theory, the computation with allocation blocks and terms, as well as measures for minimization are further topics of this chapter.
Having the formal basics available, applicable technical components and structures will be developed on the basis of binary switches, which allow for a direct conversion of formal relationships into solutions. Gates, circuit networks, synchronized sequential circuits, as well as specially derived functional units such as counters, registers, and digital memories lead to complex structures. The "All-purpose Computer" from J. von Neumann will be particularly dealt with.
To accompany the lecture material, assignments and the corresponding solutions will be given out and discussed during lecture hall exercises. Furthermore tutorials in small study groups will be held to deepen the understanding of the curriculum and methods taught. Furthermore computer exercises are offered in which digital circuits and their pattern of behaviour will be modelled and simulated with the help of the program LogicWorks.

Media
Slides of the lecture presentation.

Literature
Elective literature:

- Dieter Rumpel, Ji R. Sun: Netzleittechnik. Informationstechnik für den Betrieb elektrischer Netze Springer; Berlin (Januar 1989)

- Ernst-Günther Tietze: Netzleittechnik 1. Grundlagen; VWEW Energieverlag GmbH
- Ernst-Günther Tietze: Netzleittechnik Teil 2: Systemtechnik; VDE-Verlag
- Allen J. Wood, Bruce F. Wollenberg: Power Generation, Operation, and Control; Wiley-Interscience; 2nd edition (January 1996)
- Stuart A. Boyer: SCADA: Supervisory Control and Data Acquisition; ISA 3rd edition (June 2004)

Course: Automated Production Line [2149904]

Coordinators: Jürgen Fleischer
Part of the modules: Specialization in Production Engineering (p. 74)[WI3INGMB22]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Bachelor Seminar in Information Engineering and Management [2540524]

Coordinators: Andreas Geyer-Schulz
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 of the examination regulation in form of the written seminar thesis and a presentation.
The final mark is given, if the written seminar thesis was handed in as well as the presentation was held.
The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Conditions
See module description.
Furthermore, knowledge from CRM is required. Therefore, at least one of the following lectures has to be successfully completed:

- *Customer Relationship Management* [2540508]
- *Analytic CRM* [2540522]
- *Operative CRM* [2540520]

Learning Outcomes
The student is able to

- to perform a literature search for a given topic, to identify, find, value and evaluate the relevant literature.
- to write his seminar thesis (and later on, the bachelors/masters thesis) with the text setting system LaTeX and include format requirements as used by scientific publishers.
- to do a presentation in an adequate scientific manner.
- to write down the results of his investigations in the form of scientific publications.

Content
This seminar serves as an introduction into the process of scientific work. Students write a review for a selected scientific article. A profound literature search is required to judge the article. The review is written with LaTeX by using formating styles similiar to those of scienfitic publishers.
The seminar treats questions of Customer Relationship Management.

Literature
A CRM-specific article is assigned to every student participating in this seminar. The chosen articles are published in the beginning of every term.
Elective literature:

- W. Thomson. A Guide for the Young Economist. The MIT Press, 2001
- D.J. Brauner, H.-U. Vollmer. Erfolgreiches wissenschaftliches Arbeiten. Verlag Wissenschaft & Praxis, 2004
- University of Chicago Press. The Chicago Manual of Style. University of Chicago Press, 13th ed., 1982
- American Psychological Association. Concise of Rules of APA Style. American Psychological Association, 2005
- American Psychological Association. Publication Manual of the American Psychological Association. American Psychological Association, 2001

Remarks
The conditions for participating in the seminar were changed.

Course: Rail System Technology [2115919]

Coordinators: Peter Gratzfeld
Part of the modules: Rail System Technology (p. 65)[WI3INGMB25]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
See modul description.

Conditions
See modul description.

Learning Outcomes

- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- They can assess the suitability of existing elements in the overall system.
- They deduct the fundamental requirements for rail vehicles out of it.

Content

- 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
- Vehicles

Media
All slides are available for download (Ilias-platform).

Literature
A bibliography is available for download (Ilias-platform).

Course: Bank Management and Financial Markets, Applied Econometrics [2520355]

Coordinators: Karl-Heinz Vollmer
Part of the modules: Statistical Applications of Financial Risk Management (p. 52)[WI3STAT]

ECTS Credits	Hours per week	Term	Instruction language
5	2/2	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Literature

- Bierwag: Duration-Analysis; Managing Interest Rat Risk, 1987
- Andrew Harvey: The Econometric Analysis of Time Series, 2nd. Ed. 1993
- Andrew Harvey: Time Series Models, 2nd. Ed. 1994
- Granger/Newbold: Forecasting Economic Time Series; 2nd. Ed. 1986
- Pindyck, Rubinfeld: Econometric Models and Economic Forecasts, 1998
- B. Rolfes: Gesamtbanksteuerung, 1999

Remarks
The course Bank Management and Financial Markets, Applied Econometrics [2520355] will not be offered any more from summer term 2013 on. The examination will be offered latest until summer term 2012.

Course: Construction Technology [0170409]

Coordinators: Sascha Gentes
Part of the modules: Fundamentals of construction (p. 87)[WI3INGBGU3]

ECTS Credits	Hours per week	Term	Instruction language
6	4	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Design, Construction and Assessment of Green Buildings I [26404w]

Coordinators: Thomas Lützkendorf
Part of the modules: Sustainable Construction (p. 44)[WI3BWLOOW1]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (20 min.) according to Section 4 (2), 2 of the examination regulation.
The oral exam takes place at every semester. Re-examinations are offered at every ordinary examination date.

Conditions
A combination with the module *Real Estate Management* [WI3BWLUO1] and with engineering science modules in the area of building physics and structural design is recommended.

Learning Outcomes
Knowledge in the area of sustainable construction concerning whole buildings, building components, equipment and appliances as well as building material.

Content
Taking low-energy buildings as an example the course is an introduction to cheap, energy-efficient, resource-saving and health-supporting design, construction and operation of buildings. Questions of the implementation of the principles of a sustainable development within the building sector are discussed on the levels of the whole building, its components, building equipment as well as the materials. Besides technical interrelationships basics dimensioning and various approaches to ecological and economical assessment play a role during the lectures, as well as the different roles of people involved into the building process. Topics are the integration of economical and ecological aspects into the design process, strategies of energy supply, low-energy and passive buildings, active and passive use of solar energy, selection and assessment of construction details, selection and assessment of insulation materials, greened roofs plus health and comfort.

Media
For a better clearness videos and simulation tools will be presented during the lectures.

Literature
Elective literature:
See german version.

Course: Sustainability Assessment of Construction Works [2585404/2586404]

Coordinators: Thomas Lützkendorf
Part of the modules: Sustainable Construction (p. 44)[WI3BWLOOW1]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written or an oral exam (20 min.) according to Section 4 (2), 1 or 2 of the examination regulation. The exam takes place at every semester. Re-examinations are offered at every ordinary examination date.

Conditions
A combination with the module *Real Estate Management* [WI3BWLOOW2] and with engineering science modules from the areas building physics and structural designis recommended.

Learning Outcomes
Knowledge in the area of economic and wnvironmental assesment of construction works.

Content
The course identifies problems concerning the economical and environmental assessment of buildings along their lifecycle and discusses suitable procedures and tools supporting the decision making process. For example, the course addresses topics like operating costs, heat cost allocation, comparisons of heating costs, applied economical assessment methods, life cycle assessment as well as related design and assessment tools (e.g. element catalogues, databases, emblems, tools) and assessment procedures (e.g. carbon footprint, MIPS, KEA), which are currently available.

Literature
Elective literature:
See german version.

Course: Design Basics in Highway Engineering [19026]

Coordinators: Ralf Roos
Part of the modules: Fundamentals of Spatial and Infrastructural Development (p. 85)[WI3INGBGU1]

ECTS Credits	Hours per week	Term	Instruction language
3	1/1	Summer term	de

Learning Control / Examinations
See module description.

Conditions
See corresponding module information.

Learning Outcomes
Provision of first insights into methodologies and techniques in the fields of highway design and road construction.

Content

- Highway design
- Road network layout
- Driving dynamics
- Fundamental principles of highway design in location, elevation and cross section
- Road construction
- Earthworks (requirements and test methods)
- Pavements (structure, construction methods and requirements)
- Pavement design according to the German guideline RStO

Media
Lecture notes are provided for download (infomation will be made available in the lecture)

Course: Power Network Analysis [23371/23373]

Coordinators: Thomas Leibfried
Part of the modules: Electrical Power Engineering (p. 81)[WI3INGETIT1], Power Networks (p. 82)[WI3INGETIT3]

ECTS Credits	Hours per week	Term	Instruction language
6	2/2	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) taking place at the beginn of the recess period (according to Section 4 (2), 1 of the examination regulation). The exam takes place in every winter semester. Re-examinations are offered at every ordinary examination date.

Conditions
This course is obligatory within the module and has to be attended.

Learning Outcomes
The goal is to relay theoretical fundamentals in the field of electric power technology and power transmission.
In the first part the lecture deals with the basics of High-Voltage technology. Then the basics of transmission and distribution of electric energy is presented as well as the load flow calculation and the short-circuit calculation methods.
Supporting the lecture, assignments to the curriculum are distributed. Their solution is presented and discussed during lecture hall exercises.

Content
In its first part, this lecture introduces the High-Voltage technology and its basics. Especially, the reasons for the necessity for the power transmission with high voltages are given. Basic electrical configurations and stresses occurring at multi dielectric systems are presented. Finally the first chapter deals with discharge phenomena.
The second chapter deals with the three phase system. Especially, the mathematical treatment of three phase systems and the introduction of component systems are contained in this chapter.
The third and very comprehensive chapter deals with the transmission and distribution of electric energy. Firstly, the laws of power transmission via transmission lines are presented. Then, the stability of electric power systems and possibilities to increase the power transmission capacity are discussed. Finally, the physics of energy distribution in the medium and low voltage grid is shown.
The fourth chapter deals with the Calculation of electric power networks and systems. Firstly, the preparatory steps for the calculation of the power network are shown. After discussing the basic network analysis methods, the load flow calculation are shown. Especially, the method of current iteration and the Newton Raphson method are presented and the algorithms of the individual methods are shown using an example.
The fifth chapter deals with methods for the calculation of the 3 phase short circuit. Thereby, it is distinguished between the short circuit nearby the generator and far from the generator.
In the sixth chapter the unsymmetrical faults in power networks and their calculation are discussed. Therefore, the symmetrical components are introduced as a first step. Then, the circuits in symmetrical components of all important power network equipment are presented. The chapter closes with the mathematical treatment of unsymmetrical short circuits using the symmetrical component method.
To accompany the lecture, a collection of problems can be downloaded. During lecture hall exercises their solutions will be discussed.

Media
Online material is available on: www.ieh.uni-karlsruhe.de and can be downloaded using a password.

Literature
Elective literature:
Will be announced in the lecture notes.

Remarks
The credits have been changed to 6.

Course: Motor Fuels for Combustion Engines and their Verifications [2133109]

Coordinators: Volz
Part of the modules: Engine Development (p. 69)[WI3INGMB17], Combustion Engines II (p. 68)[WI3INGMB19], Combustion Engines (p. 66)[WI3INGMB16]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) according to §4 (2), 2 of the examination regulation. The grade of the exam is included in the overall grade of the module with a weighting factor of 3.

Conditions
Successful completion of the course *Combustion Engines A* [21101].
Basic knowledge of chemistry is recommended.

Learning Outcomes

Content

Course: Civil Law for Beginners [24012]

Coordinators: Thomas Dreier, Peter Sester
Part of the modules: Elective Module Law (p. 94)[WI3JURA]

ECTS Credits	Hours per week	Term	Instruction language
4	4/0	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (90 min) according to Section 4, (2), 1 of the examination regulation.

Conditions
None.

Learning Outcomes
To begin with, the course provides students with a general introduction into law. It shall enable them to understand legal problems and solutions both with regard to lawmaking and to individual cases. Students shall grasp the differences between civil law, public law and criminal law. In particular, students shall learn the fundamental notions and constructions of Civil law as laid down in the German Civil Code (Bürgerliches Gesetzbuch, BGB), such as subjects and objects of law, legally binding declarations, the formation of contracts, standard terms and conditions, consumer protection, performance of contractual promises etc. Students shall be trained to understand legal problems and legal solutions. They shall be able to recognise the legal problems of a given factual situation and develop solutions to simple legal problems.

Content
The course starts with a general introduction into law. What is law, why are legal rules valid, and what is the role of law in conjunction with social behaviour, technological and market developments? What is the relationship between law and justice? Moreover, the distinction between civil law, public law and criminal law will be highlighted. The basiscs of jurisdiction, international conflicts and alternative dispute settlement will be discussed. The main focus of the course is on the fundamental notions of civil law as defined and regulated in the German Civil Code (Bürgerliches Gesetzbuch, BGB), such as subjects and objects of law, legally binding declarations, agency, the formation of contracts, standard terms and conditions, consumer protection, performance of contractual promises. The course ends with an outlook to the law of contracts and property law.

Media
Transparencies/Slides

Literature
Tba at the beginning of the course,
Elective literature:
Tba at the beginning of the course,

Course: BioMEMS II (Microsystem Technology for Life-Sciences and Medicine; part II) [2142883]

Coordinators: Andreas E. Guber
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment will consist of a oral exam (30 min) (following §4 (2), 2 of the examination regulation).

Conditions
None.

Recommendations
It is recommended to attend course BioMEMS I [2141864] beforehand.

Learning Outcomes
The student

- Knows typical applications of BioMEMS in the fields of medical engineering and life sciences
- Has extensive knowledge about the realisation of micro analysing systems like e.g. LabCD-systems, BioChips or microarrays, cell based systems, systems for tissue engineering, Patch-Clamping-systems and Drug-Delivery-systems
- Understands the fundamentals of micro process engineering
- Knows different monitoring systems for intensive care and the diagnostics of respiratory air
- Masters the required basic knowledge for the realisation of neuro-prosthetics and nano surgery

Content
Table of Contents:

- Micro fluidic systems: LabCD, systems for protein crystallization
- BioChips and micro arrays
- Tissue engineering
- Biohybrid cell-chip systems
- Drug delivery systems
- Micro reaction technology
- Micro fluidic systems for FTIR measurements of biological fluids
- Micro systems for anesthesia, intensive care (monitoring) and infusion therapy
- Respiratory diagnostics
- Neural prostheses
- Nano surgery

Media
Detailed script is provided free of charge.

Literature

- ”Fundamentals of Microfabrication” by M. J. Madou
- ”Medizintechnik: Life Science Engineering. Interdisziplinarität, Biokompatibilität, Technologien, Implantate, Diagnostik, Werkstoffe, Zertifizierung, Business” by Erich Wintermantel

Course: BioMEMS III (Microsystem Technology for Life-Sciences and Medicine; part III) [2142879]

Coordinators: Andreas E. Guber
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment will consist of a oral exam (30 min) (following §4 (2), 2 of the examination regulation).

Conditions
None.

Recommendations
It is recommended to attend course BioMEMS I [2141864] beforehand.

Learning Outcomes
The student

- has fundamental as well as advanced knowledge of different BioMEMS applications, especially in the micro technical based field of medical engineering
- knows the first principles of the minimal invasive surgery (MIC), NOTES and of endoscopic neurosurgery
- understands the use and procedure of catheter based systems in the interventional vascular therapy
- has extensive knowledge in the field of stent based systems
- knows aspects of surgery robots and video pills
- has available knowledge of the Medical Devices Act

Content
Table of Contents:

- Minimal Invasive Surgery (MIS)
- Endoscopic Neurosurgery
- Interventional Cardiology and Vascular Therapy
- NOTES (Natural Orifice Transluminal Endoscopic Surgery)
- robotic surgery and Endosystems
- Approval of medical devices (Medical Device Directive) and Quality Management

Media
Detailed script is provided free of charge.

Literature

- ”Fundamentals of Microfabrication” by M. J. Madou
- ”Medizintechnik: Life Science Engineering. Interdisziplinarität, Biokompatibilität, Technologien, Implantate, Diagnostik, Werkstoffe, Zertifizierung, Business” by Erich Wintermantel

Course: Bionics for Engineers and Natural Scientists []

Coordinators: Hendrik Hölscher, S. Walheim
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations

Conditions
None.

Recommendations
Knowledge in physics and chemistry.

Learning Outcomes
The students should be able analyze, judge, plan and develop biomimetic strategies and products.

Content
Bionics focuses on the design of technical products following the example of nature. For this purpose we have to learn from nature and to understand its basic design rules. Therefore, the lecture focuses on the analysis of the fascinating effects used by many plants and animals. Possible implementations into technical products are discussed in the end.

Media
Slides of the lectures.

Literature
Werner Nachtigall: Bionik – Grundlagen und Beispiele für Ingenieure und Naturwissenschaftler. Springer-Verlag Berlin (2002), 2. Aufl.

Course: Exchanges [2530296]

Coordinators: Jörg Franke
Part of the modules: Topics in Finance I (p. 34)[WI3BWLFBV5], eFinance (p. 40)[WI3BWLISM3], Topics in Finance II (p. 35)[WI3BWLFBV6]

ECTS Credits	Hours per week	Term	Instruction language
1.5	1	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
Students learn about current developments regarding organisation of exchanges and securities trading.

Content

- Organisation of exchanges: Changing Zeitgeist - Corporates instead of cooparative structures
- Market models: order driven vs. market maker - Liquidity provision for less frequently traded securities
- Trading systems: The end of an era? - No more need for running traders?
- Clearing: Diversity instead of uniformity - Safety for all?
- Settlement: Increasing importance - Does efficient settlement assure the “value added” of exchanges in the long run?

Literature
Elective literature:
Educational material will be offered within the lecture.

Course: Fire safety in buildings [20101]

Coordinators: P. Pannier
Part of the modules: Safety Science II (p. 92)[WI3INGINTER4], Safety Science I (p. 91)[WI3INGINTER3]

ECTS Credits	Hours per week	Term	Instruction language
2	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The student
• knows in terms of fire protection requirements and properties of common building materials, components and systems for building services.
• applys the requirements of building regulations and other guidelines and regulations on building materials, components and escape routes correctly.
• has knowledge about the planning and to detect on-site problems and weaknesses in relation the fire-protection. He /she is able to find solutions.

Content
Requirement, history, legal basis, fire doctrine, protection goal, rescue equipment, areas for firefighters, building caregories, building materials, components, building services, smoke- and fire zones, escape routes, fire safety on construction sites, rescue and extinguishing measures, fire risk, fire protection concepts

Media
The images shown in the lecture and necessary guidelines etc. will be completed a week in advance to download on the KIT-student portal.
In addition further documents will be issued in the lectures.
A bibliography and links to further sources are available on the KIT-student portal.

Literature
Landesbauordnung Baden-Württemberg (LBO)
Allgemeine Ausführungsverordnung des Wirtschaftsministeriums zur Landesbauordnung (LBOAVO)
and according to the bibliography
Literature is available on the KIT-student portal an in the KIT-libraries. The acquisition is not required.

Remarks
The lecture takes place friday from 11:30 am - 1:00 pm in an auditorium at the faculty of architecture, building 20:40.
Practical experience is illustrated by a practical one-day seminar (internship) at the national fire service college in Bruchsal, followed by a fire extinguisher training (date as specified). Temporal compensation is given by the fact, that there will be no lectures on long weekends.

Course: CAN-Bus Release Control [2114092]

Coordinators: Marcus Geimer
Part of the modules: Mobile Machines (p. 64)[WI3INGMB15], Automotive Engineering (p. 61)[WI3INGMB5]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
Assessment for the module *Mobile Machines*: See module description.
Assessment for the module *Automotive Engineering*: The assessment consists of an oral exam (20 min) taking place in the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
Basic knowledge of electrical engineering is recommended. Programming skills are also helpful.

Learning Outcomes
The students will get an overview of the theoretic and practical functioning of different bus systems.

After the practical oriented lessons the students will be able to visualize the communication structure of different applications, design basic systems and evaluate the complexity of programming of the complete system.

Content

- Knowledge of the basics of data communication in networks
- Overview of the operating mode of current field buses
- Explicit observation of the operating mode and application areas of CAN buses
- Practical programming of an example application (hardware is provided)

Literature
Elective literature:

- Etschberger, K.: Controller Area Network, Grundlagen, Protokolle, Bausteine, Anwendungen; München, Wien: Carl Hanser Verlag, 2002.
- Engels, H.: CAN-Bus - CAN-Bus-Technik einfach, anschaulich und praxisnah dargestellt; Poing: Franzis Verlag, 2002.

Remarks
The course will be replenished by interesting lectures of professionals.

Course: Chemical, physical and material science aspects of plastics in the micro technology [2143500]

Coordinators: Matthias Worgull, D. Häringer, H. Moritz
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment will consist of a oral exam (30 min) (following §4 (2), 2 of the examination regulation).

Conditions
None.

Recommendations
This Lecture can be combined with “Replication processes in micro technology” [2143893]
Intermediate examination or bachelor degree of mach/wing necessary.
Basic knowledge of the micro-system technology (but not a requirement) and interdisciplinary interest are favourable.

Learning Outcomes

Content

- **Introduction to the world of the plastics**
- **Chemistry of the polymers - synthesis and chemical characteristics**
- **Tailor-made composite / polymer blends**
- **Physical characteristics of plastics and their description**
  - Morphologic structure
  - Thermal behaviour
  - Time temperature - equivalence
  - Rheology of polymer melts
  - Thermo analysis
- **Plastics processing in the micro technology**
- **Application of polymers as construction material in the micro-system technology**
  - Composites / Compounds
  - MID – injection moulding of circuit carriers
  - Assembling and welding of plastics
  - Engineering with plastics
  - Environmental problems - biological degradable polymers
- **Meaning of the plastics in the micro technology explained by examples of current developments of polymer-based applications**
  - Semi conducting organic plastics
  - Nano-structured polymer surfaces
  - Polymer sensors (biologically, chemically, optically)

Media
Printouts of the lecture presentation, if applicable further scientific articles.

Course: Complexity Management [2511400]

Coordinators: Detlef Seese
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	en

Learning Control / Examinations
The assessment of this course consists of a written examination (60 min) (following §4(2), 1 SPO). The exam will be offered every semester and may be repeated at every ordinary exam date.
Questions are in German and English, answers are possible in German or in English.
In case that only a small number of candidates apply for the examination there will be offered an oral examination according to Section 4(2),1 of the examination regulation.

Conditions
None.

Recommendations
A basic knowledge in informatics is suitable.

Learning Outcomes
Students will be enabled to acquire abilities, methods and instruments in the area of complexity management and learn to use them in an innovative way. The students should be enabled to find arguments for the solution of problems in this area. The basic goal of the lecture is to enable to understand the difficulties to manage complex systems and processes.

Content
Complexity is one of the biggest challenges of our time. Central questions are: - Why humans often fail in complex situations? - What is complexity? -What are reasons for complexity? - Which parameters are essential to control complexity? - How systems have to be designed to reduce their complexity and to enable management of complexity?
The lecture gives a survey on fundamental results and handles the following topics: - Understanding of the difficulties produced by complex systems and complex processes - Foundations: modelling complex systems, complexity theory, descriptive, structural and parametric complexity, dynamic systems, topology, dimension, non-linearity, chaos, randomness and emerging structures, human shortcomings, simulation - Complexity of products and production - Complexity of markets - How to improve complexity management? - Decision support by intelligent use of IT

Media
The slides of the lectures will be provided on the website of the lecture.

Literature

- Franz Reither: Komplexitätsmanagement. Gerling Akademie Verlag, München 1997
- Dietrich Dörner: The Logic of Failure, Basic Books 1996
- G. Schuh, U. Schwenk: Produktkomplexität managen. Carl Hanser Verlag, München 2001
- Ch. Perrow: Normal Accidents. Living with High-Risk technologies, Basic Books, New York, 1984.
- J.D. Sterman: Business Dynamics, Systems Thinking and Modeling for a Complex World, McGraw-Hill Higher Education, 2000.
- R. G. Downey, M.R. Fellows: Parameterized Complexity. Springer 1999
- Heinz-Otto Peitgen, Hartmut Jürgens, Dietmar Saupe: Chaos and Fractals, Springer-Verlag New York, 1992, 2004 (second edition).
- S. Wolfram: A new kind of Science. Wolfram Media Inc. 2002

Elective literature:

- M.R. Garey, D. S. Johnson: Computers and intractability A guide to the theory of NP-completeness, W. H. Freeman and Company, New York, 1979
- N. Immerman: Descriptive Complexity; Springer-Verlag, New York 1999
- R. Diestel: Graphentheorie, Springer 1996
- J. A. Bondy, U.S.R. Murty: Graph Theory, Springer 2008
- H.D. Ebbinghaus, J. Flum, W. Thomas: Mathematical Logic, Springer-Verlag, New York 1984
- Christos H. Papadimitriou: Computational Complexity, Addison-Wesley, Reading, Massachusetts, 1994
- R. Niedermeier: Invitation to Fixed-Parameter Algorithms, Oxford University Press 2006

- W. Metzler: Nichtlineare Dynamik und Chaos, Teubner Studienbücher Mathematik, Stuttgart 1998
- G. Frizelle, H. Richards (eds.): Tackling industrial complexity: the ideas that make a difference. University of Cambridge, Institute of Manufacturing 2002
- W. Bick, S. Drexl-Wittbecker: Komplexität reduzieren, Konzept. Methoden. Praxis, LOG_X Verlag GmbH, Stuttgart, 2008
- U. Lindemann, M. Maurer, T. Braun: Structural Complexity Management, An Approach for the field of Product Design, Springer-Verlag, Berlin, Heidelberg, 2009
- M. J. North, Ch. M. Macal: Managing Busieness Complexity, Discovering Strategic Solutions with Agent-Based Modeling and Simulation, Oxford University Press 2006
- S. Bornholdt, H. G. Schuster (Eds.): Handbook of Graphs and Networks, From the Genome to the Internet, Wiley-VCH, 2003
- Further references will be given in each lecture.

Remarks
The content of the lecture will permanently be adapted to actual developments. This can be the cause to changes of the described contend and schedule.
The course “Complexity Management” will not be offered any more from summer term 2016 on. The examination will be offered latest until summer term 2015 (repeaters only).

Course: Current Issues in the Insurance Industry [2530350]

Coordinators: Wolf-Rüdiger Heilmann
Part of the modules: Insurance Markets and Management (p. 33)[WI3BWLFBV4]

ECTS Credits	Hours per week	Term	Instruction language
2.5	2/0	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (according to Section 4 (2), 1 of the examination regulation) .
The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

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

Learning Outcomes
Knowledge and understanding of important current characteristics of insurance, e.g. insurance markets, lines, products, investment, company pension schemes, corporate structures and governance as well as controlling.

Content
Current topics in insurance markets.

Literature
Elective literature:
Schwebler, Knauth, Simmert. Kapitalanlagepolitik im Versicherungsbinnenmarkt. 1994
Seng. Betriebliche Altersversorgung. 1995
von Treuberg, Angermayer. Jahresabschluss von Versicherungsunternehmen. 1995

Remarks
Block course. To attend the course please register at the secretay of the chair of insurance science.

Course: Customer Relationship Management [2540508]

Coordinators: Andreas Geyer-Schulz
Part of the modules: CRM and Service Management (p. 41)[WI3BWLISM4]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Winter term	en

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

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 25) from excersise work will be added. The grades of this lecture are assigned following the table below:

Grade	Minimum points
1.0	113
1.3	106
1.7	99
2.0	92
2.3	85
2.7	78
3.0	71
3.3	64
3.7	57
4.0	50
4.7	40
5.0	0

Conditions
None.

Learning Outcomes
The students

- understand service management as an economic basis for Customer Relationship Management and learn the resulting consequences for the management, the organisation itself and their departments,
- design and develop service concepts and service systems at a conceptual level,
- work on case studies in the CRM-area in small groups with limit time,
- learn English as the technical language in the area of CRM and consult internationale literature from this field for the case studies.

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

Media
Slides, Audio, Reader

Literature
Christian Grönroos. Service Management and Marketing : A Customer Relationship Management Approach. Wiley, Chichester, 2nd edition, 2000.
Elective literature:
Jill Dyché. The CRM Handbook: A Business Guide to Customer Relationship Management. Addison-Wesley, Boston, 2nd edition, 2002.
Ronald S. Swift. Accelerating Customer Relationships: Using CRM and RelationshipTechnologies. Prentice Hall, Upper Saddle River, 2001.
Stanley A. Brown. Customer Relationship Management: A Strategic Imperative in theWorld of E-Business. John Wiley, Toronto, 2000.

Course: Data Mining [2520375]

Coordinators: Gholamreza Nakhaeizadeh
Part of the modules: Statistical Applications of Financial Risk Management (p. 52)[WI3STAT]

ECTS Credits	Hours per week	Term	Instruction language
5	2	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content
Part one: Data Mining
Why Data Mining?

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

Part two: Examples of application of Data Mining

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

Literature
U. Fayyad, G. Piatetsky-Shapiro, P. Smyth, R. Uthurusamy, editors, Advances in Knowledge Discovery and Data Mining, AAAI/MIT Press, 1996 (order on-line from Amazon.com or from MIT Press).

- Jiawei Han, Micheline Kamber, Data Mining : Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
- David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining , MIT Press, Fall 2000
- Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer Verlag, 2001.
- Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Addison wesley (May, 2005). Hardcover: 769 pages. ISBN: 0321321367
- Ripley, B.D. (1996) Pattern Recognition and Neural Networks, Cambridge: Cambridge University Press.
- Ian witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition, Morgan Kaufmann, ISBN 0120884070, 2005.

Course: Database Systems [2511200]

Coordinators: Andreas Oberweis, Dr. D. Sommer
Part of the modules: Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of an 1h written exam in the first week after lecture period.

Conditions
Knowledge of course *Applied Informatics I - Modelling* [2511030] is expected.

Learning Outcomes
Students

- are familiar with the concepts and principles of data base models, languages and systems and their applications,
- can design and model relational data bases on the basis of theoretical foundations,
- are able to ensure an error-free operation and the integrity of the data base and
- know how to handle enhanced data base problems occurring in the enterprises.

Content
Database systems (DBS) play an important role in today's companies. Internal and external data is stored and processed in databases in every company. The proper management and organization of data helps to solve many problems, enables simultaneous queries from multiple users and is the organizational and operational base for the entire working procedures and processes of the company. The lecture leads in the area of the database theory, covers the basics of database languages and database systems, considers basic concepts of object-oriented and XML databases, conveys the principles of multi-user control of databases and physical data organization. In addition, it gives an overview of business problems often encountered in practice such as:

- Correctness of data (operational, semantic integrity)
- Restore of a consistent database state
- Synchronization of parallel transactions (phantom problem).

Media
Slides, Access to internet resources

Literature
Elective literature:

- Schlageter, Stucky. Datenbanksysteme: Konzepte und Modelle. Teubner 1983.
- S. M. Lang, P. C. Lockemann. Datenbankeinsatz. Springer-Verlag 1995.
- Jim Gray, Andreas Reuter. Transaction Processing: Concepts and Techniques. Morgan Kaufmann 1993.

Further literature will be given individually.

Course: Derivatives [2530550]

Coordinators: Marliese Uhrig-Homburg
Part of the modules: Topics in Finance I (p. 34)[WI3BWLFBV5], Topics in Finance II (p. 35)[WI3BWLFBV6], eFinance (p. 40)[WI3BWLISM3]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The objective of the Derivatives lecture is to become familiar with financial markets, especially derivatives markets. Traded securities and frequently used trading strategies will be introduced. Furthermore the pricing of derivatives will be derived and their use in risk management will be discussed.

Content
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

Media
Slides, Exercises/Exercise sheets

Literature

- Hull (2005): Options, Futures, & Other Derivatives, Prentice Hall, 6th Edition

Elective literature:
Cox/Rubinstein (1985): Option Markets, Prentice Hall

Course: Efficient Algorithms [2511100]

Coordinators: Hartmut Schmeck
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of assignments or of a bonus exam (wrt §4 (2), 3 SPO), and a written exam (60 min.) in the week after the end of the lecturing periodwrt (§4 (2), 1 SPO).
If the mark obtained in the written exam is in between 1.3 and 4.0, a successful completion of the assignments or the bonus exam will improve the mark by one level (i.e. by 0.3 or 0.4).
Deviations from this type of assessment are announced at the beginning of this course.

Conditions
credits for the Informatics modules of years 1 and 2.

Learning Outcomes
The student will learn how to use methods and concepts of efficient algorithms and how to demonstrate adequate innovative capabilities with respect to the used methods.
This course emphasizes the teaching of advanced concepts for the design and application of algorithms, data structures, and computer infrastructures in relation to their applicability in the real world. Based on a fundamental understanding of the covered concepts and methods, students should know how to select appropriate concepts and methods for problem settings in their professional life, and, if necessary, to extend and apply them in an adequate form. The students should be enabled to find adequate arguments for justifying their chosen problem solutions.

Content
In a problem oriented way the course presents systematic approaches to the design and analysis of efficient algorithms using standard tasks of information processing as generic examples. Special emphasis is put on the influence of data structures and computer architectures on the performance and cost of algorithms.In particular, the course emphasizes the design and analysis of algorithms on parallel computers and in hardware, which is increasingly important considering the growing presence of multicore architectures.

Media

- powerpoint slides with annotations using a tablet pc
- access to applets and Internet ressources
- lecture recording (camtasia)

Literature
Akl, S.G.: The Design and Analysis of Parallel Algorithms. Prentice-Hall, Englewood Cliffs, New Jersey,1989.
Borodin, Munro: The Computational Complexity of Algebraic and Numeric Problems (Elsevier 1975)
Cormen, Leiserson, Rivest: Introduction to Algorithms (MIT Press)
Sedgewick: Algorithms (Addison-Wesley) (many different versions available)
Elective literature:
will be announced in class

Course: Efficient Creativity - Processes and Methods within the Automotive Industry [2122371]

Coordinators: Lamberti
Part of the modules: Product Lifecycle Management (p. 79)[WI3INGMB21]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: eFinance: Information Engineering and Management for Securities Trading [2540454]

Coordinators: Ryan Riordan
Part of the modules: eBusiness and Service Management (p. 36)[WI3BWLISM1], eFinance (p. 40)[WI3BWLISM3], Topics in Finance II (p. 35)[WI3BWLFBV6], Topics in Finance I (p. 34)[WI3BWLFBV5]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Winter term	en

Learning Control / Examinations
70% of the mark is based on the written examination and 30% is based on assignments during the exercises.

Conditions
None.

Learning Outcomes
The students

- are able to understand the theoretical and pracitical aspects of securitites trading,
- are able to handle the relevant electronic tools for the evaluation of financial data
- are able to identify the incentives of the traders for participation in different market plattforms
- are able to analyse capital marketplaces concerning their efficiency, weaknesses and technical configuration
- are able to apply theoretical methods of econometrics
- are able to understand, criticize and present articles with a finance-scientific background
- learn to elaborate solutions in a team.

Content
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

Media

- Powerpoint presentations
- recorded lecture available on the internet

Literature

- Picot, Arnold, Christine Bortenlänger, Heiner Röhrl (1996): “Börsen im Wandel”. Knapp, Frankfurt
- Harris, Larry (2003): “Trading and Exchanges - Market Microstructure for Practitioners””. Oxford University Press, New York

Elective literature:

- Gomber, Peter (2000): “Elektronische Handelssysteme - Innovative Konzepte und Technologien”. Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): “Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading”. Wiley, Hoboken, NJ

Course: Introduction to Management Accounting []

Coordinators: Marc Wouters
Part of the modules: Management Accounting (p. 28)[WI3BWLIBU1]

ECTS Credits	Hours per week	Term	Instruction language
6	4	Winter term	en

Learning Control / Examinations
The assessment consists of a written exam (180 minutes) (following §4(2), 1 of the examination regulation).

Conditions
The LV Allgemeine Betriebswirtschaftslehre C (2600026) must have been completed before starting this course.

Learning Outcomes
Students have an overview of management accounting topics and they can use financial information for various purposes in organizations, in particular decision-making, product costing, and performance measurement.

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics are: short-term planning, investment decisions, budgeting, activity-based costing, and variance analysis. We will use mainly international material written in English. Next to that, attention will be given to German cost accounting. We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information). The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Media
The instructor uses a LCD projector and makes the slides available for the students. Students should have their own notebook computer with the usual software for spreadsheets, word processing, internet, etc.

Literature
Will be announced in the course.

Remarks
Maximum of 80 students.

Course: Introduction to Operations Research I [2550040]

Coordinators: Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann
Part of the modules: Introduction to Operations Research (p. 20)[WI1OR]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/2/2	Summer term	de

Learning Control / Examinations
See module description.

Conditions
See module information.

Learning Outcomes
See module informaion.

Content
Examples for typical OR problems.
Linear Programming: Basic notions, simplex method, duality, special versions of the simplex method (dual simplex method, three phase method), sensitivity analysis, parametric optimization, game theory.
Graphs and Networks: Basic notions of graph theory, shortest paths in networks, project scheduling, maximal and minimal cost flows in networks.

Media
Blackboard, slides, beamer presentations, lecture notes, OR software.

Literature

- Nickel, Stein, Waldmann: Operations Research, Springer, 2011
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

Course: Introduction to Operations Research II [2530043]

Coordinators: Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann
Part of the modules: Introduction to Operations Research (p. 20)[WI1OR]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/2/2	Winter term	de

Learning Control / Examinations
See module description.

Conditions
See corresponding module information. Especially the course *Introduction to Operations Research I* [2550040] is assumed.

Learning Outcomes
See module information.

Content
Integer and Combinatorial Programming: Basic notions, cutting plane metehods, branch and bound methods, branch and cut methods, heuristics.
Nonlinear Programming: Basic notions, optimality conditions, solution methods for convex and nonconvex optimization problems.
Dynamic and stochastic models and methods: dynamical programming, Bellman method, lot sizing models, dyanical and stochastic inventory models, queuing theory.

Media
Blackboard, slides, beamer presentations, lecture notes, OR software

Literature

- Nickel, Stein, Waldmann: Operations Research, Springer, 2011
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

Course: Introduction to Energy Economics [2581010]

Coordinators: Wolf Fichtner
Part of the modules: Energy Economics (p. 30)[WI3BWLIIP2]

ECTS Credits	Hours per week	Term	Instruction language
5.5	2/2	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Conditions
See module description.

Learning Outcomes

Content

Media
Media will be provided on the e-learning platform ILIAS.

Course: Introduction in Ceramics [2125755]

Coordinators: M. J. Hoffmann
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (20-30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Conditions
The course *Material Science I* [21760] has to be completed beforehand.
Basic knowledge of natural science and knowledge of the content *Material Science II* [21782] is recommended.

Learning Outcomes
The lecture gives an overview of the relationship among processing, microstructure and properties of ceramics. Important processing routes and characterization methods will be discussed on various examples.

Content
The course is arranged in the following units:

- Atomic bonding in solids
- Crystal structures and structural imperfections
- Surfaces, interfaces and grain boundaries
- Binary and ternary phase diagrams
- Structure of glass
- Characterization and processing of ceramic powders
- Shaping methods (pressing, slip casting, injection molding)
- Densification and grain growth (sintering)
- Introduction to fracture mechanics, strength and failure probability of brittle materials
- Materials behavior at high temperatures (creep, oxidation)
- Toughening mechanisms
- Methods for microstructural characterization

Literature
Elective literature:

- H. Salmang, H. Scholze, „Keramik“, Springer-Verlag
- Kingery, Bowen, Uhlmann, „Introduction To Ceramics“, Wiley-Verlag

Course: Basic Principles of Economic Policy [2560280]

Coordinators: Ingrid Ott
Part of the modules: Economic Policy I (p. 48)[WI3VWL8]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
The course “Basic Principles of Economic Policy” is compulsory and must be examined.

Recommendations
Prior attendance of the basic courses “Microeconomics” and “Macroeconomics” is required.

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

Media

- lecture slides
- exercises

Literature
See announcements to the lecture

Course: Introduction to GIS for students of natural, engineering and geo sciences [20712/13]

Coordinators: Rösch
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
4	2/2	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Remarks
For further information, see http://www.gik.uni-karlsruhe.de/print/index.html?&no_cache=1&P=1

Course: Railway Logistics, Management and Operating - Part I [19306]

Coordinators: Eberhard Hohnecker
Part of the modules: Foundations of Guided Systems (p. 86)[WI3INGBGU2]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
See module description.

Conditions
See module description.

Learning Outcomes

Content
capcities of lines and stations; singalling; safety operation

Literature
Elective literature:
Fiedler: Grundlagen der Bahntechnik, Werner Verlag Düsseldorf
Pachl: Systemtechnik des Schienenverkehrs, Teubner-Verlag, Stuttgart

Course: Technique of Electrical Installation [23382]

Coordinators: Kühner
Part of the modules: Electrical Power Engineering (p. 81)[WI3INGETIT1], Energy Generation and Network Components (p. 83)[WI3INGETIT4]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment consists of an written exam taking place at the beginn of the recess period (according to Section 4 (2), 1 of the examination regulation). The exam takes place in every summer semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The goal is to relay practical fundamentals.
The lecture gives an overview about the classical and modern methods of electrical installations of and in buildings.
Furthermore the students get an insight to regulations and engineer standards.

Content

- Capture 1: Electrical Power Distribution and Networking
- Capture 2: Electrical Power Supply of Buildings
- Capture 3: Electrical Power Supply in Buildings
- Capture 4: Protective Equipments
- Capture 5: Electrical Energy Applications
- Capture 6: Electrical Automation and System Engineering of Buildings
- Capture 7: Powermanagement of Buildings

Media
Online material is available on: http://www.ieh.unikarlsruhe.de/elektrische_installationstechnik.php

Course: Systems for Electrical Energy [23391/23393]

Coordinators: Thomas Leibfried
Part of the modules: Electrical Power Engineering (p. 81)[WI3INGETIT1], Power Networks (p. 82)[WI3INGETIT3]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) taking place at the beginn of the recess period (according to Section 4 (2), 1 of the examination regulation). The exam takes place in every summer semester. Re-examinations are offered at every ordinary examination date.

Conditions
For a successful participation knowledge of the content of the course *Higher mathematics* and especially of complex computation is assumed.
The course is an obligatory course within the module and has to be attended.

Learning Outcomes
The goal is to relay theoretical fundamentals in the field of electrical network analysis and in the field of electrical power networks.
In the first part the lecture deals with the calculation of transients in linear electrical networks using differential equations and the Laplace transform. In the second part of the lecture the electrical power network equipment is described.
Supporting the lecture, assignments to the curriculum are distributed. Their solution is presented and discussed during lecture hall exercises.

Content
In its first part, this lecture is a consequent continuation of the calculation of electrical networks as it is presented in the lecture “Linear electrical networks”. In the second part of this lecture, the basics of electric power network equipment are presented. This is the basis for all further lectures of power system technology.
The first chapter gives an introduction in the single phase and three phase AC system.
The second chapter deals with or is a repetition of electromagnetic basics. In a first step magnetic circuits and their calculation is treated. Then are subjects like main flux and stray flux are introduced, as well as self induction main inductance and stray inductance. The induction law leads directly to the transformer and the calculation of inductances and finally to the calculation of forces caused by a current flowing in a conduction which is located within a magnetic field.
The third and very comprehensive chapter deals with the mathematical description of electrical networks. Hereby, it is distinguished between networks with concentrated elements and networks with distributed elements. The calculation of networks with concentrated elements leads to differential equations with constant coefficients. Their solution as well as a special case, the sinusoidal excitation of such networks, is comprehensively demonstrated using examples. Finally, the description of electrical networks by a system of first order differential equations is shown and their solution is presented. Circuits with distributed elements are transmission lines. The transmission line theory for sinusoidal voltages and currents as well as for impulse voltages and currents is shown.
The fourth chapter deals with the Laplace Transform as a tool for electrical network analysis. First, the Duhamel integral (convolution integral) is presented. Then the Laplace Transform is derived out of the convolution integral and in a further subchapter the solution of differential equations using the Laplace Transform is demonstrated.
The fifth chapter deals with methods for network analysis. It demonstrates the mesh analysis, the nodal analysis, the superposition theorem, Norton’s theorem, Thevenin’s theorem and the Tellegen-Theorem. These formal methods are demonstrated using two examples circuits. These circuits are transistor amplifier with and without a transformer. This allows the calculation of networks with voltage or current dependent sources.
In the sixth chapter the structure of the electric power network is shown and explained.
The seventh chapter deals with power network equipment. Thereby, their steady state behaviour in the power network as well as their electrical and mechanical basic design is presented. The chapter contains synchronous generators, power transformers, reactors, capacitors, transmission lines and switch gear. For all of this power network equipment its steady state electrical circuit is derived. This gives the basis for all further lectures in the field of power network engineering.
To accompany the lecture, a collection of problems can be downloaded. During lecture hall exercises their solutions will be discussed.
The course comprises of the interleaved lecture blocks and exercises. Current information can be found on the IEH webpage (www.ieh.uni-karlsruhe.de).

Media
Online material is available on: www.ieh.uni-karlsruhe.de and can be downloaded using a password.

Literature
Elective literature:
Will be announced in the lecture notes.

Remarks
From the summer term 2010 on, the course is held in the summer term and reduced to 4.5 CP.

Course: Electrical Engineering I [23223]

Coordinators: Wolfgang Menesklou
Part of the modules: Electrical Engineering (p. 24)[WI1ING4]

ECTS Credits	Hours per week	Term	Instruction language
2.5	2/2	Winter term	

Learning Control / Examinations
The assessment consists of a written examination (120 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The student is supposed to develop an understanding for the basic terms of electrical engineering and should be able to carry out simple calculations of DC and AC circuits.

Content
This course introduces undergraduate students of business engineering into the basics of electrical science and engineering. Supporting the lecture, assignments to the curriculum are distributed. These are solved into additional (voluntary) tutorials.

- DC: Electrical sources, resistance, circuits, Kirchhoff's law
- Fields: Electrical and magnetic fields, dielectrics, inductance
- AC: Complex calculus, RLC circuits, filters

Media
Online material is available at http://www.iwe.kit.edu

Literature
Online material is available on http://www.iwe.kit.edu/
Elective literature:

- Grundlagen der Elektrotechnik, Gert Hagemann, ISBN 978-3-89104-730-9

Course: Electrical Engineering II [23224]

Coordinators: Wolfgang Menesklou
Part of the modules: Emphasis in Fundamentals of Engineering (p. 77)[WI3INGMB8]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
Successful completion of the module Electrical Engineering [WI1ING4].

Learning Outcomes
The student knows and understands basic components and techniques of electrical engineering.

Content
This course introduces undergraduate students of business engineering into topics of advanced electrical engineering like electrical instrumentation, semiconductors, and communication systems. Within the lecture, assignments to the curriculum are discussed and are used for preparation for written examination.

Media
Online material is available at http://www.iwe.kit.edu

Literature
Online material is available on http://www.iwe.kit.edu/
Elective literature:
Will be announced in the lecture.

Remarks
The credits have been changed from 4,5 to 5.

Course: elements and systems of technical logistics [2117096]

Coordinators: Martin Mittwollen, V. Madzharov
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1	Winter term	de

Learning Control / Examinations
The assessment consists due to the number of attendees, of an oral or a written exam according to Section 4 (2), 1 of the examination regulation.

Conditions
LV 2117095 must be passed successfully - examination dates are sequenced accordingly

Learning Outcomes
The student:

- knows about elements and systems of technical logistics
- knows about structures and function of special conveying machines
- knows about material flow systems
- and is able to equip material flow systems with applicable machines

Content
material flow systems and their (conveying) technical components
mechanical behaviour of conveyors;
dedicated use of knowledge from *basics of technical logistics*
detailed structure and function of conveyor machines; elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)
sample applications and calculations in addition to the lectures inside practical lectures

Media
supplementary sheets,projector, blackboard

Literature
recommendations during lectures

Course: Energy efficient intralogistic systems [2117500]

Coordinators: F. Schönung
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

Conditions
Knowledge of Electrical Engineering and Technical Mechanics is recommended.

Learning Outcomes
The lecture provides basics for the analysis and the design of energy and resource efficient intralogistic systems for production and distribution.

Content
The main focuses of the course are:

- processes in Intralogistic systems
- evaluation of energy consumption of conveyors
- modeling of conveying systems
- methods for energy savings
- approaches for energy efficiency increasing of continuous and discontinuous conveyors
- dimensioning energy efficient drives
- new approaches for resource efficient conveying systems.

Course: Energy Policy [2581959]

Coordinators: Martin Wietschel
Part of the modules: Energy Economics (p. 30)[WI3BWLIIP2]

ECTS Credits	Hours per week	Term	Instruction language
3.5	2/0	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes

Content
The course deals with material and energy policy of policy makers and includes the effects of such policies on the economy as well as the involvement of industrial and other stakeholders in the policy design. At the beginning the neoclassical environment policy is discussed. Afterwards the Sustainable Development concept is presented and strategies how to translate the concept in policy decision follows. In the next part of the course an overview about the different environmental instruments classes, evaluation criteria for these instruments and examples of environmental instruments like taxes or certificates will be discussed. The final part deals with implementation strategies of material and energy policy.

Literature
Will be anounced in the lecture.

Course: Enterprise Risk Management [2530326]

Coordinators: Ute Werner
Part of the modules: Risk and Insurance Management (p. 32)[WI3BWLFBV3]

ECTS Credits	Hours per week	Term	Instruction language
4.5	3/0	Winter term	de

Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

Conditions
None.

Learning Outcomes
Learning to identify, to analyse and to assess business risks; this serves as a basis for strategy and policy design regarding risks and opportunities of an enterprise. Introduction to approaches that allow to consider area-specific risk objectives, risk-bearing capacity and risk acceptance.

Content

1. Concepts and practice of risk management, based on decision theory
2. Goals, strategies and policies for the identification, analysis, assessment and management of risks
3. Insurance as an instrument for loss-financing
4. Selected aspects of risk management: e.g. environmental protection, organizational failure and D&O-coverage, development of a risk management culture
5. Organisation of risk management
6. Approaches for determining optimal combinations of risk management measures considering their investment costs and outcomes.

Literature

- K. Hoffmann. Risk Management - Neue Wege der betrieblichen Risikopolitik. 1985.
- R. Hölscher, R. Elfgen. Herausforderung Risikomanagement. Identifikation, Bewertung und Steuerung industrieller Risiken. Wiesbaden 2002.
- W. Gleissner, F. Romeike. Risikomanagement - Umsetzung, Werkzeuge, Risikobewertung. Freiburg im Breisgau 2005.
- H. Schierenbeck (Hrsg.). Risk Controlling in der Praxis. Zürich 2006.

Elective literature:
Additional literature is recommended during the course.

Remarks
To attend the course please register at the secretariy of the chair of insurance science.

Course: Additional Course Safety Sciences [siwi_wahl]

Coordinators: Ute Werner
Part of the modules: Safety Science II (p. 92)[WI3INGINTER4]

ECTS Credits	Hours per week	Term	Instruction language
2-9		Winter / Summer Term	de

Learning Control / Examinations
See module description.

Conditions
See module description.
This course must be filled with one or more other courses from safety sciences to be chosen by the student in agreement with the module coordinator in order to fullfill the credits requirements of the module.

Learning Outcomes
Cf. to the course actually selected.

Content
Cf. to the course actually selected.

Course: Renewable Energy Sources - Technologies and Potentials [2581012]

Coordinators: Russell McKenna
Part of the modules: Energy Economics (p. 30)[WI3BWLIIP2]

ECTS Credits	Hours per week	Term	Instruction language
3.5	2/0	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Conditions
None.

Learning Outcomes

Content

Media
Media will likely be provided on the e-learning platform ILIAS.

Course: Energy Generation [23356]

Coordinators: Bernd Hoferer
Part of the modules: Electrical Power Engineering (p. 81)[WI3INGETIT1], Energy Generation and Network Components (p. 83)[WI3INGETIT4]

ECTS Credits	Hours per week	Term	Instruction language
3	2/0	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (20 min) taking place at the beginn of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every winter semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The goal is to relay theoretical fundamentals.
The lecture covers the entire topic of power generation from conversion of primary energy resources in coal fired power plants and nuclear power plants to utilisation of renewable energy. The lecture gives a review of the physical fundamentals, technicaleconomical aspects and potential for development of power generation both conventional generation and renewable generation.

Content

- Energy resources
- Energy consumption
- Types and use of power plants
- Conversion of primary energy in power plants
- Thermodynamical fundamental terms
- Process in steam power plants
- Steam power plants components
- Flue gas cleaning
- Thermal power plants
- Nuclear power plants
- Hydroelectric power plants
- Wind energy converters
- Solar energy plants

Media
Material is available at the beginning of the lecture.

Literature
Elective literature:
Schwab; Elektroenergiesysteme; 1. Auflage 2006.

Course: eServices [2540466]

Coordinators: Christof Weinhardt, Gerhard Satzger, Francois Habryn
Part of the modules: Specialization in Customer Relationship Management (p. 42)[WI3BWLISM5], eBusiness and Service Management (p. 36)[WI3BWLISM1]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	en

Learning Control / Examinations
The assessment consists of a written examination (60 min.) according to Section 4.2.1 of the examination regulation and by submitting written papers as part of the exercise (according to Section 4.2.3 of the examination regulation).

Conditions
None.

Learning Outcomes
This course conveys the fundamental knowledge to understand the importance of services in our economy and the impact of information and communication technology (ICT) on existing and emerging service industries. Combining theoretical models with multiple case studies and application scenarios, this course will enable students:

- to understand different service perspectives and apply the general concept of “value co-creation”
- to know and to be able to apply concepts, methods and tools used for the design, engineering and management of eServices
- to be familiar with current research topics
- to gain experience in group work and to improve their presentation skills
- to be exposed to English language in preparation for working in international environments

Content
The world is moving more and more towards “service-led” economies: in developed countries services already account for around 70% of gross value added. In order to design, engineer, and manage services, traditional “goods-oriented” models are often inappropriate. In addition, the rapid development of information and communication technology (ICT) pushes the economic importance of services that are rendered electronically (eServices) and, thus, drives competitive changes: increased interaction and individualization open up new dimensions of “value co-creation” between providers and customers; dynamic and scalable service value networks replace static value chains; digital services can be globally delivered and exchanged across today’s geographic boundaries;

Building on a systematic categorization of (e)Services and on the general notion of “value co-creation”, we cover concepts and foundations for engineering and managing IT-based services, allowing for further specialization in subsequent KSRI courses. Topics include service innovation, service economics, service modeling as well as the transformation and coordination of service value networks.

In addition, case studies, hands-on exercises and guest lectures will illustrate the applicability of the concepts. English language is used throughout the course to acquaint students with international environments.

Media

- PowerPoint slides

Literature

- Anderson, J./ Nirmalya, K. / Narus, J. (2007), Value Merchants.
- Lovelock, C. / Wirtz, J. (2007) Services Marketing, 6th ed.
- Meffert, H./Bruhn, M. (2006), Dienstleistungsmarketing, 5. Auflage,
- Spohrer, J. et al. (2007), Steps towards a science of service systems. In: IEEE Computer, 40 (1), p. 70-77
- Stauss, B. et al. (Hrsg.) (2007), Service Science – Fundamentals Challenges and Future Developments.
- Teboul, (2007), Services is Front Stage.
- Vargo, S./Lusch, R. (2004) Evolving to a New Dominant Logic for Marketing, in: Journal of Marketing 68(1): 1–17.
- Shapiro, C. / Varian, H. (1998), Information Rules - A Strategic Guide to the Network Economy

Course: Driving Dynamics Evaluation within the Global Vehicle Simulation [21850]

Coordinators: Schick
Part of the modules: Handling Characteristics of Motor Vehicles (p. 62)[WI3INGMB6]

ECTS Credits	Hours per week	Term	Instruction language
3	2/0	Summer term	de

Learning Control / Examinations
The assessment will consist of an oral exam (30-40 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
See module description.
Previous visit of *Handling Characteristics of Motor Vehicles I* [21807] is recommended.
See module description.

Learning Outcomes
The students have an overview of the vehicle dynamics simulation, the model parametrization and the related data sources. They have good knowledge about vehicle dynamics test methods and related execution of virtual test driving (open loop, closed loop). They are able to evaluate driving behavior based on self-created results. They have achieved knowledge about influences and interactions of components such as tires, suspension, kinematics and compliance, roll bars, steering, brakes, mass distribution and powertrain and they have the qualification to design components with regard to global vehicle behavior.

Content

1. Testing and evaluation methods
2. Fundamentals of vehicle dynamics simulation
3. Execution of virtual test driving and evaluation of the results
4. Influence of several components and optimization of global driving behavior

Literature
Elective literature:

1. Reimpell, J.: Fahrwerktechnik: Grundlagen, Vogel Verlag, 1995
2. Unrau, H.-J.: Scriptum zur Vorlesung “Fahreigenschaften I”
3. Unrau, H.-J.: Scriptum zur Vorlesung “Fahreigenschaften II”
4. IPG: Benutzerhandbuch CarMaker

Course: Handling Characteristics of Motor Vehicles I [2113807]

Coordinators: Hans-Joachim Unrau
Part of the modules: Handling Characteristics of Motor Vehicles (p. 62)[WI3INGMB6]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30-40 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The students know the basic connections between drivers, vehicles and environment. They can build up a vehicle simulation model, with which forces of inertia, aerodynamic forces and tyre forces as well as the appropriate moments are considered. They have proper knowledge in the area of tyre characteristics, since a special meaning comes to the tire behavior during driving dynamics simulation.

Content

1. Problem definition: Control loop driver - vehicle - environment (e.g. coordinate systems, modes of motion of the car body and the wheels)
2. Simulation models: Creation from motion equations (method according to D'Alembert, method according to Lagrange, programme packages for automatically producing of simulation equations), model for handling characteristics (task, motion equations)
3. Tyre behavior: Basics, dry, wet and winter-smooth roadway

Literature
Elective literature:

1. Willumeit, H.-P.: Modelle und Modellierungsverfahren in der Fahrzeugdynamik, B. G. Teubner Verlag, 1998
2. Zomotor, A.: Fahrwerktechnik: Fahrverhalten, Vogel Verlag, 1991
3. Gnadler, R.: Umdrucksammlung zur Vorlesung "Fahreigenschaften von Kraftfahrzeugen I"

Course: Handling Characteristics of Motor Vehicles II [2114838]

Coordinators: Hans-Joachim Unrau
Part of the modules: Handling Characteristics of Motor Vehicles (p. 62)[WI3INGMB6]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment will consist of an oral exam (30-40 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
It is recommended to attend the course *Handling Characteristics of Motor Vehicles I* [21807] beforehand.

Learning Outcomes
The students have an overview of common test methods, with which the handling of vehicles is gauged. They are able to interpret results of different stationary and transient testing methods. Apart from the methods, with which e.g. the driveability in curves or the transient behaviour from vehicles can be registered, also the influences from cross-wind and from uneven roadways on the handling characteristics are well known. They are familiar with the stability behavior from single vehicles and from vehicles with trailer.

Content

1. Vehicle handling: Bases, steady state cornering, steering input step, single sine, double track switching, slalom, cross-wind behavior, uneven roadway
2. stability behavior: Basics, stability conditions for single vehicles and for vehicles with trailer

Literature
Elective literature:

1. Richter, B.: Schwerpunkte der Fahrzeugdynamik, Verlag TÜV, 1990
2. Zomotor, A.: Fahrwerktechnik: Fahrverhalten, Vogel Verlag, 1991
3. Gnadler, R.: Umdrucksammlung zur Vorlesung “Fahreigenschaften von Kraftfahrzeugen II “

Course: Vehicle Mechatronics I [2113816]

Coordinators: Ammon
Part of the modules: Handling Characteristics of Motor Vehicles (p. 62)[WI3INGMB6], Vehicle Development (p. 63)[WI3INGMB14]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The assessment will consist of an oral exam (30-40 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
It is recommeded to have knowledge of control engineering, technical mechanics and automobile technology.

Learning Outcomes
The students have an overview of the system science field of mechatronics and its application in the area of vehicle conception, especially in the context of vehicle system dynamics. They know the tools and methods for a systemactical analysis, conception, and design of mechatronic systems, focussing on mechatronically extended suspension systems.

Content
1. Introduction: Mechatronics in vehicle technology
2. Vehicle Control systems
Brake- and traction controls (ABS, ASR, automated power train controls)
Active and semiactive suspension systems, active stabilizor bars
Vehicle dynamics controls, driver assistence systems
3. Modelling technology
Mechanics - multi body dynamics
Electrical and electronical systems, control systems
Hydraulics
Interdisciplinary coupled systems
4. Computer simulation technology
Numerical integration methods
Quality (validation, operating areas, accuracy, performance)
Simulator-coupling (hardware-in-the-loop, software-in-the-loop)
5. Systemdesign (example: brake control)
Demands, requirements (funktion, safety, robustness)
Problem setup (analysis - modelling - model reduction)
Solution approaches
Evaluation (quality, efficiency, validation area, concept ripeness)

Literature
Elective literature:

1. Ammon, D., Modellbildung und Systementwicklung in der Fahrzeugdynamik, Teubner, Stuttgart, 1997
2. Mitschke, M., Dynamik der Kraftfahrzeuge, Bände A-C, Springer, Berlin, 1984ff
3. Miu, D.K., Mechatronics - Electromechanics and Contromechanics, Springer, New York, 1992
4. Popp, K. u. Schiehlen, W., Fahrzeugdynamik - Eine Einführung in die Dynamik des Systems Fahrzeug-Fahrweg, Teubner, Stuttgart, 1993
5. Roddeck, W., Einführung in die Mechatronik, Teubner, Stuttgart, 1997
6. Zomotor, A., Fahrwerktechnik: Fahrverhalten, Vogel, Würzburg, 1987

Course: Vehicle Comfort and Acoustics I [2113806]

Coordinators: Frank Gauterin
Part of the modules: Handling Characteristics of Motor Vehicles (p. 62)[WI3INGMB6]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30-40 min) taking place in the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The students know what are noise and vibration, how they are generated, and how they are perceived by human beings.
They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved.

Content

Media
Lecture Script

Literature
Elective literature:

1. Michael Möser, Technische Akustik, Springer, Berlin, 2005
2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006
3. Manfred Mitschke, Dynamik der Kraftfahrzeuge, Band B: Schwingungen, Springer, Berlin, 1997

Remarks
In the following summer semester this lecture is to be continued with the lecture *Vehicle Comfort and Acoustics II* [21825]. In this lecture, noise and vibration characteristics as well as optimization possibilities of other components will be discussed. Moreover, the issue of traffic handled will be brought up. This lecture may be visited independently of the first part.
suche

Course: Vehicle Comfort and Acoustics II [2114825]

Coordinators: Frank Gauterin
Part of the modules: Handling Characteristics of Motor Vehicles (p. 62)[WI3INGMB6]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (30-40 minutes) according to Section 4(2), 1 of the examination regulation.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
The course can be attended independently from the course *Vehicle Comfort and Acoustics II* [21806].

Learning Outcomes
The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved.

They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods.

Content

Media
Lecture script.

Course: Remote Sensing [GEOD-BFB-1]

Coordinators: Hinz, Weidner
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
7	3/2/1	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Media
e-Learning-Modul “Fernerkundung” (geoinformation.net)
lecture notes

Literature
Elective literature:
Albertz: Fernerkundung

Remarks
For further information, see http://www.ipf.uni-karlsruhe.de/

Course: Remote Sensing Systems [20241/42]

Coordinators: Hinz, Weidner
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
2	1/1	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Media
e-Learning-Modul “Fernerkundung” (geoinformation.net)
Skript

Literature
Elective literature:
Albertz: Fernerkundung

Remarks
For further information, see http://www.ipf.uni-karlsruhe.de/

Course: Remote Sensing Methods [20243/44]

Coordinators: Hinz, Weidner
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
2	2/1	Summer term	de

Learning Control / Examinations

Conditions
It is recommended to attend the course *Thermodynamics* beforehand.

Learning Outcomes

Content

Media
e-Learning-Modul “Fernerkundung” (geoinformation.net)
lecture notes

Course: Manufacturing Engineering [2149657]

Coordinators: Volker Schulze
Part of the modules: Production Engineering I (p. 70)[WI3INGMB10], Production Engineering II (p. 71)[WI3INGMB4], Production Engineering III (p. 72)[WI3INGMB7], Manufacturing Engineering (p. 73)[WI3INGMB23]

ECTS Credits	Hours per week	Term	Instruction language
9	4/1	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (180 min) taking place at the beginning of the recess period (according to Section 4(2), 1) of the examination regulation).
The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
Successfull Completion of the modules *Material Science* [WI1ING2] and *Engineering Mechanics* [WI1ING3]

Learning Outcomes
The student

- is able to **name** the different manufacturing methods and to **explain** their functions
- is able to **classify** the manufacturing methods by their general structure and functionality according to specific main groups
- is able to **perform** a process selection based on the methods he/she has **learned about** and their characteristics
- is able to **identify** the **correlation** between different methods
- is able to **evaluate** the different methods against specific applications on the basis of technical and economical aspects

Content
The objective of the lecture is to look at manufacturing engineering within the wider context of production engineering, to provide an overview over the different manufacturing methods and to impart detailed process knowledge of the common methods. The lecture covers the basic principles of manufacturing engineering and deals with the manufacturing methods according to their classification into main groups on the basis of technical and economical aspects. The lecture is completed with topics such as process chains in manufacturing.

The following topics will be covered:

- Introduction
- Quality control
- Primary processing (casting, plastics engineering, sintering, generative methods),
- Forming (sheet-metal forming, massive forming, plastics engineering),
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment
- Process chains in manufacturing
- Work preparation

Media
Slides and lecture notes for the manufacturing engineering lecture will be made available through Ilias.

Course: Financial Management [2530216]

Coordinators: Martin E. Ruckes
Part of the modules: Essentials of Finance (p. 31)[WI3BWLFBV1]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (60 min.) according to Section 4 (2), 1 of the examination regulation.
The exam takes place at every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Recommendations
Knowledge of the content of the course Business Administration and Management Science C [25026/25027] is recommended.

Learning Outcomes
Students get an comprehensive insight into financing, capital investments of firms and the essentials of valuation.

Content
Analytical methods and theories in the field “Capital investments and financing” with the main focus on:

- Capital Structure
- Dividend policy
- Essentials of valuation
- Investment decisions
- Short term/ long term finance
- Working Capital Management
- Corporate Governance

Literature
Elective literature:

- Ross, Westerfield, Jaffe, Jordan (2008): Modern Financial Management, McGraw-Hill International Edition
- Berk, De Marzo (2007): Corporate Finance, Pearson Addison Wesley

Course: Financial Intermediation [2530232]

Coordinators: Martin E. Ruckes
Part of the modules: Topics in Finance I (p. 34)[WI3BWLFBV5], Topics in Finance II (p. 35)[WI3BWLFBV6]

ECTS Credits	Hours per week	Term	Instruction language
4.5	3	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
Students are introduced to the theoretical fundamentals of financial intermediation.

Content

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Competition in the banking sector
- Stability of the financial system
- The macroeconomic role of financial intermediation

Literature
Elective literature:

- Hartmann-Wendels/Pfingsten/Weber (2006): Bankbetriebslehre, 4. Auflage, Springer Verlag.
- Freixas/Rochet (1997): Microeconomics of Banking, MIT Press.

Course: Fluid Power Systems [2114093]

Coordinators: Marcus Geimer
Part of the modules: Mobile Machines (p. 64)[WI3INGMB15], Automotive Engineering (p. 61)[WI3INGMB5]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
Assessment for the module *Mobile Machines*: See module description.
Assessment for the module *Automotive Engineering*: The assessment consists of an oral exam (20 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The students will be able to

- know and understand physical principles of fluid power systems
- know the current components and their operating mode
- know the advantages and disadvantages of different components
- dimension the components for a given purpose and to
- calculate simple systems

Content
In the range of hydrostatics the following topics will be introduced:

- Hydraulic fluids
- Pumps and motors
- Valves
- Accessories
- Hydraulic circuits.

In the range of pneumatics the following topics will be introduced:

- Compressors
- Motors
- Valves
- Pneumatic circuits.

Course: Introduction to Engineering Geology and Hydrogeology [10557]

Coordinators: Tanja Liesch, Philipp Blum
Part of the modules: Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
Written exam at the end of the lecture period. The exam will be graded. A re-examination is offered 4-6 weeks later.

Conditions
none

Recommendations
None.

Learning Outcomes
Hydrogeology:

- Acquisition of hydrogeological basic knowledge and fundamental terms
- Preparation for the subsequent lecture “Principles of Hydrogeology”

Content
Hydrogeology:

- Hydrogeology: Definition and objectives
- Basics of the hydrologic cycle
- Basics of groundwater hydraulics: subsurface voids, porosity, aquifers ans aquifuges, types of aquifers, basics of hydrostatics and hydrodynamics, Bernoulli’s law, Darcy’s law
- Springs, wells and ponds
- Illustration of groundwater morphology
- Basics of groundwater chemistry and quality

Literature
Hydrogeology:

- Hölting, B. & Coldewey, W. (2005): Hydrogeologie: Einführung in die allgemeine und angewandte Hydrogeologie; 69 Tabellen/. - 6., überarb. und erw. Aufl.; Elsevier, Spektrum Akad. Verl., 326 S.
- Matthess, G. & Ubell, K. (2003) Lehrbuch der Hydrogeologie Band 1: Allgemeine Hydrogeologie – Grundwasserhaushalt; 2., überarb. u. erw. Aufl. Borntraeger, 2003. - XII, 575 S.
- DIN 4049, Teil 1-3

Course: Business Strategies of Banks [2530299]

Coordinators: Wolfgang Müller
Part of the modules: Topics in Finance I (p. 34)[WI3BWLFBV5], Topics in Finance II (p. 35)[WI3BWLFBV6]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
Students are told the basics of commercial banking.

Content
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.
The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

Literature
Elective literature:

- A script is disseminated chapterwise within the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 2. Auflage, Springer

Course: Global Optimization I [2550134]

Coordinators: Oliver Stein
Part of the modules: Applications of Operations Research (p. 56)[WI3OR5], Methodical Foundations of OR (p. 58)[WI3OR6]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Winter term	de

Learning Control / Examinations
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.
The examination is held in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.
The examination can also be combined with the examination of *Global Optimization II* [2550136]. In this case, the duration of the written examination takes 120 minutes.
In a combined examination of *Global Optimization I* [2550134] and *Global Optimization II* [2550136], upon attaining more then 60% of the exercise points, the grade of the passed examination is improved by a third of a grading step.
In a combined examination of *Global Optimization I* [2550134] and *Global Optimization II* [2550136], upon attaining more then 60% of the computer exercise points, the grade of the passed examination is improved by a third of a grading step.

Conditions
None.

Learning Outcomes
The student

- knows and understands the fundamentals of deterministic global optimization,
- is able to choose, design and apply modern techniques of deterministic global optimization in practice.

Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
Elective literature:

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

Remarks
Part I and II of the lecture are held consecutively in the *same* semester.

Course: Global Optimization II [2550136]

Coordinators: Oliver Stein
Part of the modules: Methodical Foundations of OR (p. 58)[WI3OR6]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Winter term	de

Learning Control / Examinations
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.
The examination is held in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration to the written examinationen is subject to fulfilling the prerequisite.
The examination can also be combined with the examination of *Global Optimization I* [2550134]. In this case, the duration of the written examination takes 120 minutes.
In a combined examination of *Global Optimization I* [2550134] and *Global Optimization II* [2550136], upon attaining more then 60% of the exercise points, the grade of the passed examination is improved by a third of a grading step.
In a combined examination of *Global Optimization I* [2550134] and *Global Optimization II* [2550136], upon attaining more then 60% of the computer exercise points, the grade of the passed examination is improved by a third of a grading step.

Conditions
None.

Learning Outcomes
The student

- knows and understands the fundamentals of deterministic global optimization,
- is able to choose, design and apply modern techniques of deterministic global optimization in practice.

Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
The global solution of convex optimization problems is subject of part I of the lecture.
Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via αBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
Elective literature:

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

Remarks
Part I and II of the lecture are held consecutively in the *same* semester.

Course: Basics of Automotive Engineering I [2113805]

Coordinators: Frank Gauterin, Unrau
Part of the modules: Automotive Engineering (p. 61)[WI3INGMB5]

ECTS Credits	Hours per week	Term	Instruction language
6	4	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) taking place in the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The students know the movements and the forces at the vehicle and are familiar with active and passive security. They have proper knowledge about operation of engines, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and the calculation methods for sizing. They are able to lay out the appropriate modules of a vehicle.

Content

1. Driving mechanics: Driving resistances and driving performances, mechanics of the longitudinal and transverse forces, collision mechanics
2. Engine: Classification, comparison processes, real processes, waste gas emission, alternative drives
3. Transmission: Clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)
4. Power transmission and distribution: drive shafts, cardon joints, differentials

Literature
Elective literature:

1. Reimpell, J.: Fahrwerktechnik: Fahrzeugmechanik, Vogel Verlag, 1992
2. Braes, H.H.; Seiffert, U.: Handbuch Kraftfahrzeugtechnik, Vieweg & Sohn-Verlag, 2005
3. Gnadler, R.: Umdrucksammlung zur Vorlesung “Grundlagen der Fahrzeugtechnik I”

Course: Basics of Automotive Engineering II [2114835]

Coordinators: Frank Gauterin, Unrau
Part of the modules: Automotive Engineering (p. 61)[WI3INGMB5]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (90 min) taking place in the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
It is recommeded to attend the course *Basics of Automotive Engineering I* [21805].

Learning Outcomes
The students have an overview of the modules, which are necessary for the road holding of a motor vehicle and the power transmission between vehicle bodywork and roadway. They have knowledge of different wheel suspensions, the tyres, the steering elements and the brakes. They know different execution forms, the function and the influence on the driving or brake behavior. They are able to construct the appropriate components correctly.

Content

1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Steering elements of single vehicles and of trailers
3. Brakes: Disc brake, drum brake, retarder, comparison of the designs

Literature
Elective literature:

1. Reimpell, J.: Fahrwerktechnik: Grundlagen, Vogel Verlag, 1995
2. Burckhardt, M.: Bremsdynamik und Pkw-Bremsanlagen, Vogel Verlag, 1991
3. Gnadler, R.: Umdrucksammlung zur Vorlesung “Grundlagen der Fahrzeugtechnik II”

Course: Foundations of Informatics I [2511010]

Coordinators: Rudi Studer, Elena Simperl
Part of the modules: Introduction to Informatics (p. 19)[WI1INFO]

ECTS Credits	Hours per week	Term	Instruction language
5	2/2	Summer term	de

Learning Control / Examinations
The assessment consists of an 1h written exam according to Section 4 (2), 1 of the examination regulation.
The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
Central theoretic basics and solution approaches coming from all areas of computer science are presented as well as illustrated and exercised using examples.

The following topics are covered:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Content

Media
Lecture slides

Literature
Elective literature:

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

Additional literature will be announced in the lecture.

Course: Foundations of Informatics II [2511012]

Coordinators: Hartmut Schmeck
Part of the modules: Introduction to Informatics (p. 19)[WI1INFO]

ECTS Credits	Hours per week	Term	Instruction language
5	3/1	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation.
If the grade obtained in the written exam is in between 1.3 and 4.0, a successful bonus exam will improve the grade by one level.
The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
It is recommended to attend the course *Foundations of Informatics I* [2511010] beforehand.
Active participation in the practical lessons is strongly recommended.

Learning Outcomes

Content

Literature
Elective literature:
Will be announced in the lecture.

Course: Internal Combustion Engines and Exhaust Gas Aftertreatment Technology [2134138]

Coordinators: Lox
Part of the modules: Engine Development (p. 69)[WI3INGMB17], Combustion Engines II (p. 68)[WI3INGMB19]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) according to §4 (2), 2 of the examination regulation. The grade of the exam is included in the overall grade of the module with a weighting factor of 3.

Conditions
The course *Combustion Engines A* [21101] has to be completed beforehand.

Learning Outcomes

Content

Literature
Will be announced in the lecture.

Course: Basics of microsystemtechnology I [2141861]

Coordinators: Arndt Last
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None.

Recommendations
The course Microsystem technology II [2142874] and the practical exercise [2143875] are recommended.

Learning Outcomes
Learning the basics of structuring silicon, crystallographic background and the processes required.

Content
- Silicon and microelectronics techniques
- Physical basics and materials for the micro structure technology
- Basic technologies
- Silicon micro mechanics

Media
Lecture notes at the institutes website

Literature

- Microsystemtechnology for engineers, W. Menz und J. Mohr, VCH Verlagsgesellschaft, Weinheim 2005.
- Fundamentals of Microfabrication, M. Madou, CRC Press, Boca Raton 1997

Remarks
There are two fixed examination dates per year, both Thursdays, in the second complete week in September and the second week after Ash Wednesday in March or April.

Course: Basics of microsystem technology II [2142874]

Coordinators: Arndt Last
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None.

Recommendations
The course Microsystem technology I [2141861] and the practical exercise [2143875] are recommended.

Learning Outcomes
Learning the basics of UV-lithography, deep X-ray lithography, LIGA-process and divers other processes used for micro structuring.

Content
- lithography
- LIGA-process
- mechanical micro structuring
- structuring with lasers
- joining techniques
- micro systems

Media
Lecture notes at the institutes website

Literature

- Micro system technology for engineers, W. Menz und J. Mohr, VCH Verlagsgesellschaft, Weinheim 2005.
- Fundamentals of Microfabrication, M. Madou, CRC Press, Boca Raton 1997.

Remarks
There are two fixed examination dates per year, both Thursdays, in the second complete week in September and the second week after Ash Wednesday in March or April.

Course: Fundamentals of Production Management [2581950]

Coordinators: Frank Schultmann
Part of the modules: Industrial Production I (p. 29)[WI3BWLIIP]

ECTS Credits	Hours per week	Term	Instruction language
5.5	2/2	Summer term	de

Learning Control / Examinations
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Conditions
This course is compulsory in module “Industrial Production I” [WW4BWLIIP].

Learning Outcomes

- Students should describe the tasks of strategic corporate planning.
- Students should be able to use general approaches in order to solve these problems.

Content
This lecture focuses on strategic production management with respect to various economic aspects. Interdisciplinary approaches of systems theory will be used to describe the challenges of industrial production. This course will emphasize the importance of R&D as the central step in strategic corporate planning to ensure future long-term success.
In the field of site selection and planning for firms and factories, attention will be drawn upon individual aspects of existing and greenfield sites as well as existing distribution and supply centres. Students will obtain knowledge in solving internal and external transport and storage problems with respect to supply chain management and disposal logistics.

Media
Media will be provided on learning platform.

Literature
will be announced in the course

Course: basics of technical logistics [2117095]

Coordinators: Martin Mittwollen, V. Madzharov
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
4	3/1	Winter term	de

Learning Control / Examinations
The assessment consists due to the number of attendees, of an oral or a written exam according to Section 4 (2), 1 of the examination regulation.

Conditions
None.

Recommendations
Some technical knowledge

Learning Outcomes
The student:

- knows about processes and machines of technical logistics
- is able to handle fundamental structures and the impacts
- is able to refer to industrially used machines and
- practices the calculation on applying knowledge from lessons.

Content
Bases effect model of conveyor machines made for the change of position and orientation; conveyor processes; identification systems; drives; mechanical behaviour of conveyors; structure and function of conveyor machines; basic examples for elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation)
sample applications and calculations in addition to the lectures inside practical lectures

Media
supplementary sheets,projector, blackboard

Literature
Recommendations during lessons

Course: Basics of Ground Born Guided Systems [19066]

Coordinators: Michael Weigel
Part of the modules: Foundations of Guided Systems (p. 86)[WI3INGBGU2]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1	Summer term	de

Learning Control / Examinations
See module description.

Conditions
See module description.
Siehe Modulbeschreibung.

Learning Outcomes

Content
definitions; basics in operation; track; layout of lines; dynamics; vehicles

Literature
Elective literature:
Zilch,Diederichs,Katzenbach (Hrsg): Handbuch für Bauingenieure, Springer-Verlag 2001

Course: Basics and Methods for Integration of Tires and Vehicles [2114843]

Coordinators: Leister
Part of the modules: Vehicle Development (p. 63)[WI3INGMB14]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment will consist of an oral exam (30 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
Knowledge of automobile technology is recommeded.

Learning Outcomes

Content

Course: Fundamentals for Design of Motor-Vehicle Bodies I [2113814]

Coordinators: Bardehle
Part of the modules: Automotive Engineering (p. 61)[WI3INGMB5]

ECTS Credits	Hours per week	Term	Instruction language
1.5	1	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The students have an overview of the fundamental possibilities for design and manufacture of motor-vehicle bodies. They know the complete process, from the first idea, through the concept to the dimensioned drawings (e.g. with FE-methods). They have knowledge about the fundamentals and their correlations, so that the design of relevant assemblies can be performed to the required demands.

Content

Literature
Elective literature:

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

Course: Fundamentals for Design of Motor-Vehicle Bodies II [2114840]

Coordinators: Bardehle
Part of the modules: Automotive Engineering (p. 61)[WI3INGMB5]

ECTS Credits	Hours per week	Term	Instruction language
1.5	1	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
It is recommended to attend the course *Fundamentals for Design of Motor-Vehicle Bodies I* [21814] beforehand.

Learning Outcomes
The students know that, often the design of seemingly simple detail components can result in the solution of complex problems. They have knowledge in testing procedures of body properties. They have an overview of body parts such as bumpers, window lift mechanism and seats. They understand, as well as, parallel to the normal electrical system, about the electronic side of a motor vehicle. They have knowledge of the inert safety of a motor vehicle.

Content

Literature
Elective literature:

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

Course: Fundamentals in the Development of Commercial Vehicles I [21812]

Coordinators: Zürn
Part of the modules: Mobile Machines (p. 64)[WI3INGMB15], Vehicle Development (p. 63)[WI3INGMB14]

ECTS Credits	Hours per week	Term	Instruction language
1.5	1	Winter term	de

Learning Control / Examinations
Assessment for the module *Mobile Machines*: See module description.
Assessment for the module *Automotive Engineering*: The assessment consists of an oral exam (20 min) taking place in the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The students have proper knowledge about the process of commercial vehicle development starting from the concept and the underlying original idea to the real design. They know that the customer requirements, the technical realisability, the functionality and the economy are important drivers. The students are able to develop parts and components. Furthermore they have knowledge about different cap concepts, the interior and the interior design process.

Content

1. Definitions in the area of commercial vehicles
2. Driver of the commercial vehicle development process
3. Development process
4. Development tools
5. Specification criteria
6. Component and parts development
7. Cab

Literature
Elective literature:

1. Marwitz, H., Zittel, S.: ACTROS - die neue schwere Lastwagenbaureihe von Mercedes-Benz, ATZ 98, 1996, Nr. 9
2. Alber, P., McKellip, S.: ACTROS - Optimierte passive Sicherheit, ATZ 98, 1996
3. Morschheuser, K.: Airbag im Rahmenfahrzeug, ATZ 97, 1995, S. 450 ff.

Course: Fundamentals in the Development of Commercial Vehicles II [21844]

Coordinators: Zürn
Part of the modules: Mobile Machines (p. 64)[WI3INGMB15], Vehicle Development (p. 63)[WI3INGMB14]

ECTS Credits	Hours per week	Term	Instruction language
1.5	1	Summer term	de

Learning Control / Examinations
Assessment for the module *Mobile Machines*: See module description.
Assessment for the module *Automotive Engineering*: The assessment will consist of an oral exam (20 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
It is recommended to attend the course *Fundamentals in the Development of Passenger Vehicles I* [21810] beforehand.

Learning Outcomes
The students are able to create general vehicle concepts tailored for different areas of application. They know the advantages and disadvantages of different drives. Furthermore they are familiar with components, such as transfer box, propeller shaft, powered and non-powered frontaxle etc. Beside other mechanical components, such as chassis, axle suspension and braking system, also electric and electronic systems, such as lighting, control, bus and diagnostic systems, are known.

Content

1. Drive and Drive train of Commercial Vehicles
2. Chassis
3. Axle suspension
4. Braking System
5. Elektrics
6. Elektronic Systems

Literature
Elective literature:

1. Schittler, M., Heinrich, R., Kerschbaum, W.: Mercedes-Benz Baureihe 500 - neue V-Motorengeneration für schwere Nutzfahrzeuge, MTZ 57 Nr. 9, S. 460 ff., 1996
2. Robert Bosch GmbH (Hrsg.): Bremsanlagen für Kraftfahrzeuge, VDI-Verlag, Düsseldorf, 1. Auflage, 1994
3. Rubi, V., Strifler, P. (Hrsg. Institut für Kraftfahrwesen RWTH Aachen): Industrielle Nutzfahr-zeugentwicklung, Schriften-reihe Automobiltechnik, 1993

Course: Fundamentals in the Development of Passenger Vehicles I [21810]

Coordinators: Frech
Part of the modules: Vehicle Development (p. 63)[WI3INGMB14]

ECTS Credits	Hours per week	Term	Instruction language
1.5	1	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (90 min) taking place in the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile.

Content

1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

Media
Lecture script (will beprovided during the first lesson).

Course: Fundamentals in the Development of Passenger Vehicles II [21842]

Coordinators: Frech
Part of the modules: Vehicle Development (p. 63)[WI3INGMB14]

ECTS Credits	Hours per week	Term	Instruction language
1.5	1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (90 min) taking place in the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
It is recommended to attend the course *Fundamentals in the Development of Passenger Vehicles I* [21810] beforehand.

Learning Outcomes
The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile.

Content

1. Application-oriented material and production technology I
2. Application-oriented material and production technology II
3. Overall vehicle acoustics in the automobile development
4. Drive train acoustics in the automobile development
5. Testing of the complete vehicle
6. Properties of the complete automobile

Media
Lecture script (provided during the first lessons).

Course: Hauptvermessungsübung III [20245]

Coordinators: Stefan Hinz, Weidner
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
1	0/1	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Media
e-Learning-Modul “Fernerkundung” (geoinformation.net)
lecture notes

Literature
Elective literature:
Albertz: Fernerkundung

Course: Industrial Safety and Environmental Management [21037]

Coordinators: Zülch, Kiparski
Part of the modules: Safety Science II (p. 92)[WI3INGINTER4], Safety Science I (p. 91)[WI3INGINTER3]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Remarks
Please register in the previous winter term.
Block course.
For further information, see http://www.ifab.uni-karlsruhe.de/797.php

Course: Information Systems and Supply Chain Management [2118094]

Coordinators: C. Kilger
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

Conditions
Technical understanding is required. It is recommended to attend the lecuture *Logistics - Organisation, Design, and Control of Logistic Systems.*

Learning Outcomes
Basic knowledge of information systems for logistics processes will be delivered and the students should be able to identify the requirements of a supply chain and choose an appropriate information system.

Content

1. Overview of logistics systems and processes
2. Basic concepts of information systems and information technology
3. Introduction to IS in logistics: Overview and applications
4. Detailed discussion of selected SAP modules for logistics support

Literature
Elective literature:
Stadtler, Kilger: Supply Chain Management and Advanced Planning, Springer, 4. Auflage 2008

Course: Seminar in Engineering Science [SemING]

Coordinators: Fachvertreter ingenieurwissenschaftlicher Fakultäten
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Literature
Will be announced in the respective seminar.
Elective literature:
Will be announced in the seminar.

Course: Meteorological Measurements [03203]

Coordinators: Kottmeier
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
3.5	2	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Insurance Marketing [2530323]

Coordinators: Ute Werner
Part of the modules: Insurance Markets and Management (p. 33)[WI3BWLFBV4]

ECTS Credits	Hours per week	Term	Instruction language
4.5	3/0	Winter / Summer Term	de

Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

Conditions
None.

Learning Outcomes
See German version.

Content
See German version.

Literature
Elective literature:

- Farny, D.. Versicherungsbetriebslehre (Kapitel III.3 sowie V.4). Karlsruhe 2006
- Kurtenbach / Kühlmann / Käßer-Pawelka. Versicherungsmarketing. . . . Frankfurt 2001
- Wiedemann, K.-P./Klee, A. Ertragsorientiertes Zielkundenmanagement für Finanzdienstleister, Wiesbaden 2003

Remarks
This course is offered on demand. For further information, see: http://insurance.fbv.uni-karlsruhe.de
To attend the course please register at the secretary of the chair of insurance science.

Course: Integrated Production Planning [2150660]

Coordinators: Lanza, Gisela
Part of the modules: Production Engineering II (p. 71)[WI3INGMB4], Production Engineering III (p. 72)[WI3INGMB7], Integrated Production Planning (p. 75)[WI3INGMB24], Production Engineering I (p. 70)[WI3INGMB10]

ECTS Credits	Hours per week	Term	Instruction language
9	4/2	Summer term	de

Learning Control / Examinations
Performance is assessed in the form of one written examination (180 min) during the lecture-free period (as per §4(2), 1 SPO [study and examination regulations]). The examination will take place once every semester and can be retaken at every official examination date.

Conditions
None.

Recommendations
It is recommended to attend the course *Manufacturing Technology* [2149657] beforehand.

Learning Outcomes
The student

- has knowledge of the content covered by this lecture and understands the challenges and the fields of action of integrated production planning,
- is able to apply the methods of integrated production planning he/she has learned about to new problems,
- is able to analyse and evaluate the suitability of the methods, procedures and techniques he/she has learned about for a specific problem.

Content
Planning factories within the context of value networks and integrated production systems (Toyota etc.) requires an integrated perspective for the consideration of all functions included in the “factory” system. This includes the planning of manufacturing systems including the product, the value network and factory production, and the examination of SOPs, the running of a factory and maintenance. Content and theory covered by this lecture are completed with many examples from industry and exercises based on real-life situations and conditions.

Main topics covered by the lecture:

1. The basic principles of production planning

2. Links between product planning and production planning

3. Integrating a production site into a production network

4. Steps and methods of factory planning

5. Approach to the integrated planning of manufacturing and assembly plants

6. Layout of production sites

7. Maintenance

8. Material flow

9. Digital factory

10. Process simulation for material flow optimisation

11. Start-up

Media
Lecture notes of the lecture *Integrated Production Planning*

Course: Intelligent Systems in Finance [2511402]

Coordinators: Detlef Seese
Part of the modules: eFinance (p. 40)[WI3BWLISM3], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment is a written examination.
See the German part for special requirements to be admitted for the examination.

Conditions
None.

Learning Outcomes

- The students acquire abilities and knowledge of methods and systems from the area of machine learning and learn how to use them in the area of finance, which is the core area of application of this lecture.
- It is taught the ability to choose and change these methods and systems adequate to the situation and to use them for problem solving in the area of finance.
- The students get the ability to find strategic and creative answers in their search for solutions for precisely defined, concrete and abstract problems.
- At the same time the lecture aims to give foundational knowledge and methods in the context of their application in practise. On the basis of the basic understanding of concepts and methods of informatics the students should be able to comprehend quickly the new developments in the area and to use them correctly.

Content
A new generation of computing methods, commonly known as “intelligent systems”, has recently been successfully applied to a variety of business and financial modelling tasks. In many application fields these novel methods outperform traditional statistical techniques. The lecture provides a comprehensive coverage of the area, including foundations and applications. In particular it deals with intelligent software agents, genetic algorithms, neural networks, support vector machines, fuzzy-logic, expert systems and intelligent hybrid systems. The presented applications focus on the finance area and are related to risk management (credit risk, operational risk), financial trading, portfolio management and economic modelling. The lecture is given in cooperation with the company msgGILLARDON. The lecture starts with an introduction of the central problems of application in this area, e.g. decision support for investors, Portfolioselection under constraints, information retrieval from business reports, automatic development of trading rules for the capital market, modelling of time series at the capital market, explanation of phenomena at capital markets by simulation, decision support in risk management (credit risk, operational risk). After this the basics of intelligent systems are discussed. Basic ideas and essential results for different stochastic heuristics for local search are discussed next, especially Hill Climbing, Simulated Annealing, Threshold Accepting and Tabu Search. After this different population-based approaches of evolutionary methods are presented, e.g. Genetic Algorithms, Evolutionary Strategies and Programming, Genetic Programming, Memetic Algorithms and Ant-Algorithms. It follows an introduction into Neural Networks, Support Vector Machines and Fuzzylogic. Softwareagents and agentbased stock market models are the next topic. The lecture ends with an overview on the complexity of algorithmic problems in the area of finance, giving in this way one of the key reasons for the necessity to use heuristics and intelligent systems. Essential examples and basic applications are choosen from the area of finance.

Media
Slides.

Literature
There is no text book covering completely the content of the lecture.

- Z. Michalewicz, D. B. Fogel. How to Solve It: Modern Heuristics. Springer 2000.
- J. Hromkovic. Algorithms for Hard Problems. Springer-Verlag, Berlin 2001.
- Christopher M. Bishop: Pattern Recognition and Machine Learning,Springer 2006
- P. Winker. Optimization Heuristics in Econometrics. John Wiley & Sons, Chichester 2001.
- A. Brabazon, M. O’Neill. Biologically Inspired Algorithms for Financial Modelling. Springer, 2006.
- A. Zell. Simulation Neuronaler Netze. Addison-Wesley 1994.
- R. Rojas. Theorie Neuronaler Netze. Springer 1993.
- N. Cristianini, J. Shawe-Taylor. An Introduction to Support Vector Machines and other kernal-based learning methods. Cambridge University Press 2003.

- G. Klir, B. Yuan. Fuzzy Sets and Fuzzy Logic: Theory and Applications. Prentice-Hall, 1995.
- F. Schlottmann, D. Seese. Modern Heuristics for Fiance Problems: A Survey of Selected Methods and Applications. In S. T. Rachev (Ed.) Handbook of Computational and Numerical Mrthods in Finance, Birkhäuser, Boston 2004, pp. 331 - 359.

Further references will be given in each lecture.

Elective literature:

- S. Goonatilake, Ph. Treleaven (Eds.). Intelligent Systems for Finance and Business. John Wiley & Sons, Chichester 1995.
- F. Schlottmann, D. Seese. Financial applications of multi-objective evolutionary algorithms, recent developments and future directions. Chapter 26 of C. A. Coello Coello, G. B.Lamont (Eds.) Applications of Multi-Objective Evolutionary Algorithms, World Scientific, New Jersey 2004, pp. 627 - 652.
- D. Seese, F. Schlottmann. Large grids and local information flow as reasons for high complexity. In: G. Frizelle, H. Richards (eds.), Tackling industrial complexity: the ideas that make a difference, Proceedings of the 2002 conference of the Manufacturing Complexity Network, University of Cambridge, Institute of Manufacturing, 2002, pp. 193-207. (ISBN 1-902546-24-5).
- R. Almeida Ribeiro, H.-J. Zimmermann, R. R. Yager, J. Kacprzyk (Eds.). Soft Computing in Financial Engineering. Physica-Verlag, 1999.
- S. Russel, P. Norvig. Künstliche Intelligenz Ein moderner Ansatz. 2. Auflage, Pearson Studium, München 2004.
- M. A. Arbib (Ed.). The Handbook of Brain Theory and neural Networks (second edition). The MIT Press 2004.
- J.E. Gentle, W. Härdle, Y. Mori (Eds.). Handbook of Computational Statistics. Springer 2004.
- F. Schweitzer. Brownian Agents and Active Particles. Collective Dynamics in the Natural and Social Sciences, Springer 2003.
- D. Seese, C. Weinhardt, F. Schlottmann (Eds.) Handbook on Information Technology in Finance, Springer 2008.
- Further references will be given in the lecture.

Remarks

The content of the lecture will permanently be adapted to actual developments. This can be the cause to changes of the described contend and schedule.

The course “Intelligent Systems in Finance” will not be offered any more from summer term 2016 on. The examination will be offered latest until summer term 2015 (repeaters only).

Course: International Risk Transfer [2530353]

Coordinators: Wolfgang Schwehr
Part of the modules: Insurance Markets and Management (p. 33)[WI3BWLFBV4]

ECTS Credits	Hours per week	Term	Instruction language
2.5	2/0	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (according to Section 4 (2), 1 of the examination regulation) .
The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
Becoming acquainted with the various possibilities of international risk transfer.

Content
How are the costs of potential major damages financed and covered on a global scale? Traditionally, direct insurers and, especially, reinsurers are conducting a global business, Lloyd's of London is a turntable for international risks, and global industrial enterprises are establishing captives for self insurance. In addition to this, capital markets and insurance markets are developing innovative approaches to cover risks, which were hard to insure in the past (e.g. weather risk). The lecture will elucidate the functioning and the background of these different possibilities of international risk transfer.

Literature

- K. Geratewohl. Rückversicherung: Grundlagen und Praxis Band 1-2.
- Brühwiler/ Stahlmann/ Gottschling. Innovative Risikofinanzierung - Neue Wege im Risk Management.
- Becker/ Bracht. Katastrophen- und Wetterderivate.

Remarks
Block course. To attend the course please register at the secretary of the chair of insurance science.

Course: International Finance [2530570]

Coordinators: Marliese Uhrig-Homburg, Walter
Part of the modules: Topics in Finance I (p. 34)[WI3BWLFBV5], eFinance (p. 40)[WI3BWLISM3], Topics in Finance II (p. 35)[WI3BWLFBV6]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The objective of this course is to become familiar with the basics of investment decisions on international markets and to manage foreign exchange risks.

Content
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First the point of view of an international investor second that, of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore current exchange rate theories are discussed.

Literature
Elective literature:

- D. Eiteman et al. (2004): Multinational Business Finance, 10. Auflage

Course: International Economic Policy [2560254]

Coordinators: Jan Kowalski
Part of the modules: International Economics (p. 47)[WI3VWL3]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (60min) according to Setion 4(2), 1 of the examination regulation.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Recommendations
Previous visit of the lectures *Economics II: Macroeconomics* [2600014] is recommended.

Learning Outcomes

Content

Literature
Elective literature:

- World Bank: “World Development Report”. 2008, 2009
- Wagner, M.: „Einführung in die Weltwirtschaftspolitik“. Oldenbourg 1995
- Gerber, J.: „International Economics“, Pearson, 2007, IV Edition weitere Angaben in der Vorlesung

Remarks
The credits have been changed to 5.

Course: Management Accounting [2530210]

Coordinators: Torsten Lüdecke
Part of the modules: Topics in Finance I (p. 34)[WI3BWLFBV5], Topics in Finance II (p. 35)[WI3BWLFBV6]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (60 min) taking place in the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
This course aims at providing students with the understanding of the purposes of alternative costing systems as well as the use of relevant information for decision making. The course will also examine techniques for the purpose of cost management and accounting for control.

Content

- Design of Cost Systems
- Cost Classifications, Cost Behavior, and Principles of Cost Allocation
- Activity-based Costing
- Product Costing
- Production Decisions
- Cost-based Pricing
- Cost Management
- Decisions under Risk
- Cost Accounting for Control

Literature
Elective literature:

- Coenenberg, A.G. Kostenrechnung und Kostenanalyse, 6. Aufl. 2007.
- Ewert, R. und Wagenhofer, A. Interne Unternehmensrechnung, 7. Aufl. 2008.
- Götze, U. Kostenrechnung und Kostenmanagement. 3. Aufl. 2007.
- Kilger, W., Pampel, J., Vikas, K. Flexible Plankostenrechnung und Deckungsbeitragsrechnung , 11. Aufl. 2002.

Course: Investments [2530575]

Coordinators: Marliese Uhrig-Homburg
Part of the modules: Essentials of Finance (p. 31)[WI3BWLFBV1]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessment consits of a written exam (75 min) according to Section 4(2), 1 of the examination regulation.
The examination takes place in every semester. Re-examinations are offered at eyery ordinary examination date.
By submitting the excercises (according to Section 4(2), 3 of the examination regulation) up to 4 bonus points can be aquired.

Conditions
None.

Recommendations
Knowledge of Business Administration and Management Science C [25026/25027] is recommended.

Learning Outcomes
The objective of this course is to become familiar with the basics of investment decisions on stock and bond markets. Basic economic concepts and models are discussed and applied on introductionary level. Interlinkages between markets, different decision makings concepts and models are demonstrated.

Content
The lecture deals with investment decisions under uncertainty, where the main emphasis is on investment decisions on stock markets. After a discussion of the basic questions of corporate valuation, the lecture focuses on portfolio theory. After that, risk and return in equilibrium are derived using the Capital Asset Pricing Model and the Arbitrage Pricing Theory. The lecture concludes with investments on bond markets.

Literature
Elective literature:
Bodie/Kane/Marcus (2010): Essentials of Investments, Eighth Edition, McGraw-Hill Irwin, Boston

Course: Theory of Business Cycles [25549]

Coordinators: Marten Hillebrand
Part of the modules: Macroeconomic Theory (p. 50)[WI3VWL8]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Winter term	en

Learning Control / Examinations
According to the attendance the assessment consists of a written or an oral exam at the beginning of the recess period (according to Section 4 (2), 1 or 2 of the examination regulation.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
The courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014] have to be completed beforehand.
According the focus of the course quantitativ-mathematical modelling should be in participiant's interest.

Recommendations
Basic knowledge in micro- and macroeconomics, as conveyed in the courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014], is assumed.
According the focus of the course quantitativ-mathematical modelling should be in participiant's interest.

Learning Outcomes

Content

Literature
Elective literature:
David Romer, *Advanced Macroeconomics*, 3rd edition, MaGraw-Hill (2006)
Lutz Arnold: Makroökonomik. Eine Einführung in die Theorie der Güter-, Arbeits- und Finanzmärkte (2003)

Course: Warehouse and Distribution Systems [2118097]

Coordinators: M. Schwab, J. Weiblen
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

Conditions
None.

Learning Outcomes
This course provides basics to understand material and information processes in warehouse and distribution systems. The student will also learn to evaluate them quantitatively.

Content

- Control and organisation of distribution centers
- Analytical models for analysing and dimensioning of warehouse systems
- Distribution Center Reference Model (DCRM)
- Lean Distribution
- The processes from receiving to shipping
- Planning and controlling
- Distribution networks

Course: Logistics - Organisation, Design, and Control of Logistic Systems [2118078]

Coordinators: Kai Furmans
Part of the modules: Supply Chain Management (p. 38)[WI3BWLISM2]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation. The grade of the exam may be improved by passing case studies.

Conditions
None.

Recommendations
Requied are lectures on “Linear Algebra” and “Stochastic”.

Learning Outcomes
After successfully finishing this course, the student is able to plan simple material handling and logistic systems and is able to assign the right models to a certain task. He is able to evaluate the performance of the most important elements of material handling and logistic systems.

Content
Introduction

- historical overview
- lines of development

Structure of logistics systems
Distribution logistics

- location planning
- Vehicle Routing Planning
- distribution centers

Inventory management

- demand forecasting
- Inventory management policies
- Bullwhip effect

Production logistics

- layout planning
- material handling
- flow control

Supply Managament

- information flow
- transportation organization
- controlling and development of a logistics system
- co-operation mechanisms
- Lean SCM
- SCOR model

Identification Technologies

Media
Blackboard, LCD projector, in excercises also PCs.

Literature
Elective literature:

- Arnold/Isermann/Kuhn/Tempelmeier. Handbuch Logistik, Springer Verlag, 2002 (Neuauflage in Arbeit)

- Domschke. Logistik, Rundreisen und Touren, Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, Oldenbourg Verlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Neumann-Morlock. Operations-Research, Hanser-Verlag, 1993
- Tempelmeier. Bestandsmanagement in Supply Chains, Books on Demand 2006
- Schönsleben. Integrales Logistikmanagement, Springer, 1998

Remarks
Formerly, the course was known as *Logistics*.

Course: Automotive Logistics [2118085]

Coordinators: Kai Furmans
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

Conditions
None.

Learning Outcomes
It is the aim of the course to show the importance and impact of logistic questions in the automotive industry sector.

Content
A basic model of the automobile production and distribution is used to study the main elements of the automotive supply chain:

- Supply side logistics (Tasks due to disposition and physical accomplishment; methods; solution models)
- Car manufacturing with the specific questions of the interaction of body shell, paint shop and assembly (sequence planning; partial allocation for assembly)
- Car distribution and the connection to sale processes (physical accomplishment; planning and control)

Course: Logistics and Supply Chain Management [2581996]

Coordinators: Frank Schultmann
Part of the modules: Industrial Production I (p. 29)[WI3BWLIIP]

ECTS Credits	Hours per week	Term	Instruction language
3.5	2/0	Winter term	de

Learning Control / Examinations
The examination will be in form of an oral or written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Conditions
None.

Learning Outcomes
Students shall learn foundations and main characteristics of managerial logistics and supply chain management. Following an overview of basic managerial logistics functions, students will learn the interdependencies and trade-offs between these functions and concurring aims. Additionally, students will gain knowledge in designing and steering internal and external value-creating networks.

Content
This course covers following topics:

- Introduction into logistics
- Fields of activity
- Aims and costs of logistics
- Performance and performance figures
- Supply logistics
- Production logistics
- Distributing logistics
- Reverse logistics
- Definition and aims of Supply Chain Management
- Concepts of Supply Chain Management
- Modeling Supply Chains

Media
Medie will be provided on learning platform.

Course: Airport Logistics [2117056]

Coordinators: A. Richter
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

Conditions
None.

Learning Outcomes
Giving an inside view of the conveyor and material handling technical activities on airports is the aim of this course. Furthermore an overview of air traffic and the legal situation is given.

Content
Development of air traffic:

- Legal basics
- Infrastructure (among other things person, luggage and freight conveyance)
- Supply and disposal activities
- Logistic process networks
- Information logistics

Remarks
The course takes place as a block course.

Course: Management of Business Networks [2590452]

Coordinators: Christof Weinhardt, Jan Kraemer
Part of the modules: Supply Chain Management (p. 38)[WI3BWLISM2], eBusiness and Service Management (p. 36)[WI3BWLISM1]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Winter term	en

Learning Control / Examinations
The assessment of this course is a written examination (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4(2), 3 SPO).

Conditions
None.

Learning Outcomes
The student

- indentifes the coordination problems in a business network,
- explains the theorie of strategic and operative management,
- analyses case studies in logistics considering the organization theory and network analysis
- argues and constructs new solutions for the case studies by means of electronic tools

Content
The significant and lasting impact of web-based business-to-business (B2B) networks has just recently become apparent. The exploratory phase during the first Internet hype bred a variety of approaches which were often bold in business nature, yet simple and unfounded in system architecture. Only very few survived and proved sustainable. Nowadays web-based B2B networks are increasingly reappearing and even promoted by major traditional companies and governments. However, this new wave of networks is more mature and more powerful in functionality than their predecessors. As such they provide not only auction systems but also facilities for electronic negotiation. This implies a shift from price-focused to relationship-oriented trading. But what motivates this shift? Why do firms enter business networks? How can these networks be best supported by IT? The course intends to resolve these questions. Firstly, an introduction in organization theory will be given. Secondly, the problems of networks will be addressed. Thirdly, an analysis of how IT can alleviate those problems will be undertaken.

Media

- Powerpoint presentations
- recorded lecture available on the internet
- videoconferencing, if circumstances allow

Literature

- Milgrom, P., Roberts, J., Economics, Organisation and Management. Prentice-Hall, 1992.
- Shy, O., The Economics of Network Industries. Cambridge, Cambridge University Press, 2001.
- Bichler, M. The Future of e-Markets - Multi-Dimensional Market Mechanisms. Cambridge, Cambridge University Press, 2001.

Course: Management of Business Networks (Introduction) [2540496]

Coordinators: Christof Weinhardt, Jan Kraemer
Part of the modules: Supply Chain Management (p. 38)[WI3BWLISM2]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	en

Learning Control / Examinations
The assessment consists of a written examination (60 min) according to Section 4(2), 1 of the examination regulation. There is no case study to execute in the 3 respectively 4 LP version of this course.
Grading: Exam counts for 85 % ,participation in the course for 15 %.

Conditions
None.

Learning Outcomes
The student

- indentifes the coordination problems in a business network,
- explains the theory of strategic and operative management,
- analyses case studies in logistics considering the organization theory and network analysis

Content
The significant and lasting impact of web-based business-to-business (B2B) networks has just recently become apparent. The exploratory phase during the first Internet hype bred a variety of approaches which were often bold in business nature, yet simple and unfounded in system architecture. Only very few survived and proved sustainable. Nowadays web-based B2B networks are increasingly reappearing and even promoted by major traditional companies and governments. However, this new wave of networks is more mature and more powerful in functionality than their predecessors. As such they provide not only auction systems but also facilities for electronic negotiation. This implies a shift from price-focused to relationship-oriented trading. But what motivates this shift? Why do firms enter business networks? How can these networks be best supported by IT? The course intends to resolve these questions. Firstly, an introduction in organization theory will be given. Secondly, the problems of networks will be addressed. Thirdly, an analysis of how IT can alleviate those problems will be undertaken.

Media

- Powerpoint presentations
- recorded lecture available on the internet.

Literature

- Milgrom, P., Roberts, J., Economics, Organisation and Management. Prentice-Hall, 1992.
- Shy, O., The Economics of Network Industries. Cambridge, Cambridge University Press, 2001.
- Bichler, M. The Future of e-Markets - Multi-Dimensional Market Mechanisms. Cambridge, Cambridge University Press, 2001.

Remarks
This Version of the MBN Course does not include the case study in the second part of the lecture, so that it is worth less credits.

Course: Managenment and Organisation of Projects in Developing Countries [2560259]

Coordinators: Niklas Sieber
Part of the modules: International Economics (p. 47)[WI3VWL3]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The examination takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes

Content

Course: Brand Management [2572177]

Coordinators: Bruno Neibecker
Part of the modules: Foundations of Marketing (p. 46)[WI3BWLMAR]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
(See description of the module)

Content
The students should learn the essential scientific and practical principles of Marketing, especially branding. Branding consists of any name, design, style, words or symbols, singly or in any combination that distinguish one product from another in the eyes of the consumer. Brand positioning, brand loyalty and brand equity are discussed as important elements of a management concept. The focus of the course is not limited to short-term ROI, but also long-term benefits of communication strategies facing company's responsibilities to all of its stakeholders, e.g. consumers, investors and public. The strategies and techniques in branding are broaden by several case studies. English as an international technical language in marketing is practiced with course readings and scientific papers. Content:
The course brand management starts with the development of the corporate objectives as the heart of the brand planning process followed by definitions of brand. Setting up on the psychological and social bases of consumer behavior, aspects of an integrated marketing communication are discussed. The students should acquire the particular value of branding strategies. The concept of brand personality is considered in two perspectives, from a practical point of view and the challenging position of the theoretical construct. Methods for the measurement of a consumer-based brand equity are compared with the financial valuation of the brand. The information provided by this equity measurements are related to the equity drivers in brand management. The marketers perspective will be accomplish with the analysis of several case studies. Within the limits of a knowledge based system for advertising evaluation many of the issues accomplished in the course are summarized. At the same time it is discussed as a tool to use marketing knowledge systematically.

Media
Slides, Powerpoint presentations, Website with Online Course Readings

Literature

- Aaker, J. L.: Dimensions of Brand Personality. In: Journal of Marketing Research 34, 1997, 347-356.
- BBDO-Düsseldorf (Hrsg.): Brand Equity Excellence. 2002.
- BBDO-Düsseldorf (Hrsg.): Brand Equity Drivers Modell. 2004.
- Bruhn, M. und GEM: Was ist eine Marke? Gräfelfing: Albrecht (voraussichtlich 2003).
- Esch, F.-R.: Strategie und Technik der Markenführung. München: Vahlen 2003.
- Keller, K. L.: Kundenorientierte Messung des Markenwerts. In: Esch, F.-R. (Hrsg.): Moderne Markenführung. 3. Aufl. 2001.
- Kotler, P.; V. Wong; J. Saunders und G. Armstrong: Principles of Marketing (European Edition). Harlow: Pearson 2005.
- Krishnan, H. S.: Characteristics of memory associations: A consumer-based brand equity perspective. In: Internat. Journal of Research in Marketing 13, 1996, 389-405.
- Meffert, H.; C. Burmann und M. Koers (Hrsg.): Markenmanagement. Grundfragen der identitätsorientierten Markenführung. Wiesbaden: Gabler 2002.
- Neibecker, B.: Tachometer-ESWA: Ein werbewissenschaftliches Expertensystem in der Beratungspraxis. In: Computer Based Marketing, H. Hippner, M. Meyer und K. D. Wilde (Hrsg.), Vieweg: 1998, 149-157.
- Riesenbeck, H. und J. Perrey: Mega-Macht Marke. McKinsey&Company, Frankfurt/Wien: Redline 2004.
- Solomon, M., G. Bamossy, S. Askegaard und M. K. Hogg: Consumer Behavior, 4rd ed., Harlow: Pearson 2010.

Course: Material Flow in Logistic Systems [2117051]

Coordinators: Kai Furmans
Part of the modules: Introduction to Technical Logistics (p. 60)[WI3INGMB13]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation. The grade of the exam may be improved by passing case studies.

Conditions
None.

Learning Outcomes
This course provides the basics of material handling systems. The student will learn how to model material handling systems and how to evaluate them according to quantitative aspects.

Content

- Material handling equipment: conveyor system, diverts, merges
- Modelling of material handling systems by graphs and matrixes
- Queueing theory
- Simulation
- Analysis of the current situation
- Planning of the target state by using material and information flow

Literature
Elective literature:
Arnold, Dieter; Furmans, Kai: Materialfluss in Logistiksystemen, Springer, 2005 (VDI)

Remarks
The course was formerly known as *Materialflow.*

Course: Materials and Processes in Automotive Lightweight Construction [2149669]

Coordinators: Haepp
Part of the modules: Specialization in Production Engineering (p. 74)[WI3INGMB22]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Mathematics I [01350]

Coordinators: Günter Last, Folkers, Klar
Part of the modules: Mathematics (p. 25)[WI1MATH]

ECTS Credits	Hours per week	Term	Instruction language
7	4/2/2	Winter term	de

Learning Control / Examinations
The assessment of *Mathematics I* consists of two written partial exams (both acording to Section 4 (2), 1 of the examination regulation):

1. Midterm exam after half of the lecture time (60 min) without utilities
2. Final exam at the beginning of the following recess period (60 min) without utilities

A re-examination is offered at the beginning of the lecture period of the following summer term. Both re-examinations taking place at the same day.
For the re-examinations both types of candidates (candidates who failed the midterm or the final exam, as well as those candidates who do not yet have passed their first attempt) are admitted.
Oral re-examinations (according to Section 8 (2) of the examination regulation) take place as individual examinations (ca. 20 min).
Mid-term exam as well as final exam has to be passed separatley. The overall grade *of Mathematics 1* consists of the grade o the midterm exam (50 percent) and the final exam (50 percent).

Conditions
None.

Learning Outcomes

Content

Literature
Elective literature:

- Henze, N., Last, G.: Mathematik für Wirtschaftsingenieure 1, 2. Auflage, Vieweg 2005.
- Sydsaeter, K., Hammond, P.: Mathematik für Wirtschaftswissenschaften, 2. Auflage, Pearson Studium 2006.

Course: Mathematics II [01830]

Coordinators: Günter Last, Folkers, Klar
Part of the modules: Mathematics (p. 25)[WI1MATH]

ECTS Credits	Hours per week	Term	Instruction language
7	4/2/2	Summer term	de

Learning Control / Examinations
The assessment of *Mathematics 2* consists of two written partial exams (both acording to Section 4 (2), 1 of the examination regulation):

1. Midterm exam after half of the lecture time (60 min) without utilities
2. Final exam at the beginning of the following recess period (60 min) without utilities

A re-examination is offered at the beginning of the lecture period of the following summer term. Both re-examinations taking place at the same day.
For the re-examinations both types of candidates (candidates who failed the midterm or the final exam, as well as those candidates who do not yet have passed their first attempt) are admitted.
Oral re-examinations (according to Section 8 (2) of the examination regulation) take place as individual examinations (ca. 20 min).
Midterm exam as well as final exam has to be passed separatley. The overall grade *of Mathematics 2* consists of the grade o the mid-term exam (50 percent) and the final exam (50 percent).

Conditions
Good knowledge of the content of the course *Mathematics I* [01350].

Learning Outcomes

Content

Literature
Elective literature:

- Henze, N., Last, G.: Mathematik für Wirtschaftsingenieure 1, 2. Auflage, Vieweg 2005.
- Sydsaeter, K., Hammond, P.: Mathematik für Wirtschaftswissenschaften, 2. Auflage, Pearson Studium 2006.

Course: Mathematics III [01352]

Coordinators: Günter Last, Folkers, Klar
Part of the modules: Mathematics (p. 25)[WI1MATH]

ECTS Credits	Hours per week	Term	Instruction language
7	4/2/2	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (75 min) at the beginning of the recess period (according to Section 4(2), 1 of the examination regulation.
A re-examination is offered at the beginning of the lecture period of the following summer term. For the re-examinations both types of candidates (candidates who failed the midterm or the final exam, as well as those candidates who do not yet have passed their first attempt) are admitted.

Conditions
Good knowledge of the content of the courses Mathematics I [01350] and Mathematics II [01830].

Learning Outcomes

Content

Literature
Elective literature:

- Henze, N., Last, G.: Mathematik für Wirtschaftsingenieure Band 2, 2. Auflage, Vieweg 2010 (im Netz des KIT als Online-Ressource verfügbar).
- Sydsaeter, K., Hammond, P., Seierstad, A., Strom, A.: Further Mathematics for Economic Analysis, Prentice Hall 2005.

Course: Seminar in Mathematics [SemMath]

Coordinators: Fachvertreter der Fakultät für Mathematik
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Literature
Will be announced in the respective seminar.
Elective literature:
Will be announced in the seminar.

Course: Meteorological Natural Hazards [03013]

Coordinators: Kottmeier, Kunz
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
3.5	2	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Remarks
For further information, see http://www.imk.uni-karlsruhe.de/english/17.php

Course: Methods in Analyzing Internal Combustion [21134]

Coordinators: Wagner
Part of the modules: Engine Development (p. 69)[WI3INGMB17], Combustion Engines II (p. 68)[WI3INGMB19], Combustion Engines (p. 66)[WI3INGMB16]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) according to §4 (2), 2 of the examination regulation. The grade of the exam is included in the overall grade of the module with a weighting factor of 3.

Conditions
The course *Combustion Engines A* [21101] has to be completed beforehand.

Learning Outcomes

Content

Course: Interpretative Social Research Methods [n.n.]

Coordinators: Pfadenhauer
Part of the modules: Qualitative Social Research (p. 96)[WI3SOZ2]

ECTS Credits	Hours per week	Term	Instruction language
4	2/0	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (according to Section 4 (2), 1 of the examination regulation).

Conditions
The lecture is obligatory and has to be attended.

Learning Outcomes
The student

- gains a basic overview of the well-established and some of the advanced explorative methods of data collection and interpretative methods of data evaluation.
- acquires basic knowledge of methodology/the philosophy of science.
- is capable of choosing and applying appropriate explorative-interpretative methods according to a research question and arranging them in a conceptual research design.

Content
See lecture announcement.

Media
Will be announced in the lecture.

Literature
Will be announced in the lecture.
Elective literature:
Will be announced in the lecture.

Course: Microactuation [2142881]

Coordinators: Manfred Kohl
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment will consist of a oral exam (20 min) (following §4 (2), 2 of the examination regulation).

Conditions
None.

Recommendations
It is recommended to attend the lecture “Novel Actuators and Sensors” [2141865].

Learning Outcomes
The student

- knows the basics of the actuation principles
- has the required knowledge on the design, fabrication and operation of microactuators
- is familiar with important microactuators in use and their application areas
- knows typical specifications, advantages and disadvantages of the different microactuators

Content

- Microrobotics: linear actuators, micromotors
- Medical and Life Sciences: Mikrovalves, Micropumps, microfluidic Systems
- Information technology: Optical Switches, mirror systems, read/write heads
- Microelectromechanical systems: Microrelais

Media
Script of ppt-slides

Literature

1. Technischer Einsatz Neuer Aktoren: Grundlagen, Werkstoffe, Designregeln und Anwendungsbeispiele, D. Jendritza, Expert-Verlag, 3. Auflage, 2008.
2. Microactuators, M. Tabib-Azar, Kluwer Academic Publishers London, 1998.
3. Shape Memory Microactuators, M. Kohl, Springer-Verlag Berlin, 2004.

Course: Mobile Machines [2113073]

Coordinators: Marcus Geimer
Part of the modules: Mobile Machines (p. 64)[WI3INGMB15]

ECTS Credits	Hours per week	Term	Instruction language
6	4	Winter term	de

Learning Control / Examinations
See modul description.

Conditions
Knowledge in Fluid Power are required.

Recommendations
It is recommended to attend the course *Fluid Power Systems* [21093] beforehand.

Learning Outcomes
The students will learn the basic structure and construction of mobile machines. The basis will be practically introduced by consultants from industry area. Thereby, the typical working process will be described.

Content

- Introduction of the required components and machines
- Basics of the structure of the whole system
- Practical insight in the development techniques

Media
Lecture notes.

Course: Modelling and Identification [23168]

Coordinators: Sören Hohmann
Part of the modules: Control Engineering (p. 84)[WI3INGETIT2]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) taking place at the beginn of the recess period (according to Section 4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
The course *System Dynamics and Control Engineering* [23155] has to be completed beforehand.

Learning Outcomes

Content

Course: Engine Measurement Technologies [2134137]

Coordinators: Bernhardt
Part of the modules: Engine Development (p. 69)[WI3INGMB17], Combustion Engines II (p. 68)[WI3INGMB19], Combustion Engines (p. 66)[WI3INGMB16]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) according to Section 4 (2), 2 of the examination regulation. The grade of the exam is included in the overall grade of the module with a weighting factor of 3.

Conditions
The course *Combustion Engines A* [21101] has to be completed beforehand.

Learning Outcomes

Content

Course: Nanotechnology with clusters [2143876]

Coordinators: Jürgen Gspann
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The assessment will consist of a oral exam (30 min) (following §4 (2), 2 of the examination regulation).

Conditions
None.

Learning Outcomes

Content
Production and properties of atom clusters (nanoparticles) for either coating or for micro- and nanostructure generation via high-speed cluster erosion are described. The technical significance of nanostructures (Lotus-effect, Gecko-adhesion) as well as the new carbon modifications (Fullerenes, Graphene, Nanotubes) are treated. The concept of the molecular nanotechnology is considered and compared with biological molecular motors.

Media
Lecture script

Course: Natural Disaster Management [19632]

Coordinators: N.N.
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
1.5	1	Winter / Summer Term	en

Learning Control / Examinations
Cf. information for studies of “Ressource Engineering”.

Conditions
None.

Learning Outcomes
Cf. information for studies of “Ressource Engineering”.

Content
Cf. information for studies of “Ressource Engineering”.

Remarks
This course is offered irregularly. For further information, please cf. to the schedule of the studies in “Ressource Engineering”.

Course: Novel Actuators and Sensors [2141865]

Coordinators: Manfred Kohl, M. Sommer
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The assessment will consist of a oral exam (20 min) (following §4 (2), 2 of the examination regulation).

Conditions
None.

Learning Outcomes
The student

- knows physical principles and basics on novel actuators and sensors
- has the required knowledge on the design, fabrication and operation of novel actuators and sensors
- is familiar with important novel actuators and sensors in use
- can name typical fields of application
- knows typical specifications

Content
Topics of the first part:

- Piezo actuators
- Magnetostrictive actuators
- Shape memory actuators
- Electrorheological actuators

Topics of the second part:

- Nano sensors: materials, fabrication
- Nano fibres
- Examples: gas sensors, electronic nose
- Data processing /interpretation

Media
Script / script of ppt foils (part 2)

Course: Nonlinear Optimization I [2550111]

Coordinators: Oliver Stein
Part of the modules: Methodical Foundations of OR (p. 58)[WI3OR6], Stochastic Methods and Simulation (p. 59)[WI3OR7]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessmentconsits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation.
The exam takes place in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.
The examination can also be combined with the examination of *Nonlinear Optimization II* [2550113]. In this case, the duration of the written examination takes 120 minutes.
In a combined examination of *Nonlinear Optimization I* [2550111] and *Nonlinear Optimization II* [2550113], upon attaining more then 60% of the exercise points, the grade of the passed examination is improved by a third of a grading step.
In a combined examination of *Nonlinear Optimization I* [2550111] and *Nonlinear Optimization II* [2550113], upon attaining more then 60% of the computer exercise points, the grade of the passed examination is improved by a third of a grading step.

Conditions
None.

Learning Outcomes
The student

- knows and understands fundamentals of nonlinear optimization,
- is able to choose, design and apply modern techniques of nonlinear optimization in practice.

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer 2000

Remarks
Part I and II of the lecture are held consecutively in the *same* semester.

Course: Nonlinear Optimization II [2550113]

Coordinators: Oliver Stein
Part of the modules: Methodical Foundations of OR (p. 58)[WI3OR6]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (120 minutes) according to §4(2), 1 of the examination regulation.
The exam takes place in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registrationfor the written examination is subject to fulfilling the prerequisite.
The exam can also be combined with the examination of *Nonlinear Optimization I* [2550111]. In this case, the duration of the written exam takes 120 minutes.
In a combined exam of *Nonlinear Optimization I* [2550111] and *Nonlinear Optimization II* [2550113], upon attaining more then 60% of the exercise points, the grade of the passed exam is improved by a third of a grading step.
In a combined exam of *Nonlinear Optimization I* [2550111] and *Nonlinear Optimization II* [2550113], upon attaining more then 60% of the computer exercise points, the grade of the passed exam is improved by a third of a grading step.

Conditions
None.

Learning Outcomes
The student

- knows and understands fundamentals of nonlinear optimization,
- is able to choose, design and apply modern techniques of nonlinear optimization in practice.

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer 2000

Remarks
Part I and II of the lecture are held consecutively in the *same* semester.

Course: Public Revenues [2560120]

Coordinators: Berthold Wigger, Assistenten
Part of the modules: Public Finance (p. 51)[WI3VWL9]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

Conditions
Basic knowledge of Public Finance is required.

Learning Outcomes

Content
The *Public Revenues* lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

Literature
Elective literature:

- Homburg, S.(2000): *Allgemeine Steuerlehre,* Vahlen
- Rosen, H.S.(1995): *Public Finance*; 4th ed., Irwin
- Wellisch, D.(2000): *Finanzwissenschaft I* and *Finanzwissenschaft III*, Vahlen
- Wigger, B. U.(2006): *Grundzüge der Finanzwissenschaft*; 2nd ed., Springer

Course: Public Law I - Basic Principles [24016]

Coordinators: Indra Spiecker genannt Döhmann
Part of the modules: Elective Module Law (p. 94)[WI3JURA]

ECTS Credits	Hours per week	Term	Instruction language
3	2/0	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam concerning the courses *Public Law I* [24016] and *Public Law II* [24520] (according to Section 4(2), 1 of the examination regulation).

Conditions
None.

Recommendations
Parallel to the lectures tutoria are offered in which legal thinking and argumentation is practised. Their attendance is strongly recommended.
During the semester, test exams to each lecture are offered with extensive coaching. During the lecture-free time, a Q-and-A-lecture is offered.Details on the homepage of the ZAR (www.kit.edu/zar).

Learning Outcomes
The lecture covers the core principles of public law. Students shall become acquainted with the basics of constitutional law, the fundamental rights which route governmental actions and the entire legal system, as well as possibilities of actions and instruments (especially law, administrative act, public-private contract) of the public authority. Furthermore the distinction between public and private law will be clarified. Moreover, possibilities of legal protection regarding administrative behavior will be addressed. Students shall learn to classify problems in public law and to solve (simple) administrative and constitutional cases.

Content
The course covers core material of constitutional and administrative law. It begins with the differentiation between public and private law. In the constitutional law part, the course will concentrate on the rule of law and individual rights, especially those protecting communication and entrepreneurship. The administrative law part will explain the different legal instruments of the administration how to act (rule, order, contract, etc.) and their propositions. Also, court proceedings to sue the administrative will be discussed. Students will learn the technique how to solve (simple) administrative and constitutional cases

Media
extensive script with cases; content structure, further information in the lectures

Literature
tba in srciptum
Elective literature:
tba in scriptum

Remarks
From the winter term 2008 on, the *Public Law I* will be lectured during the winter termn and *Public Law II* will be lectured during the summer term. This means:

1. In the winter term 2008/2009, Public Law I was being lectured.
2. In the summer term 2009, Public Law II will be lectured.

Course: Public Law II - Public Economic Law [24520]

Coordinators: Indra Spiecker genannt Döhmann
Part of the modules: Elective Module Law (p. 94)[WI3JURA]

ECTS Credits	Hours per week	Term	Instruction language
3	2/0	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam concerning the courses *Public Law I* [24016] and *Public Law II* [24520] according to Section 4(2), 1 of the examination regulation.

Conditions
None.

Recommendations
Parallel to the lectures tutoria are offered in which legal thinking and argumentation is practised. Their attendance is strongly recommended.
During the semester, test exams to each lecture are offered with extensive coaching. During the lecture-free time, a Q-and-A-lecture is offered.Details on the homepage of the ZAR (www.kit.edu/zar)

Learning Outcomes
Public economic law is of significant importance to supervise the German economy. In order to understand the functionality of mandatory interventions into market mechanisms in a thoroughly normed legal system, appropriate legal knowledge is required. This knowledge is to be provided in the lecture. In doing so, substantive law ought to be dealt with in a deepened way, while responsible authorities and institutions as well as possibilities of legal protection in the area of public commercial law will be taught at a glance. The lecture's primary aim is to exercise handling the corresponding legal norms. It proceeds the lecture *public law I*.

Content
In a first step legal basics of the economic system (such as financial system and freedom of property and profession) will be presented. In this context, interaction between the Basic Constitutional Law and presettings of European Community law will be elaborated on as well. Thereafter, regulatory instruments of the administrative law will be analysed extensively. As particular matters, we will deal with industrial code, further trade law (handicrafts code; law of gastronomy), basic principles of telecommunication law, state aid law and public procurement law. A last part is devoted to the institutional design of the economy's regulation.

Media
extensive script with cases; content structure, further information in the lectures

Literature
Will be announced in the lecture.
Elective literature:
tba in lecture slides

Remarks
In winter term 2008 on, the *Public Law I* will be lectured during the winter term and *Public Law II* will be lectured during the summer term. This means:

1. In the winter term 2008/2009, Public Law I will be lectured.
2. In the summer term 2009, Public Law II will be lectured.

Course: Operative CRM [2540520]

Coordinators: Andreas Geyer-Schulz
Part of the modules: Specialization in Customer Relationship Management (p. 42)[WI3BWLISM5], CRM and Service Management (p. 41)[WI3BWLISM4]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Winter term	de

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

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 25) from excersise work will be added. The grades of this lecture are assigned following the table below:

Grade	Minimum points
1.0	113
1.3	106
1.7	99
2.0	92
2.3	85
2.7	78
3.0	71
3.3	64
3.7	57
4.0	50
4.7	40
5.0	0

Conditions
None.

Recommendations
The attendance of courses *Customer Relationship Management* [2540508] and *Analyitical CRM* [2540522] is advised.

Learning Outcomes
The Student

- understands the theory of methods for process and data analyses and applies them for the design and implementation of operative CRM-processes in the complex context of companies,
- takes privacy problems into account,
- evaluates existing operative CRM-processes in companies and gives recommendation for their improvement. This requires the knowledge of example processes and the ability to transform them according to the given setting.
- uses literature for the solution of case studies, communicates with professionals and summarizes his recommendations and drafts in precise and coherent texts.

Content
The Student should be able to understand and implement methods and applications within the operative CRM. This includes, but is not limited to the analysis of business processes, as a basis for improvements in CRM, and applications like call centers.

Literature
Jill Dyché. The CRM Handbook: A Business Guide to Customer Relationship Management. Addison-Wesley, Boston, 2 edition, 2002.
Ronald S. Swift. Accelerating Customer Relationships: Using CRM and RelationshipTechnologies. Prentice Hall, Upper Saddle River, 2001.
Elective literature:
Alex Berson, Kurt Thearling, and Stephen J. Smith. Building Data Mining Applications for CRM. Mc Graw-Hill, New York, 2000.
Stanley A. Brown. Customer Relationship Management: A Strategic Imperative in theWorld of E-Business. John Wiley, Toronto, 2000.
Dimitris N. Chorafas. Integrating ERP, CRM, Supply Chain Management, and SmartMaterials. Auerbach Publications, Boca Raton, Florida, 2001.

Keith Dawson. Call Center Handbook: The Complete Guide to Starting, Running, and Improving Your Call Center. CMP Books, Gilroy, CA, 4 edition, 2001.
Andreas Eggert and Georg Fassot. eCRM – Electronic Customer Relationship Management: Anbieter von CRM-Software im Vergleich. Schäffer-Poeschel, Stuttgart, 2001.
Seth Godin. Permission Marketing. Kunden wollen wählen können. FinanzBuch Verlag, München, 1999.
Paul Greenberg. CRM at the Speed of Light: Capturing and Keeping Customers in Internet Real Time. Osborne/McGraw-Hill, 3rd ed. edition, Aug 2004.
Philip Kotler. Marketing Management: Millennium Edition. Prentice Hall, Upper Saddle River, 10 edition, 2000.
Don Peppers and Martha Rogers. The One To One Future. Currency Doubleday, New York, 1997.
Duane E. Sharp. Customer Relationship Management Systems Handbook. Auerbach, 2002.
Len Silverston. The Data Model Resource Book: A Library of Universal Data Models for All Entreprises, volume 1. John Wiley & Sons, 2001.
Toby J. Teorey. Database Modeling and Design. Morgan Kaufmann, San Francisco, 3 edition, 1999.
Chris Todman. Designing a Data Warehouse : Supporting Customer Relationship Management.

Course: Optoelectronic Components [23486 / 23487]

Coordinators: Wolfgang Freude
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2 / 1	Summer term	en

Learning Control / Examinations
The assessment will consist of a oral exam (20 min) according to §4 (2), 1 of the examination regulation.

Conditions
This course can not be combined with the course Optical Sources and Detectors [23462 / 23463] and/or Optical Waveguides and Fibers [23464 / 23465.

Recommendations
Recommendations for lectures (but this is not mandatory for this course): “Electrodynamics and field calculations” or similar course on electrodynamics, “Semiconductor Devices” or similar course, “High-frequency Technology”.
Minimal background required: Calculus, differential equations, Fourier transforms and p-n junction physics.

Learning Outcomes
The students understand the components of the physical layer of optical communication systems. To this end, the students

- acquire the knowledge of operation principles and impairments of optical waveguides,
- know the basics of laser diodes, luminescence diodes and semiconductor optical amplifiers,
- understand pin-photodiodes, and
- know the systems’ sensitivity limits, which are caused by optical and electrical noise.

The knowledge presented is important in comprehending the physical layer of optical communication systems. It is this very basic understanding which enables a designer to read a device’s data sheet, to make most of its favourite properties, and to avoid hitting its limitations.
Learning the working principles of key components in optical communications opens the road to understand design and performance aspects of modern transmission systems. The following components are discussed>

- Light waveguides: Wave propagation, slab waveguides, strip wave-guides, integrated optical waveguides, fibre waveguides
- Light sources and amplifiers: Luminescence and laser radiation, luminescent diodes, laser diodes, stationary and dynamic behavior, semiconductor optical amplifiers
- Receivers: pin photodiodes, electronic amplifiers, noise

Content
The course concentrates on the most basic optical communication components. Emphasis is on physical understanding, exploiting results from electromagnetic field theory, (light waveguides), solid-state physics (laser diodes, LED, and photodiodes), and communication theory (receivers, noise).

Media
Detailed textbook-style lecture notes, and lecture slides

Literature

- Grau, G.; Freude, W.: Optische Nachrichtentechnik, 3. Ed. Berlin: Springer-Verlag 1991. In German. Since 1997 out of print.
  Corrected reprint Karlsruhe 2005, available via W. F. (w.freude@kit.edu).
- Voges, E.; Petermann, K. (Eds.): Optischen Kommunikationstechnik Handbuch für Wissenschaft und Industrie. Springer-Verlag, Berlin 2002. In German
- Agrawal, G. P.: Lightwave technology. Hoboken: John Wiley & Sons 2004
- Iizuka, K.: Elements of photonics. Vol. I, especially Vol. II. Hoboken: John Wiley & Sons 2002

Course: Managing Organizations [2577902]

Coordinators: Hagen Lindstädt
Part of the modules: Strategy and Organization (p. 27)[WI3BWLUO1]

ECTS Credits	Hours per week	Term	Instruction language
4	2/0	Winter term	de

Learning Control / Examinations
The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The course should enable the participants to assess the strengths and weaknesses of existing organisational structures and rules using systematic criteria. Here concepts and models for designing organisation structures, regulating organisational processes and managing organisational changes are presented and discussed using case studies. The course is structured to relate to actions and aims to give students a realistic view of the opportunities and limits of rational design approaches.

Content

- Principles of organisational management
- Managing organisational structures and processes: the selection of design parameters
- Ideal-typical organisational structures: choice and effect of parameter combinations
- Managing organisational changes

Media
Slides.

Literature

- Laux, H.; Liermann, F.: *Grundlagen der Organisation*, Springer. 6. Aufl. Berlin 2005.
- Lindstädt, H.: *Organisation*, in Scholz, C. (Hrsg.): Vahlens Großes Personallexikon, Verlag Franz Vahlen. 1. Aufl. München, 2009.
- Schreyögg, G.: *Organisation. Grundlagen moderner Organisationsgestaltung*, Gabler. 4. Aufl. Wiesbaden 2003.

The relevant excerpts and additional sources are made known during the course.

Course: Physics for Engineers [2142890 / 2142891]

Coordinators: Peter Gumbsch, A. Nesterov-Müller, D. Weygand, A. Last
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
6	2/2	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None.

Recommendations
Knowledge of bases in mechanics and optics are necessary.

Learning Outcomes
Orientation in topics of modern physics.

Content
Laser, superconductivity and transistor will be presented from the point of view of quantum phenomena up to technical applications.

Media
script

Literature
Bergmann-Schäfer, Lehrbuch der Experimentalphysik, Band I-III.

Course: Physical Basics of Laser Technology [2181612]

Coordinators: Schneider
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Conditions
Basic knowledge of physics, chemistry and material science is assumed.
It is not possible, to combine this lecture with the lecture *Laser Application in Automotive Engineering* [21642]

Learning Outcomes
The student

- comprehends the physical basics and understands the function of laser sources and the interactions between laser radiation and materials surfaces.
- Based on this the student is able to choose appropriate laser sources and laser process techniques for various applications in materials processing.

Content
Based on the description of the physical basics about the formation and the properties of laser light the lecture goes through the different types of laser beam sources used in industry these days. The lecture focus on the usage of lasers especially in materials engineering. Other areas like measurement technology or medical applications are also mentioned.

An excursion to the laser laboratory of the Institute for Materials Research (IMF I) at the Forschungszentrum Karlsruhe (FZK) will be offered.

Media
Lecture notes.

Literature
Elective literature:

- F. K. Kneubühl, M. W. Sigrist: Laser, 1999, Teubner Studienbücher
- J. Eichler, H.-J. Eichler: Laser: Bauformen, Strahlführung, Anwendungen, 2003, Springer
- R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer
- H. Hügel: Strahlwerkzeug Laser; 1992, Teubner Studienbücher

Course: Polymerengineering I [2173590]

Coordinators: Peter Elsner
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, to equip the students with knowledge and technical skills, and to use the material “polymer” meeting its requirements in an economical and ecological way.

Content
1. Economical aspects of polymers
2. Introduction of mechanical,chemical end electrical properties
3. Processing of polymers (introduction)
4. Material science of polymers
5. Synthesis

Literature
Recommended literature and selected official lecture notes are provided in the lecture

Course: Polymerengineering II [2174596]

Coordinators: Peter Elsner
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, to equip the students with knowledge and technical skills, and to use the material “polymer” meeting its requirements in an economical and ecological way. Also the manifold production processes are discussed and compared regarding the component design .

Content
1. Processing of polymers

2. Properties of polymer components
Based on practical examples and components

2.1 Selection of material

2.2 Component design

2.3 Tool engineering

2.4 Production technology

2.5 Surface engineering

2.6 Sustainability, recycling

Literature
Recommended literature and selected official lecture notes are provided in the lecture

Course: Practical training in basics of microsystem technology [2143875]

Coordinators: Arndt Last
Part of the modules: Microsystem Technology (p. 80)[WI3INGMBIMT1]

ECTS Credits	Hours per week	Term	Instruction language
3		Winter / Summer Term	de

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 SPO).

Conditions
None

Recommendations
Courses Microsystem technology I [2141861] and II [2142874] are recommended.

Learning Outcomes
Practical training in micro structure technology

Content
Five different practical exercises in microsystem technological themes per student are offered.

Media
Each student gets a booklet for the preparation of the practical exercise with descriptions of the experiments at the end of the Microsystem technology I respectively II - lecture.

Literature

- Micro system technology for engineers, W. Menz und J. Mohr, VCH Verlagsgesellschaft, Weinheim 2005.
- Fundamentals of Microfabrication, M. Madou, CRC Press, Boca Raton 1997

Remarks
The registration for the practical exercises takes place in the course Microsystem technology I respectively II.
There are two fixed examination dates per year, both Thursdays, in the second complete week in September and the second week after Ash Wednesday in March or April.

Course: Principles of Insurance Management [2550055]

Coordinators: Ute Werner
Part of the modules: Insurance Markets and Management (p. 33)[WI3BWLFBV4], Risk and Insurance Management (p. 32)[WI3BWLFBV3]

ECTS Credits	Hours per week	Term	Instruction language
4.5	3/0	Summer term	de

Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

Conditions
None.

Learning Outcomes
See German version.

Content
See German version.

Literature

- D. Farny. *Versicherungsbetriebslehre.* 2006.
- P. Koch. *Versicherungswirtschaft - ein einführender Überblick.* 2005.
- M. Rosenbaum, F. Wagner. Versicherungsbetriebslehre. Grundlegende Qualifikationen. 2002.
- U. Werner. Einführung in die Versicherungsbetriebslehre. Skript zur Vorlesung.

Elective literature:
Will be announced in the lecture.

Remarks
To attend the course please register at the secretariat of the chair of insurance science.

Course: Private and Social Insurance [2530050]

Coordinators: Wolf-Rüdiger Heilmann, Klaus Besserer
Part of the modules: Insurance Markets and Management (p. 33)[WI3BWLFBV4]

ECTS Credits	Hours per week	Term	Instruction language
2.5	2/0	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (according to Section 4 (2), 1 of the examination regulation) .
The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
Getting to know basic terms and functioning of private and social insurance.

Content
Basic terms of insurance, i.e. characteristics, judicial and political background and functioning of private and social insurance as well as their economic and societal and political meaning.

Literature
Elective literature:

- F. Büchner, G. Winter. Grundriss der Individualversicherung. 1995.
- P. Koch. Versicherungswirtschaft. 2005.
- Jahrbücher des GDV. Die deutsche Versicherungswirtschaft.

Remarks
Block course. To attend the course please register at the secretariat of the chair of insurance science.

Course: Product Lifecycle Management [2121350]

Coordinators: Jivka Ovtcharova
Part of the modules: Product Lifecycle Management (p. 79)[WI3INGMB21]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1	Winter term	de

Learning Control / Examinations
The assessment is carried out as a general written exam (90 min.) (according to Section 4 (2), 1 of the examination regulation) of the single course 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 written examination.

Conditions
This course Product Lifecycle Management [2121350] is compulsory for the module Product Lifecycle Management [WW4INGMB21] and must be examined.

Learning Outcomes
The objective of the PLM lecture is to provide an overview about management and organizational approaches to product lifecycle management.
The students should:

- know the PLM management concept, its objectives and they should be able to highlight the economic benefits of the concept;
- know PLM solution vendors and can estimate the current market situation;
- understand the demand for integrated and cross-department business processes, regarding portfolio planning, manufacturing and recirculation of customer feedback from the market. The overall lifecycle including maintenance and recycling is regarded.
- know required processes and functions to support the entire product life cycle;
- are aware of the major industrial software systems in PDM, ERP, SCM, CRM and the methods for systems integration-
- Acquire techniques to successfully introduce PLM Management concepts.

Content
Product Lifecycle Management (PLM) is an approach for holistic and enterprise spanning management and governing of all product related processes and data throughout the product life cycle including an extended supply chain - from design and production and sales to the dismantling and recycling of the product.
Product Lifecycle Management is a comprehensive approach for effective and efficient design of information from the cradle to the grave of a product. Based on the entirety of product information, acquired across the entire value chain and across multiple partners, processes methods and tools are made available to provide the right information at the right time and achieve high quality at the right place.
The course covers:

- a consistent description of all business processes that occur during the product life cycle (development, production, sales, dismantling, ...)
- the presentation of methods for performing PLM business processes,
- explaining the most important corporate information systems to support the life cycle (PDM, ERP, SCM, CRM systems) using the software manufacturer SAP as an example.

Course: Product Lifecycle Management in the Manufacturing Industry [2121366]

Coordinators: Gunter Meier
Part of the modules: Product Lifecycle Management (p. 79)[WI3INGMB21]

ECTS Credits	Hours per week	Term	Instruction language
4	2/0	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) according to §4 (2), 2 of the examination regulation.
The grade corresponds to the grade of the oral exam.

Conditions
None.

Recommendations
It is recommended to take the course *Product Lifecycle Management* [2121350] beforehand.

Learning Outcomes

Content

Course: Introduction to Programming with Java [2511000]

Coordinators: Detlef Seese
Part of the modules: Introduction to Informatics (p. 19)[WI1INFO]

ECTS Credits	Hours per week	Term	Instruction language
5	3/1/2	Winter term	de

Learning Control / Examinations
The assessment consists of a written resp. computer-based exam (120 min) according to Section 4 (2),1 of the examination regulation.
The successful completion of the compulsory tests in the computer lab is prerequisited for admission to the written resp. computer-based exam.
The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
see German version

Content
see German version

Literature
D. Ratz, J. Scheffler, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 6. aktualisierte und erweiterte Auflage, Hanser 2011.

Remarks
see German version

Course: Advanced Programming - Java Network Programming [2511020]

Coordinators: Detlef Seese, D. Ratz
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1/2	Summer term	de

Learning Control / Examinations
The assessment consits of a written exam (120 min) according to Section 4(2), 1 of the examination regulation.
The successful completion of the compulsory tests in the computer lab is prerequisite for admission to the written exam. Further information about attendance to the exercises and practical terms will be announced in the first lecture and at the lecture homepage.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
This course cannot be taken together with *Advanced Programming - Application of Business Software* [2540886/2590886].

Recommendations
Successful completion of the course *Introduction to Programming with Java* [2511000].

Learning Outcomes
see German version

Content
see German version

Literature
D. Ratz, J. Scheffler, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 6. aktualisierte und erweiterte Auflage, Hanser 2011.
Elective literature:

- S. Zakhour, S. Hommel, J. Royal. Das Java Tutorial. Addison Wesley 2007
- W. Eberling, J. Lessner. Enterprise JavaBeans 3. Hanser Verlag 2007.
- R. Oechsle. Parallele und verteilte Anwendungen. 2. Auflage. Hanser Verlag 2007.
- Further references will be given in the lecture.

Course: Advanced Programming - Application of Business Software [2540886/2590886]

Coordinators: Andreas Oberweis, Stefan Klink
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1/2	Winter term	de

Learning Control / Examinations
The assessment consists of a written examination of 2 hours (according to Section 4 (2), 1 of the examination regulation) and of assignments during the course (according to Section 4 (2), 3 of the examination regulation).
Successful participation to the computer lab is precondition for permission to the assessment. Further information will be given at the first lesson and via the homepage of the course.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
This course cannot be taken together with *Advanced Programming - Java Network Programming* [2511020].

Recommendations
Knowledge of the course “Grundlagen der Informatik I und II” are helpful.

Learning Outcomes
Students

- master basic concepts and principles of enterprise information systems,
- apply standard software for modelling busines processes and for analysing them to given criteria
- master the installation, configuration, and parameterisation of enterprise information systems in business and
- assess economical aspects of such systems.

Content
Business information systems enable, support, and accelerate new forms of business processes and forms of organisation. They are the central infrastucture of the economy in the age of eBusiness. Thus, basic knowledge is given in lectures, in excersises and in the computer lab which deals with installation, configuration and parameterization of busines information systems. The course communicates profund knowledge in following topics:

- Analysis of cooperation scenarios and business process scenarios
- Selection of modelling methods according to defined criteria
- Implementation of business process modells and cooperation modells with the help of standard software
- Identification and assessment of challenges during the installation of information systems
- Economical evaluation of business information systems.

Media
Slides, access to internet resources.

Literature
Elective literature:

- Schwabe, Streitz, Unland. CSCW-Kompendium. Lehr- und Handbuch zum computerunterstützen kooperativen Arbeiten.
- Krcmar, Schwarzer. Wirtschaftsinformatik.
- Stucky. Petri-Netze zur Modellierung verteilter DV-Systeme.

Further literature will be given during the course.

Course: Project Workshop-Automative Engineering [2115817]

Coordinators: Frank Gauterin
Part of the modules: Vehicle Development (p. 63)[WI3INGMB14], Handling Characteristics of Motor Vehicles (p. 62)[WI3INGMB6], Automotive Engineering (p. 61)[WI3INGMB5]

ECTS Credits	Hours per week	Term	Instruction language
4.5	3	Winter / Summer Term	de

Learning Control / Examinations
The assessment consists of a project presentation at the end of the lecture period (according to Section 4(2), 3 of the examination regulation) and an oral exam (30-40 min) in the recess period (according to Section 4(2), 2 of the examination regulation). Re-examinations are offered at every ordinary examination date.
The overall grade of the course consists of the weighted grades of both assessments

- Processing and results of the project: 75%
- Oral exam: 25 percent

Conditions
None.

Learning Outcomes
The students are familiar with typical industrial development processes and working style. They are able to apply knowledge gained at the university to a practical task.

Content
During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop. The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute. At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Media
Course script (will be supplied during the start-up meeting).

Literature
Elective literature:
Steinle, Claus; Bruch, Heike; Lawa, Dieter (Hrsg.), Projektmanagement, Instrument moderner Innovation, FAZ Verlag, Frankfurt a. M., 2001, ISBN 978-3929368277

Course: Project Management [0170106]

Coordinators: Harald Schneider
Part of the modules: Fundamentals of construction (p. 87)[WI3INGBGU3]

ECTS Credits	Hours per week	Term	Instruction language
3	1/1	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Project Management in Rail Industry [2115995]

Coordinators: Peter Gratzfeld
Part of the modules: Rail System Technology (p. 65)[WI3INGMB25]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
See modul description.

Conditions
See modul description.

Learning Outcomes

- The students learn the basics of project management in rail industry.
- They realize the role of the project manager and the project core team.
- They understand the different project phases and know about processes and tools.
- They understand the governance process.

Content

- Project management system (project, project management, project phases, main processes and supporting processes, governance)
- Organization (organizational structure within a company, project organization, roles in a project organization)
- Main processes (project start, project plan, DPS, WBS, risk and opportunity management, change management, project closure)

Media
All slides are available for download (Ilias-platform).

Literature
A bibliography is available for download (Ilias-platform).

Course: Projectseminar [SozSem]

Coordinators: Bernart, Kunz, Pfaff, Haupt, Grenz, Eisewicht
Part of the modules: Sociology/Empirical Social Research (p. 95)[WI3SOZ]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The student:

- Is able to develop sociological analyses based on the topic of the seminar
- Is able to organize a small survey or to evaluate a given data set on the research problem

Content
In this class, students will conduct small empirical projects.

Course: Explorative-interpretative Project Seminar [n.n.]

Coordinators: Pfadenhauer, Kunz, Grenz, Eisewicht
Part of the modules: Qualitative Social Research (p. 96)[WI3SOZ2]

ECTS Credits	Hours per week	Term	Instruction language
4	2/0	Winter / Summer Term	de

Learning Control / Examinations
The form of the assessment will be announced at the beginning of the course by the resp. lecturer. Usually at 2 Credit Points i twill be an oral presentation, at 4 LP there has to be passed a term paper as well.
The modality of grading will be announced at the beginning of the course by the lecturer. Usually at 2 Credit Points the overall grade consists of the oral presentation and the active participation in the project - at 4 Credit Points it consists of the active parcticipation and the term paper.

Conditions
Succssesful completion of the lecture *Interpretative Social Research Methods* [n.n.].
Knowledge of this lecture is required.
The lecture is compulsory in the module and has to be attended.

Learning Outcomes
The student

- is, based on the lecture 'Interpretative Social Research Methods', capable of choosing and applying appropriate explorative-interpretative methods according to a research question and arranging them in a conceptual research design.
- uses this capability to concretise a scientific question and to collect, fixate and evaluate suitable data.

Content
See seminar announcement.

Media
Will be announced in the lecture.

Literature
Will be announced in the lecture.
Elective literature:
Will be announced in the lecture.

Course: High Performance Powder Metallurgy Materials [2126749]

Coordinators: Rainer Oberacker
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20-30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Conditions
None.

Recommendations
Knowledge of basic material science is assumed. Therefore it is recommended to attend the courses Material Science I [21760] and Material Science II [21782] beforehand.

Learning Outcomes
The students know the basics of powder metallurgy. They are able to asses the conditions for applying either powder metallurgy or competing production methods. They have knowledge on production, properties and application of the most important PM materials.

Content
The lecture gives an overview on production, properties and application structural and functional powder metallurgy material. The following groups of materials are presented: PM High Speed Steels, Cemented Carbides, PM Metal Matrix Composites, PM Secialities, PM Soft Magnetic and Hard Magnetic Materials.

Literature
Elective literature:
W. Schatt ; K.-P. Wieters ; B. Kieback. „.Pulvermetallurgie: Technologien und Werkstoffe“, Springer, 2007
R.M. German. “Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
F. Thümmler, R. Oberacker. “Introduction to Powder Metallurgy”, Institute of Materials, 1993

Course: Quality Management [2149667]

Coordinators: Lanza, Gisela
Part of the modules: Specialization in Production Engineering (p. 74)[WI3INGMB22]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
Performance is assessed in the form of one written examination (60 min) (as per §4(2), 1 or 2 SPO [study and examination regulations]) during the lecture-free period. The examination will take place once every semester and can be retaken at every official examination date.

Conditions
None.

Learning Outcomes
The student

- has **knowledge** of the content covered by the lecture,
- **understands** the quality philosophies covered by the lecture,
- is able to **apply** the QM tools and methods he/she has learned about in the lecture **to** new problems from the context of the lecture,
- is able to **analyse** and **evaluate** the suitability of the methods, procedures and techniques he/she has learned about in the lecture for a specific problem.

Content
Based on the quality philosophies Total Quality Management (TQM) and Six Sigma, the lecture deals with the requirements of modern quality management. Within this context, the process concept of a modern enterprise and the process-specific fields of application of quality assurance methods are presented. The lecture covers the current state of the art in preventive and non-preventive quality management methods in addition to manufacturing metrology, statistical methods and service-related quality management. The content is completed with the presentation of certification possibilities and legal quality aspects.

Main topics of the lecture:

1. The term “quality”

2. Total Quality Management (TQM) and Six Sigma

3. Universal methods and tools

4. QM during early product stages - product definition

5. QM during product development and in procurement

6. QM in production - manufacturing metrology

7. QM in production - statistical methods

8. QM in service

9. Quality management systems

10. Legal aspects of QM

Media
Lecture notes (available at the Institute of Production Science)

Remarks
The credits were changed to 4 CP.

Course: Quantitative Methods for Supply Chain Risk Management [2118090]

Coordinators: A. Cardeneo
Part of the modules: Supply Chain Management (p. 38)[WI3BWLISM2]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

Conditions
Knowledge in Logistics and Operations Research are recommended (linear and mixed integer optimization, simple graph theory, and basic knowledge of statistics).

Learning Outcomes
The student

- identifies, analyzes and assigns risks of logistic systems
- plans location and transport decisions under uncertainty
- knows risk-relevant elements and knows adequate countermeasures for planning processes (regarding procurement, demand, infrastructure, continuity management)

Content
The planning and the operation of logistics systems are strongly connected with uncertainty: It is the unknown demand, varying transportation times, unexpected delays, irregularly production yield or volatile rates of exchange: Quantities, times, qualities and prices are uncertain values. Therefore it is necessary to deal with particular these uncertain values to avoid negative effects . In this lecture we mostly work with mathematical models and methods to control the various kinds of risks.

Literature
Will be announced in the lecture.

Course: Spatial Planning and Planning Law [19028]

Coordinators: Dirk Engelke, Heberling
Part of the modules: Fundamentals of Spatial and Infrastructural Development (p. 85)[WI3INGBGU1]

ECTS Credits	Hours per week	Term	Instruction language
3	1/1	Summer term	de

Learning Control / Examinations
The assessment of the module is a written examination (40 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place every semester as well as the reexamination. In case of failing or to improve the examination grade an additional oral examination (according to Section 4(2), 2 of the examination regulation) is offered in the same examination periode. The 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
None.

Learning Outcomes
The educational aim of the lecture is to give a first view on spatial planning and its main tasks. At the end of the semester the participants should be able to work on modest issues of spatial planning on the local level. This is due to assess quantitative aspects like temporal processes and display spatial data.

Content

- Tasks and strategies of spatial planning
- Spaces, uses and conflicts of local planning
- Spatial planning on the local level: Properties and buildings including the public technical and social infrastructure
- Planning on municipality level
- Sustainable settlement structure and land use management
- Historic view on urbanism and regional development
- Planning on different levels: Regional plans, structure plans and zoning plans
- Spatial planning and the European Dimension
- Real estate economy
- Exercise: Urban Planning in Karlsruhe Nordstadt

Literature
Elective literature:

- W. Müller: Städtebau
- W. Braam: Stadtplanung
- D. Bökemann (1982): Theorie der Raumplanung
- Hotzan, Jürgen (1994): dtv-Atlas zur Stadt

Course: Real Estate Management I [26400w]

Coordinators: Thomas Lützkendorf
Part of the modules: Real Estate Management (p. 45)[WI3BWLOOW2]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/2	Winter term	de

Learning Control / Examinations
The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (REM I and REM II) happen in the same semester in which the lectures take place. Therefore, REM I exams currently only take place in the winter semester and REM II exams take place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.

Conditions
A combination with the module *Design Construction and Assessment of Green Buildings I* [WI3BWLOOW1] is recommended. Furthermore it is recommeded to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

Learning Outcomes
Application of economic methods to the fields of real estate economics and sustainable construction.

Content
The course Real Estate Management I deals with questions concerning the economy of a single building througout its lifecycle. Among other topics this includes project development, location and market studies, german federal building codes as well as finance and assessment of economic efficiency.
The tutorial recesses the contents of the course by means of practical examples and, in addition to that, goes into the possible use of software tools.

Media
Presentation slides and supplementary material is provided partly as printout, partly online for download.

Literature
Elective literature:

- Gondring (Hrsg.): „Immobilienwirtschaft: Handbuch für Studium und Praxis". ISBN 3-8006-2989-5. Vahlen 2004
- Kühne-Büning (Hrsg.): „Grundlagen der Wohnungs- und Immobilienwirtschaft". ISBN 3-8314-0706-1. Knapp & Hammonia-Verlag 2005
- Schulte (Hrsg.): „Immobilienökonomie Bd. I". ISBN 3-486-25430-8. Oldenbourg 2000

Remarks
The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

Course: Real Estate Management II [2585400/2586400]

Coordinators: Thomas Lützkendorf
Part of the modules: Real Estate Management (p. 45)[WI3BWLOOW2]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/2	Summer term	de

Learning Control / Examinations
The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (REM I and REM II) happen in the same semester in which the lectures take place. Therefore, REM I exams currently only take place in the winter semester and REM II exams take place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.

Conditions
A combination with the module *Design Construction and Assessment of Green Buildings I* [WI3BWLOOW1] is recommended. Furthermore it is recommeded to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

Learning Outcomes
Application of economic methods to the fields of real estate economics and sustainable construction.

Content
The course Real Estate Management II gives special attention to topics in connection to the management of large real estate portfolios. This especially includes property valuation, market and object rating, maintenance and modernization, as well as real estate portfolio and risk management. The tutorial provides examples in order to practice the application of theoretical knowledge to practical problems.

Media
Presentation slides and supplementary material is provided partly as printout, partly online for download.

Literature
Elective literature:
See german version.

Remarks
The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

Course: Computer Integrated Planning of New Products [2122387]

Coordinators: Roland Kläger
Part of the modules: Product Lifecycle Management (p. 79)[WI3INGMB21]

ECTS Credits	Hours per week	Term	Instruction language
4	2/0	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) according to §4 (2), 2 of the examination regulation.
The grade corresponds to the grade of the oral exam.

Conditions
None.

Learning Outcomes

Content

Course: Financial Accounting and Cost Accounting [2600002]

Coordinators: Torsten Lüdecke
Part of the modules: Business Administration (p. 17)[WI1BWL]

ECTS Credits	Hours per week	Term	Instruction language
4	2/2	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation.
The examination takes place in every semester. Re-examinations are offered at eyery ordinary examination date.

Conditions
None.

Learning Outcomes
Business transactions are economic events that affect the financial position of a business entity. After this basic course students have to be familiar with the principles of Financial and Management Accounting especially with the four financial statements and the instruments of a cost accounting system.

Content
After an introduction to the objectives of accounting the student will learn the double- Entry- System, the basic method of accounting, and the difference between accounting and bookkeeping. We examine the typical business transactions for Trading Companies and Industrial Enterprises. Financial statements are the primary means of communicating important accounting information about a business to those who have an interest in the business. Four major financial statements are used to communicate accounting information: the income statement, the statement of retained earnings, the balance sheet and the statement of cash flows, here in the context with german laws (HGB). In the second part of the course the cost accounting instruments will be analyzed: cost type accounting, cost center accounting, and unit of output costing. Aspects of modern systems in Management Accounting conclude this basic course.

Media
slides

Literature

- R. Buchner, Buchführung und Jahresabschluss, Vahlen Verlag
- A. Coenenberg, Jahresabschluss und Jahresabschlussanalyse, Verlag Moderne Industrie
- A. Coenenberg, Kostenrechnung und Kostenanalyse, Verlag Moderne Industrie
- R. Ewert, A. Wagenhofer, Interne Unternehmensrechnung, Springer Verlag
- J. Schöttler, R. Spulak, Technik des betrieblichen Rechnungswesen, Oldenbourg Verlag

Course: Rail Vehicle Technology [2115996]

Coordinators: Peter Gratzfeld
Part of the modules: Rail System Technology (p. 65)[WI3INGMB25]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
See modul description.

Conditions
See modul description.

Learning Outcomes

- The students learn about advantages and disadvantages of different types of traction drives and judge which one fits best for each application.
- They understand brakes from a vehicular and an operational point of view. They assess the fitness of different brake systems.
- They know about the basics of running dynamics and bogies.
- They define suitable vehicle concepts based on requirements for modern rail vehicles.

Content

- Main systems of rail vehicles
- Electric and non-electric traction drives
- Brakes
- Bogies
- Vehicle concepts for mass transit and main line

Media
All slides are available for download (Ilias-platform).

Literature
A bibliography is available for download (Ilias-platform).

Course: Semantic Web Technologies I [2511304]

Coordinators: Rudi Studer, Sebastian Rudolph, Elena Simperl
Part of the modules: Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter term	de

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
Lectures on Informatics of the Bachelor on Information Management (Semester 1-4) or equivalent.

Learning Outcomes

- Basic knowledge about the main ideas and the realisation of Semantic Web Technologies

Content
”Semantic Web” denotes an extension of the World Wide Web by meta data and applications in order to make the meaning (semantics) of data on the web usable by intelligent systems, e.g. in e-commerce and internet portals. Central to this is the representation and processing of knowledge in form of ontologies. This lecture provides the foundations for knowledge representation and processing for the corresponding technologies and presents example applications. It covers the following topics:

- Extensible Markup Language (XML)
- Resource Description Framework (RDF) and RDF Schema
- Web Ontology Language (OWL)
- Rule Languages
- Applications

Media
Slides.

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer 2003.

Elective literature:

1. Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, Foundations of Semantic Web Technologies. Textbooks in Computing, Chapman and Hall/CRC Press, 2009.
2. G. Antoniou, Grigoris Antoniou, Frank Van Harmelen, A Semantic Web Primer, MIT Press, 2004
3. Uwe Schöning. Logik für Informatiker. Spektrum Akademischer Verlag, 5. Auflage 2000
4. Steffen Hölldobler. Logik und Logikprogrammierung. Synchron Verlag, 3. Auflage 2003
5. Dieter Fensel. Spinning the Semantic Web. 2003 (ISBN 0262062321).
6. Handschuh, Staab. Annotation for the Semantic Web. 2003 (ISBN 158603345X).
7. J. Sowa. Knowledge Representation. Brooks/Cole 1999
8. Tim Berners-Lee. Weaving the Web. Harper 1999 geb. 2000 Taschenbuch.
9. Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/

Course: Seminar in Enterprise Information Systems [SemAIFB1]

Coordinators: Rudi Studer, Andreas Oberweis, Thomas Wolf, Ralf Kneuper
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis and a presentation.
The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.
The seminar is for bachelor as well as master students. The differentiation will be made by selection of different topics and different standards of evaluation.

Conditions
See corresponding module information.

Learning Outcomes
Students are able to

- do literature search based on a given topic: identify relevant literature, find, assess and evaluate this literature.
- write the seminar thesis (and later the Bachelor-/Masterthesis) with a minimal learning curve by using format requirements such as those recommended by well-known publishers.
- give presentations in a scientific context in front of an auditorium. These techniques are presented and learned during the seminar.
- present results of the research in written form generally found in scientific publications.

Content
The seminar intensifies and extends specific topis which are discussed within corresponding lectures. Knowledge of these lecture topics is an advantage but not a precondition.
Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at http://www.aifb.uni-karlsruhe.de/Lehre

Literature
Literature will be given individually in the specific seminar.

Course: Seminar Management accounting for industrial engineers [2577916]

Coordinators: Marc Wouters
Part of the modules: Management Accounting (p. 28)[WI3BWLIBU1], Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	en

Learning Control / Examinations
The final grade of the course is the grade awarded to the paper.

Conditions
The LV “Allgemeine Betriebswirtschaftslehre C” (2600026) must have been completed before starting this seminar.

Learning Outcomes
Students are familiar with topics in management accounting literature and practice that are most relevant to their studies and to their research projects.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. Meetings are concentrated in three weeks that are spread throughout the semester.
Week 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Week 2: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Week 3: In the third week we are going to present and discuss the final papers.

Media
The instructor uses a LCD projector and makes the slides available for the students. Students should have their own notebook computer with the usual software for spreadsheets, word processing, internet, etc.

Literature
Will be announced in the course.

Remarks
Maximum of 24 students.

Course: Seminar Efficient Algorithms [SemAIFB2]

Coordinators: Hartmut Schmeck
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment consists of a talk (presentation of 45-60 minutes) about the research topic of the seminar together with discussion, a written summary about the major issues of the topic (approx. 15 pages) and attending the discussions of the seminar (according Section 4(2), 3 of the examination regulation).
The grade of this course is achieved by the weighted sum of the grades (talk 50%, written summary 30% and discussion 20%). This seminar is for bachelor as well as master students. The difference between them is calculated according to different evaluation mechanisms for the written summary work and the talk.

Conditions
See corresponding module information.

Learning Outcomes
The students should learn to work on research papers by searching for new topics in computer science and by presenting the major issues of the papers.
The master students should deepen their ability to develop independent insight into new scientific topics and to communicate them through oral presentation and written summary to others.
The students will learn to deal with critical discussions on scientific presentations and written summaries through active participation in the seminar.

Content
Topics include the new research issues of the research group “applied Informatics”. The new topics are in the area Organic Computing, Nature-inspired optimization and service oriented architectures.
The topics of the seminars are introduced around the end of the former semester on the board A12 of the institute AIFB (building 11.40) and in Internet http://www.aifb.kit.edu/web/SeminarePraktika

Literature
Will be announced at the beginning of the semester.

Remarks
There is a limited number of participants. The students have to register for the seminar.

Course: Seminar Energy Economics [SemEW]

Coordinators: Wolf Fichtner, Patrick Jochem, Anke Eßer-Frey, Massimo Genoese
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Seminar eOrganization [SemAIFB5]

Coordinators: Stefan Tai
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis (15-20 pages), a presentation and active participation in class.

The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Conditions
None.

Learning Outcomes
Research in the field of eOrganization adhering to scientific standards.

Content
The seminar explores current research topics of Cloud Service Engineering (including service computing, service engineering, cloud computing and service networks). Each time, a particular focus theme will be chosen.

Course: Seminar Public Finance [2560130]

Coordinators: Berthold Wigger, Assistenten
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
See module description.
Adequate for students in an advanced stage of their studies.

Learning Outcomes

Content
Preparation, presentation, and discussion of recent research papers on varying Public Finance issues. The current seminar subject, including the exact topics to work on, will be announced under http://fiwi.iww.kit.edu and on the notice board prior to the start of semester.

Literature
Will be announced at the beginning of the seminar.

Course: Seminar Conveying Technology and Logistics [SemIFL]

Coordinators: Kai Furmans
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
Participation during the information presentation. The performance review is based on the written paper and the two presentations. Active participation during the presentations is required.

Conditions
None.

Learning Outcomes
The student gets an opportunity to learn how to work academically. By delving into a scientific topic the student learns to do research and to argue specially in logistics and material handling. Through the presentation of his work the student will learn technical basics of presentation and basics of academic argumentation. Also rhetorical competence will be acquired.

Content
The topics of the seminar will be published under http://www.ifl.kit.edu/seminare.php one semester before. To participate it is necessary to sign in the semester before.

Course: Seminar in Finance [2530293]

Coordinators: Marliese Uhrig-Homburg, Martin E. Ruckes
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Recommendations
Knowledge of the content of the module *Essentials of Finance* [WI3BWLFBV1] is assumed.

Learning Outcomes
The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.
Through the presentations in this seminar the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.
The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Literature
Will be announced at the end of the foregoing semester.

Course: Seminar in International Economy [SemIWW2]

Coordinators: Jan Kowalski
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2/0	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: [SemIWW3]

Coordinators: Ingrid Ott
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted graded examinations. (Essay 50%, 40% oral presentation, active participation 10%).

The seminar is intended for students both of bachelor and master degree program. They are differentiated by different assessment criteria for term paper and presentation grading.

Conditions
At least one of the lectures “Theory of Endogenous Growth” or “Innovation Theory and Policy” should be attended in advance, if possible.

Learning Outcomes

Content
The current topic of the seminar including the subjects treated will be announced before the semester begins at http://wipo.iww.kit.edu.
Previous Topics:

- Economic Aspects of General Purpose Technologies (SS 2010)
- Questions of Modern Economic Growth Theories (WS 2010/2011)
- Beans or fully automated machines? Determinants of Developement and Growth in a globalized World (SS 2011)

Literature
Todaro, Michael P. und Stephen C. Smith (2009). Economic Development, Tenth Edition, Pearson Education Ltd., Essex.

Course: Seminar in Industrial Production [SemIIP2]

Coordinators: Frank Schultmann, Magnus Fröhling, Tina Comes
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
Assessment acc. to §4 (2), No.3 ER by assessing the written seminar thesis (approx. 20 pages), the oral presentation and active participation in public discussions. The final grade will be formed by weighing the individual assessment grades.

Conditions
Students should have completed the modules „Industrial Production I“ [WI3BWLIIP], „Industrial Production II“ [WW4BWLIIP2] or “Industrial Production III” [WW3BWLIIP6].

Learning Outcomes
Students shall gain insights into selected research of the Institute of Industrial Production (IIP).

- Students search for, identify, review and evaluate relevant literature.
- Students prepare their seminar thesis (and later on bachelor/master thesis) with a minimum expense in becoming acquainted with their topic and general layout.
- Students produce an oral presentation in a scientific context by using the outlined techniques of scientific presentation.
- Students learn to present their written results in an adequate form for scientific publishing.

Students in M.Sc. studies will have to put special emphasis on a critical discussion and evaluation of their topic, since they will have to look into actual scientific results in the field of industrial production.

Content
This seminar covers actual topics of industrial production, logistics, environmental science, project management and similar fields. We recommend a successful attendance of previous IIP modules (not compulsory!).
Actual topics covered in this seminar will be published before the start of semester.

Course: Seminar Information Engineering and Management [SemIW]

Coordinators: Christof Weinhardt
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The student is evaluated based on the written work, a presentation of the results in front of an audience and his contribution to the discussion

Conditions
See corresponding module information.

Recommendations
Business Engineering/Economics Engineering: At least one module offered by the institute should have been chosen before attending this seminar.

Learning Outcomes
The student should be able to do a literature review based on a predefined topic in the context of information engineering and management. The approach comprises the identification of relevant literature according to the topic and an analysis as well as an evaluation of the methods presented in the literature. The student learns to present his results in a paper and in front of an audience on a academic level. This process gives him the knowledge and practice for further research work like a master thesis or a doctoral thesis

Content
In the seminar the student should learn to apply the research methods to a predefined topic area. The topics are based on research questions in Information Engineering and Management across different industry sectors. This problem analysis requires a interdisciplinary examination.

Media

- Powerpoint
- eLearning Platform Ilias
- Software Tools, if necessary

Literature
The student will receive the necessary literature for his research topic.

Remarks

- Students from Bachelor and Master Course can visit the seminar. The research topic as well as the evaluation of the work and the presentation will have a different focus between Bachelor and Master Course.
- All the seminars offered at the chair of Prof. Dr. Weinhardt can be chosen. The current topics of the seminars are available at the following homepage: http://www.iism.kit.edu/im/lehre .

Course: Seminar Complexity Management [SemAIFB3]

Coordinators: Detlef Seese
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
see German version

Conditions
None.

Learning Outcomes
see German version

Content
see German version

Literature
Will be announced in the seminar.

Remarks
The number of participants is limited. Please take notice about the inscription procedure at the institutes website. Specific titles and the topics of offered seminars will be announced before the start of a semester on the website of AIFB.

Course: Seminar Service Science, Management & Engineering [2590470]

Coordinators: Christof Weinhardt, Gerhard Satzger, Rudi Studer, Stefan Nickel
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis (15-20 pages), a presentation and active participation in class.
The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Conditions
See corresponding module information.

Recommendations
Lecture *eServices* [2540466] is recommended.

Learning Outcomes
Autonomously deal with a special topic in the Service Science, Management and Engineering field adhering to scientific standards.

Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.
See the KSRI website for more information about this seminar: http://www.ksri.kit.edu

Literature
The student will receive the necessary literature for his research topic.

Course: Seminar Stochastic Models [SemWIOR1]

Coordinators: Karl-Heinz Waldmann
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	

Learning Control / Examinations
The assessment of this course is in form of an examination of the written seminar thesis and a presentation. The final mark is the result of both the paper and its presentation.

Conditions
None.

Learning Outcomes
In case studies students comprehend stochastic relationships and gain deep knowledge of modelling, evaluation, and optimization of stochastic systems. In group presentations, students learn basic academic presentation and argument skills.

Content
The actual topic as well as the contemporary issues are available online.

Media
Power Point and related presentation techniques.

Literature
Will be presented with the actual topic.

Course: Seminar Knowledge Management [SemAIFB4]

Coordinators: Rudi Studer
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The success monitoring is done through a presentation about a research topic from the current topic of the seminar (45-60 minutes) followed by a discussion, a written summary of the main points (approx. 15 pages) and of active participation in discussions (in accordance with §4(2),3 SPO).
The total mark is composed of the graded and weighted success controls (50% lecture, 30% written paper, and 20% participation and discussion.
The seminar can be attended by both bachelor and master students. A differentiation is made by different topic assignment and evaluation standards for seminar paper and presentation.

Conditions
See module description.

Learning Outcomes
The students will learn to perform literature searches on current topics in computer science and holistic knowledge management as well as preparing and presenting the contents of scientific publications.

During the work on the seminar topics the master students will deepen their skills to autonomously comprehend current scientific knowledge and to convey it to others through oral presentations and written summaries.

Through active participation in the seminar, students acquire skills in critical appraisal of research topics and in oral and written presentation of independently developed research content.

Content
Each year, the seminar will cover topics from a different selected subfield of knowledge management, e.g.:

- Ontology-based knowledge management,
- Information Retrieval and Text Mining,
- Data Mining,
- Personal Knowledge Management,
- Case Based Reasoning (CBR),
- Collaboration and Scoial Computing,
- Business-process Oriented Knowledge Management.

Media
Slides.

Literature

- I. Nonaka, H. Takeuchi: The Knowledge Creating Company. Oxford University Press 1995
- G. Probst et al.: Wissen managen - Wie Unternehmen ihre wertvollste Ressource optimal nutzen. Gabler Verlag, Frankfurt am Main/ Wiesbaden, 1999
- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolf, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- S. Staab, R. Studer: Handbook on Ontologies, ISBN 3-540-40834-7, Springer Verlag, 2004
- Modern Information Retrieval, Ricardo Baeza-Yates & Berthier Ribeiro-Neto. New York, NY: ACM Press; 1999; 513 pp. (ISBN: 0-201-39829-X.)

Remarks
The number of students is limited. Students have to observe the designated registration process.

Course: Seminar in Insurance Management [SemFBV1]

Coordinators: Ute Werner
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
Oral presentation, written report of 10 pages on the same topic, as well as active participation in discussion and working groups (according to §4(2), 3 SPO).
The grading consists of the weighted performance of the works performed.

Conditions
See corresponding module information.
The seminar is held within the courses of *Insurance Management* [WI3BWLFBV4] and [WW4BWLFBV6/7], respectively.
A course taken as a seminar cannot be chosen as a part of a course module (and vice versa).

Recommendations
The seminar fits well with the bachelor modules *Risk and Insurance Management* [WI3BWLFBV3] and *Insurance Markets and Management* [WI3BWLFBV4] as well as with the master modules *Insurance Management I* [WW4BWLFBV6] and *Insurance Management* II [WW4BWLFBV7]. These modules, though, are not required to be taken.

Learning Outcomes
See German version.

Content
The seminar is offered within the following courses:

- Principles of Insurance Management
- Insurance Marketing
- Insurance Production
- Service Management

For their contents refer to the information given at the referring pages.

Literature
Will be announced at the beginning of the lecture period.

Remarks
Some of the respective courses are offered on demand. For further information, see: http://insurance.fbv.uni-karlsruhe.de
To attend the course please register at the secretary of the chair of insurance science.

Course: Seminar in Operational Risk Management [SemFBV2]

Coordinators: Ute Werner
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
Oral presentation, written report of 10 pages on the same topic, as well as active participation in discussion and working groups (according to §4(2), 3 SPO).
The grading consists of the weighted performance of the works performed.

Conditions
See corresponding module information.
The seminar is held within the courses of *Operational Risk Management I/II* [WW4BWLFBV8/9] but with special forms of working.
A course taken as a seminar cannot be chosen as a part of a course module (and vice versa).

Recommendations
The seminar fits well with the bachelor module *Risk and Insurance Management* [WI3BWLFBV3] as well as with the master modules *Operational Risk Management I* [WW4BWLFBV8] and *Operational Risk Management* II [WW4BWLFBV9]. These modules, though, are not required to be taken.

Learning Outcomes
See German version.

Content
The seminar is offered within the following courses:

- Enterprise Risk Management
- Multidisciplinary Risk Research
- Risk Communication
- Risk Management of Microfinance and Private Households
- Project Work in Risk Research

For their contents refer to the information given at the referring pages.

Literature
Will be announced at the beginning of the course period.

Remarks
Some of the respective courses are offered on demand. For further information, see: http://insurance.fbv.uni-karlsruhe.de
To attend the course please register at the secretary of the chair of insurance science.

Course: Seminar in strategic and behavioral marketing [2572197]

Coordinators: Bruno Neibecker
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter term	de

Learning Control / Examinations
The student is evaluated based on the written work, a presentation of the results in front of an audience and his contribution to the discussion

Conditions
None.

Learning Outcomes
At the seminar (with a “Referat” as its goal) the student should be able to do a literature review based on a predefined topic in the context of marketing research. The approach comprises the identification of relevant literature according to the topic and an analysis as well as an evaluation of the methods presented in the literature. The student learns to present his results in a paper and in front of an audience on a academic level.

Content
In the seminar the student should learn to apply the research methods to a predefined topic area. The topics are based on research questions in marketing. This problem analysis requires a interdisciplinary examination. As a special option, the implementation of methodological solutions for market research can be accomplished and discussed with respect to its application.

Literature
Will be allocated according the individual topics.

Remarks
• Students from Bachelor and Master Course can visit the seminar. The research topic as well as the evaluation of the work and the presentation will have a different focus between Bachelor and Master Course.

Course: Seminar in Ergonomics [SemIIP]

Coordinators: Artur Wollert, Christine Harbring
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
See corresponding module information.

Learning Outcomes

Content

Literature
Will be announced at the end of the recess period.

Course: Seminar in Discrete Optimization [2550491]

Coordinators: Stefan Nickel
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 40-60 minutes (according to §4(2), 3 of the examination regulation).
The final mark for the seminar is the weighted average of the marks for the assessed assignments (seminar thesis 50 %, presentation 50%).
The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Conditions
Successful completion of the module *Introduction to Operations Research* [WI1OR].

Learning Outcomes
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management).
The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.
Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

Remarks
The seminar is offered in each term.

Course: Seminar in Experimental Economics [SemWIOR3]

Coordinators:
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
Term paper and presentation

Conditions
See corresponding module information.
A course in the field of Game Theory should be attended beforehand.

Learning Outcomes
The seminar wants to deepen the methods of scientific work. Students shall learn to discuss critical the latest research results in Experimental Economics.
Students learn the technical basics of presentation and to argument scientifically. Also rethoric skills shall be amplified.

Content
The seminar's topic will be announced before the beginning of each semester on the internet (http://www.wior.uni-karlsruhe.de/LS_Berninghaus/Studium/).

Media
Slides.

Literature
Will be announced at the end of the recess period.

Course: Seminar in Continous Optimization [2550131]

Coordinators: Oliver Stein
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.
The total grade is composed of the equally weighted grades of the written and oral assessments.
The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the seminar presentation.

Conditions
See corresponding module information.
Attendance is compulsory.
Preferably at least one module offered by the institute should have been chosen before attending this seminar.

Learning Outcomes
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.
The student is introduced to the style of scientific work. By focussed treatment of a scientific topic the student learns the basics of scientific investigation and reasoning.
For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.
With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Content
The current seminar topics are announced under http://kop.ior.kit.edu at the end of the preceding semester.

Literature
References and relevant sources are announced at the beginning of the seminar.

Course: Seminar on Network Economics [2560263]

Coordinators: Kay Mitusch
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The assessment consists of a seminar paper of 15-20 pages, a presentation of results and active participation in the diskussion during the seminar (according to §4(2), 3 ERSC)
The grading is carried out primarily in reference to the seminar paper, however, divergent performance in the presentation will be accounted for by a corresponding adjustment. In particular, there is the chance to improve grades through good participation during the seminar.

Conditions
See module description.
Basic knowledge of network economics is required. The course *Competition in Networks* [26240] should be completed.

Learning Outcomes
The student

- can acquire a scientific article to an economic topic,
- deepens his/her knowlede in network economics,
- gets inspiration for a potential master thesis.

Content
The current theme of the seminar including the suggestion of topics for the seminar papers will be announced in KIM and on the notice board at the institute (http://netze.iww.kit.edu).
(The title of the seminar may change from term to term depending on the topic)

Course: [2561209]

Coordinators:
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3		Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Seminar: Legal Studies [RECHT]

Coordinators: Inst. ZAR
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Seminar: Management and Organization [2577915]

Coordinators: Hagen Lindstädt
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
Term paper (50%) and presentation (50%).

Conditions
See corresponding module information.

Learning Outcomes
The aim of the seminar is to describe corporate and organisational management approaches, to assess them critically and clarify them using practical examples. The focus is on assessing the models with a view to their applicability and theoretical limits.

Content
The subjects are redefined each semester on the basis of current issues.

Media
Slides.

Literature
The relevant sources are made known during the course.

Course: Seminar paper “Production Engineering” [21690sem]

Coordinators: Volker Schulze, Lanza, Munzinger
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations
The following work and performance is required for the successful completion of the seminar:

- active participation in the seminar,
- completion of a seminar paper on the topic of the seminar (minimum input: 80 h) and
- a presentation given after completion of the seminar paper.

The seminar paper can be submitted:

- for the module: *seminar module* [SemING] OR
- to improve the module grade of modules: *Manufacturing Engineering* [WI3INGMB23], *Integrated Production Planning* [WI3INGMB24] or *Vertiefung der Produktionstechnik* [WI4INGMB22].

Each seminar paper can be submitted only once. One paper cannot be submitted for both the seminar module and the improvement of the grade.

The score of the seminar paper can be used to improve the grade of one of the above-mentioned modules. The module grade can be improved by three tenths maximum. Only seminar papers written at wbk Institute of Production Science qualify for an improvement of the module grade.

One seminar paper can be used for the improvement of one module grade (named above) maximum. For the improvement of a grade, no more than one seminar paper can be submitted.

Conditions
None.

Learning Outcomes
Complex analysis and addressing of production engineering related problem areas

Content
Students independently deal with production engineering related problems from the fields of manufacturing engineering, machine tools and handling technology and organisation, planning and logistics with tutorial assistance. The results are aggregated in the form of a seminar paper and are then illustrated in the form of a presentation.

Media
Lecture notes of the Institute of Production Science.

Course: Service Oriented Computing 1 [2511500]

Coordinators: Stefan Tai
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter term	de

Learning Control / Examinations
The assessment of this course is a written examination (60min.) in the first week after lecture period (nach §4(2), 1 SPO).

Conditions
Lecture *AI2* [2511032] is recommended.

Learning Outcomes
The course introduces concepts, methods, and techniques of “service-oriented computing”, including languages for (Web) service description, methods and tools for the development of services, and platforms (middleware, runtimes) for the Web-based deployment, delivery, and execution of services. The course provides a solid technical foundation that enables the student to address the increasingly relevant challenges of developing “service-oriented architectures (SOA)” in the industry.

Content
Web services represent the next-generation of Web technology, and are an evolution of conventional distributed middleware. They enable new and improved ways for enterprise computing, including application interoperability and integration, and business process management. Modern software systems are being designed as service-oriented architectures (SOA), introduding increased agility and flexibilty at both the software systems and the business level. Web services and SOA thus have a profound impact on software development and the businesses that they support. The course “Service-oriented Computing” introduces the concepts, methods and technology that provide a solid foundation in this area. Topics include:

- Service description
- Service engineering, including development and implementation
- Service composition (aggregation), including process-based service orchestration
- Interoperability formats and protocols
- Service platforms and runtimes (middleware)

Media
Slides, access to internet resources.

Literature
Will be announced in the lecture.

Course: Safety Management in Highway Engineering [19315]

Coordinators: Matthias Zimmermann
Part of the modules: Safety Science II (p. 92)[WI3INGINTER4], Safety Science I (p. 91)[WI3INGINTER3]

ECTS Credits	Hours per week	Term	Instruction language
2	1	Winter term	de

Learning Control / Examinations
See module description.

Conditions
See corresponding module information.

Learning Outcomes

Content

Remarks
For further information, see http://www.ise.uni-karlsruhe.de/16.php

Course: Safety Engineering [2117061]

Coordinators: H.-P. Kany
Part of the modules: Safety Science II (p. 92)[WI3INGINTER4], Safety Science I (p. 91)[WI3INGINTER3]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

Conditions
None.

Learning Outcomes

Content
The course provides basic knowledge of safety engineering. In particular the basics of health at the working place, job safety in Germany, national and European safety rules and the basics of safe machine design are covered. The implementation of these aspects will be illustrated by examples of material handling and storage technology. This course focuses on: basics of safety at work, safety regulations, basic safety principles of machine design, protection devices, system security with risk analysis, electronics in safety engineering, safety engineering for storage and material handling technique, electrical dangers and ergonomics. So, mainly, the technical measures of risk reduction in specific technical circumstances are covered.

Course: Simulation of coupled systems [2114095]

Coordinators: Marcus Geimer
Part of the modules: Mobile Machines (p. 64)[WI3INGMB15], Vehicle Development (p. 63)[WI3INGMB14]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Summer term	de

Learning Control / Examinations
Assessment for the module *Mobile Machines*: See module description.
Assessment for the module *Automotive Engineering*: The assessment consists of an oral exam (20 min) taking place in the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
It is recommended to have:

- Knowledge of ProE (ideally in actual version)
- Basic knowledge of Matlab/Simulink
- Basic knowledge of dynamics of machines
- Basic knowledge of hydraulics

Learning Outcomes
The limitation of the simulation programs and the related problems will be introduced by using the example of the working movement of a wheel loader. As a solution the coupled simulation of multiple programs by using the mentioned example will be shown.

Content

- Knowledge of the basics of multi-body and hydraulic simulation programs
- Possibilities of coupled simulations
- Development of a simulation model by using the example of a wheel loader
- Documentation of the results in a short report

Literature
Elective literature:

- miscellaneous guides according the software-tools pdf-shaped
- information to the wheel-type loader

Course: Simulation I [2550662]

Coordinators: Karl-Heinz Waldmann
Part of the modules: Applications of Operations Research (p. 56)[WI3OR5], Stochastic Methods and Simulation (p. 59)[WI3OR7]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1/2	Winter term	de

Learning Control / Examinations
The assessment consists of an 1h written exam according to Section 4(2), 1 of the examination regulation. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3 (according to Section 4(2), 3 of the examination regulation).

Conditions
Foundations in the following fields are required:

- Operations Research, as lectured in *Introduction to Operations Research I* [2550040] and *Introduction to Operations Research II* [2530043].
- Statistics, as lectured in *Statistics I* [25008/25009] and *Statistics II* [25020/25021].

Learning Outcomes
The lecture provides insights into the typical process in planning and conducting simulation studies.

Content
As the world is getting more complex it is often not possible to analytically provide key figures of interest without overly simplifying the problem. Thus efficient simulation techniques become more and more important. In the lecture important basic concepts are presented in terms of selected case studies.
Topics overview: Discrete event simulation, generation of random numbers, generating discrete and continous random variables, statistical analysis of simulated data.

Media
Blackboard, Slides, Flash Animations, Simulation Software

Literature

- Lecture Notes
- K.-H. Waldmann / U. M. Stocker: Stochastische Modelle - Eine anwendungsorientierte Einführung; Springer (2004).

Elective literature:

- A. M. Law / W. D. Kelton: Simulation Modeling and Analysis (3rd ed); McGraw Hill (2000)

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Simulation II [2550665]

Coordinators: Karl-Heinz Waldmann
Part of the modules: Stochastic Methods and Simulation (p. 59)[WI3OR7]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1/2	Summer term	de

Learning Control / Examinations
The assessment consists of an 1h written exam following §4(2), 1 SPO. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3 (§4(2), 3 SPO).

Conditions
Foundations in the following fields are required:

- Operations Research, as lectured in *Introduction to Operations Research I* [2550040] and *Introduction to Operations Research II* [2530043].
- Statistics, as lectured in *Statistics I* [25008/25009] and *Statistics II* [25020/25021].
- *Simulation I*[2550662]

not any

Learning Outcomes
The lecture provides insights into the typical process in planning and conducting simulation studies.

Content
As the world is getting more complex it is oftern not possible to analytically provide key figures of interest without overly simplifying the problem. Thus efficient simulation techniques become more and more important. In the lecture important basic concepts are presented in terms of selected case studies.
Topics overview: Variance reduction techniques, simulation of stochastic processes, case studies.

Media
Blackboard, Slides, Flash Animations, Simulation Software

Literature

- Lecture Notes

Elective literature:

- A. M. Law / W. D. Kelton: Simulation Modeling and Analysis (3rd ed); McGraw Hill (2000)
- K.-H. Waldmann / U. M. Stocker: Stochastische Modelle - Eine anwendungsorientierte Einführung; Springer (2004).

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Simulation of Spray and Mixture Formation in Internal Combustion Engines [21114]

Coordinators: Baumgarten
Part of the modules: Engine Development (p. 69)[WI3INGMB17], Combustion Engines II (p. 68)[WI3INGMB19], Combustion Engines (p. 66)[WI3INGMB16]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) according to §4 (2), 2 of the examination regulation. The grade of the exam is included in the overall grade of the module with a weighting factor of 3.

Conditions
The course *Combustion Engines A* [21101] has to be completed beforehand.

Learning Outcomes

Content

Course: Software Engineering [2511206]

Coordinators: Andreas Oberweis, Detlef Seese
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of an 1h written exam in the first week after lecture period.

Conditions
Modul “Introduction to Informatics” [WI1INFO] is precondition

Learning Outcomes
Students

- are familiar with the concepts and principles of software engineering
- know important and common software development process models
- know methods for requirements analysis and know how to model and evaluate use case models
- know models for systems structuring and controling as well as architecture principles of software systems.
- can model and evaluate component diagrams
- are familiar with basic concepts of software quality management and are able to apply software test and evaluation methods.

Content
The course deals with fundamental aspects of the systematically development of huge software systems. The course covers topics such as:

- software developing process models
- methods and tools for the development phases: requirements analysis, system specification, system design, programming and testing.

Media
Slides, access to internet resources.

Literature
Elective literature:

- H. Balzert. Lehrbuch der Software-Technik. Spektrum Verlag 1996.
- B. Boehm. Software Engineering Economics. Englewood Cliffs, N.J.: Prentice-Hall 1981.
- P. Brössler, Johannes Siedersleben. Softwaretechnik. Hanser Verlag 2000.
- E. Denert. Software-Engineering. Springer-Verlag 1991.
- Frühauf, K., J. Ludewig, H. Sandmayr. Software-Projektmanagement und – Qualitätssiche-rung. Teubner 1991.
- E. Gamma et al.. Design Patterns. Addison Wesley 1995.

Further literature is given in the course.

Course: Software Laboratory: OR Models I [2550490]

Coordinators: Stefan Nickel
Part of the modules: Applications of Operations Research (p. 56)[WI3OR5]

ECTS Credits	Hours per week	Term	Instruction language
4.5	1/2	Winter term	de

Learning Control / Examinations
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the software laboratory and the following term.

Conditions
Firm knowledge of the contents from the lecture *Introduction to Operations Research I* [2550040] of the module *Operations Research* [WI1OR].

Learning Outcomes
The software laboratory has the goal to make the students familiar with the usage of computers in practical applications of Operations Research. An important benefit lies in the ability to assess and estimate general possibilities and fields of usage of modeling and implementation software for solving OR models in practice. As software-based planning modules are used in many companies, this course provides a reasonable preparation for students for practical planning activities.

Content
After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, ...), the program XPress-MP IVE with its modelling language Mosel will be presented in detail.
Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

Remarks
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The planned lectures and courses for the next three years are announced online.

Course: Social structures of modern societies [11005]

Coordinators: Gerd Nollmann
Part of the modules: Sociology/Empirical Social Research (p. 95)[WI3SOZ]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of a written test according to Setion 4 (2), 3 of the examination regulation. The test will be graded. The test takes place in the last lecture. Generally re-examinations are offered six weeks later.

Conditions
The lecture is obligatorily in the module and has to be completed.

Learning Outcomes
The student:

- Gains knowledge on social structures of modern societies
- Describes and explains current societal processes
- Gets to know selected research, problems and data.

Content
The lecture begins with definitions of social structures and their relation to the culture of human behaviour. Furthermore, important research, current debates, and controversies will be presented as well as continuity and change of German social structures in comparative fashion.

Important topics will be modernisation, individualisation, class structures, education and job market, social mobility, life courses and cohorts, distributions of income and wealth, family, marriage market, fertility.

The lecture stresses knowledge about data sources, official statistics, and relevant results of survey research.

Course: Special Topics in Information Engineering & Management [2540478]

Coordinators: Christof Weinhardt
Part of the modules: eBusiness and Service Management (p. 36)[WI3BWLISM1]

ECTS Credits	Hours per week	Term	Instruction language
4.5	3	Winter / Summer Term	de

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.
The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class)

Conditions
None.

Learning Outcomes
The student should be able to do a literature review based on a predefined topic in the context of information engneering and management. The approach comprises the identification of relevant literature according to the topic and an analysis as well as an evaluation of the methods presented in the literature.The practical work components should enable the student to learn and independently use scientific methods employed e.g. in case studies or experiments.
The student learns to present his results in a paper and in front of an audience on an academic level. This process is helpful for furhter scientific work like the master or doctoral thesis.

Content
In this course the student should learn to apply the search methods to a predefined topic area. The topics are based on research questions in Information Engineering and Management across different industry sectors. This problem analysis requires a interdisciplinary examination. Experiments, case studies or software development can be part of the practical work that offers the students an opportunity to get a deeper insight into the field of Information Engineering and Management. The course also encompases a documentation of the implemented work.

Media

- Power Point
- eLearning Plattform Ilias
- Software tools for development , if needed

Literature
The basic literature will be made available to the student according to the respecitive topic.

Remarks
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Engineering & Management course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre
The Special Topics Information Engineering and Management is equivalent to the practical seminar, as it was only offered for the major in “Information Management and Engineering” so far. With this course students majoring in “Business Engineering“ and “Economics Engineering” also have the chance of getting practical experience and enhance their scientific capabilities.
The Special Topics Information Engineering and Managementcan be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

Course: Special Topics of Applied Informatics [Platzhalter]

Coordinators: Andreas Oberweis, Hartmut Schmeck, Detlef Seese, Rudi Studer, Stefan Tai
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter / Summer Term	de

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None.

Learning Outcomes
Students are able to handle methods and instruments in a area of applied informatics and to show the capability to be innovative with regard to applied methods.

The course will impart knowledge of basics and methods in the context of their application in practice. Based on the understanding of the imparted concepts and methods students will be able to choose the appropriate methods and apply them in the right way for problems they will face in their professional life.

Students will be enabled to find arguments for solution approaches and to argue for them.

Content
This course is a placeholder for special courses that are offered in an irregular sequence and cover selected topics in the field of applied informatics.

Media
Will be announced at the beginning of the course.

Literature
Will be announced at the beginning of the course.

Remarks
This course can be used in particular for the acceptance of external courses whose content is in the broader area of applied informatics, but cannot assigned to another course of this topic.

Course: Special Topics in Management: Management and IT [2577907]

Coordinators: Hagen Lindstädt
Part of the modules: Strategy and Organization (p. 27)[WI3BWLUO1]

ECTS Credits	Hours per week	Term	Instruction language
2	1/0	Winter / Summer Term	de

Learning Control / Examinations
The assessment consists of a written exam (30 min) at the beginning of the recess period (according to Section 4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-eaminations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The course discusses management questions and concepts that are clearly motivating from a current and practical perspective. Here the integration of IT and process issues into corporate management from the management's perspective is one of the subjects of particular interest. The event takes place in close cooperation with leading, practical managers.

Content
(Excerpt):

- A summary of current management concepts and questions.

Media
Slides.

Literature
The relevant excerpts and additional sources are made known during the course.

Course: Special Sociology [spezSoz]

Coordinators: Gerd Nollmann, Pfadenhauer, Pfaff, Haupt, Grenz, Eisewicht, Kunz
Part of the modules: Sociology/Empirical Social Research (p. 95)[WI3SOZ], Qualitative Social Research (p. 96)[WI3SOZ2]

ECTS Credits	Hours per week	Term	Instruction language
2	2	Winter / Summer Term	de

Learning Control / Examinations
Module *Sociology/Empirical Social Research* [WI3SOZ]: The assessment conists of lecture minutes (graded) and an oral presentation (according to Section 4 (2), 3 of the examination regulation.
Modul *Qualitative Social Research* [WI3SOZ2]: The assessment consists of an oral exam according to Section 4(2), 2 of the examination regulation.

Conditions
The form of the lecture has to be attended and must be completed with 2 Credit Points. The form of the lecture must not be swapped by a seminar according sociological theory, according techniques of social research or any other lecture.

Learning Outcomes
The student

- gains basic knowledge of a Special Sociology.
- gains knowledge of a specific problem in the Social Sciences.
- accordingly is capable of questioning further phenomena of the Social Sciences.
- is able to specify, pursue and explain own scientific questions.

Content
The student has the choice of the broad range of course offerings at the institute. In the course specific scientific problems and their debate will be introduced and dicussed.

Media
Will be announced in the lecture.

Literature
Will be announced in the lecture.
Elective literature:
Will be announced in the lecture.

Course: Specific Aspects in Taxation [2561129]

Coordinators: Berthold Wigger, A. Bader
Part of the modules: Topics in Finance I (p. 34)[WI3BWLFBV5], Public Finance (p. 51)[WI3VWL9], Topics in Finance II (p. 35)[WI3BWLFBV6]

ECTS Credits	Hours per week	Term	Instruction language
4,5	3	Winter term	de

Learning Control / Examinations
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

Conditions
None.

Recommendations
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course “Öffentliche Einnahmen” beforehand.

Learning Outcomes

Content
The lecture „Special Aspects of Taxation“ focuses on the effects of different taxes. The main emphasis is on German tax legislation. In addition to that, international aspects of taxation, in particular with respect to the European integration, will be discussed.
The lecture consists of four parts: First specific tax problems of corporate, income and consumption taxes are treated. Part two introduces the advantages and disadvantages of each of these taxes, in particular their incidence (“Who actually carries the tax burden?”) and their effects within the value chain. The third part then deals with the question how the different taxes contribute to public revenues. Finally, the last part compares tax systems within and outside Europe.
As a special feature, guest lecturers will provide insight into practical aspects of taxation.

Literature
Elective literature:

- Andel, N. (1998): *Finanzwissenschaft*, 4th ed., Mohr Siebeck.
- Betsch, O., Groh, A.P. und Schmidt, K. (2000): *Gründungs- und Wachstumsfinanzierung innovativer Unternehmen*, Oldenbourg.
- Cloer, A. und Lavrelashvili, N. (2008): *Einführung in das Europäische Steuerrecht*, Schmidt Erich.
- Homburg, S.(2007) : *Allgemeine Steuerlehre*, 5th ed.,Vahlen.
- Kravitz, N. (Ed.) (2010) : *Internationale Aspekte der Unternehmensbesteuerung,* Journal of Business Economics, Special Issue 2/2010
- Scheffler, W. (2009) : *Besteuerung von Unternehmen I – Ertrags- Substanz- und Verkehrssteuern*, 11th ed., Müller Jur..
- Scheffler, W. (2009): *Besteuerung von Unternehmen II – Steuerbilanz*, 11th ed., Müller Jur..
- Wigger, B.U. (2006): *Grundzüge der Finanzwissenschaft*; 2nd ed., Springer.

Course: Game Theory I [2520525]

Coordinators: N.N.
Part of the modules: Microeconomic Theory (p. 49)[WI3VWL6]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/2	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (80 minutes) according to Section 4(2),1 of the examination regulation.
The exam takes place in the recess period and can be resited at every ordinary examination date.

Conditions
None.

Recommendations
Basic knowledge of mathematics and statistics is assumed.
See corresponding module information.

Learning Outcomes
This course conveys established knowledge in theory of strategic decision making. The students shall be able to analyze strategic problems systematically and to give advice for behavior in concrete economic situations.

Content
Main topic is non-cooperative game theory. Models, solution concepts and applications are discussed for simultaneous as well as sequential games. Different equilibrium concepts are introduced and a short introduction to cooperative game theory is given.

Media
Folien, Übungsblätter.

Literature
Gibbons, A primer in Game Theory, Harvester-Wheatsheaf, 1992
Holler/Illing, Eine Einführung in die Spieltheorie, 5. Auflage, Springer Verlag, 2003
Gardner, Games for Business and Economics, 2. Auflage, Wiley, 2003
Berninghaus/Ehrhart/Güth, Strategische Spiele, 2. Auflage, Springer Verlag 2006
Elective literature:

- Binmore, Fun and Games, DC Heath, Lexington, MA, 1991

Course: Facility Location and Strategic Supply Chain Management [2550486]

Coordinators: Stefan Nickel
Part of the modules: Supply Chain Management (p. 38)[WI3BWLISM2], Methodical Foundations of OR (p. 58)[WI3OR6], Applications of Operations Research (p. 56)[WI3OR5]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) according to Section 4 (2), 1 of the examination regulation.
The exam takes place in every semester.
Prerequisite for admission to examination is the succesful completion of the online assessments.

Conditions
Prerequisite for admission to examination is the succesful completion of the online assessments.

Learning Outcomes
The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models).The exercises accompanying the lecture offer the possibility to apply the considered models to practical problems.

Content
Since the classical work “Theory of the Location of Industries” of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.
Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

Literature
Elective literature:

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

Remarks
The planned lectures and courses for the next three years are announced online.

Course: Statistics and Econometrics in Business and Economics [2521325]

Coordinators: Wolf-Dieter Heller
Part of the modules: Statistical Applications of Financial Risk Management (p. 52)[WI3STAT]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/2	Winter term	de

Learning Control / Examinations

Conditions
Basic knowledge in statistics is required.

Learning Outcomes
statistically accurate use of financial market data, particularly time series analysis
Evaluation of various time series models and their applicability

Content
In Part 1 we will provide a thorough description of the quantitative part of investment theory paying attention to the mathematical, probabilistic and statistical methods now widely used in financial practice.
In Part 2 we shall study the methods of construction, identification and verification of te time-series models, which are among most powerful instruments of the financial econometrics. The emphasis will be on the financial and economic indicators forecasting the financial time-series.

Media
transparencies lecture

Literature
e.g.

- Franke/Härdle/Hafner : Einführung in die Statistik der Finanzmärkte.
- Ruppert: Statistics and Finance
- Cochran J.H. : Time Series for Macroeconomics and Finance

Elective literature:
See reading list

Course: Statistics I [2600008]

Coordinators: Steffi Höse
Part of the modules: Statistics (p. 26)[WI1STAT]

ECTS Credits	Hours per week	Term	Instruction language
5	4/0/2	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation.
The exam takes place at the end of the lecture period or at the beginning of the recess period. The re-examination takes place in the following semester.

Conditions
None.

Learning Outcomes
The Student should understand and apply

- the basic concepts of statistical data exploration
- the basic definitions and theorems of probability theory

Content
A. Descriptive Statistics: univariate und bivariate analysis
B. Probability Theory: probability space, conditional and product probabilities

Media
lecture notes

Literature
Skriptum: Kurzfassung Statistik I
Elective literature:

- Bol, G.: Deskriptive Statistik, 5. Aufl., Oldenbourg, München etc., 2001
- Bol, G.: Wahrscheinlichkeitstheorie, 5. Aufl., Oldenbourg, München etc., 2001
- Bosch, K.: Statistik-Taschenbuch, Oldenbourg, München etc., 1992
- Jambu, M.: Explorative Datenanalyse, G. Fischer, Stuttgart, 1992 Polasek,W.: Explorative Statistik, Springer, Berlin etc., 1994
- Rinne, H.: Taschenbuch der Statistik, 2. Aufl., Harri Deutsch, Frankfurt a. M. etc., 1997

Course: Statistics II [2600020]

Coordinators: Steffi Höse
Part of the modules: Statistics (p. 26)[WI1STAT]

ECTS Credits	Hours per week	Term	Instruction language
5	4/0/2	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation.
The exam takes place at the end of the lecture period or at the beginning of the recess period. The re-examination takes place in the following semester.

Conditions
It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2600020].

Learning Outcomes
probability theory (continued), Introduction to estimation and testing theory

Content
B. Probability Theory:

- transformation of probabilities,
- parameters of location and dispersion,
- most importand discrete and continuous distributions,
- covariance and correlation,
- convolution and limit distributions

C. Theory of estimation and testing:

- suffiency of statistics,
- point estimation (optimality, ML-method),
- internal estimations,
- theory of tests (optimality, most important examples of tests)

Media
lecture notes

Literature
Script: Kurzfassung Statistik II
Elective literature:

- Bohley, P.: Statistik, 5. Aufl., Oldenbourg, München etc., 1992
- Bol, G.: Wahrscheinlichkeitstheorie, 5. Aufl., Oldenbourg, München etc., 2001
- Bol, G.: Induktive Statistik, 3. Aufl., Oldenbourg, München etc., 2003
- Bosch, K.: Statistik-Taschenbuch, Oldenbourg, München etc., 1992
- Bünning, H. - Trenkler, G.: Nichtparametrische statistische Methoden, de Gruyter, Berlin, 1994
- Rinne, H.: Taschenbuch der Statistik, 2. Aufl., Harri Deutsch, Frankfurt a. M. etc., 1997
- Schaich, E.: Schätz- und Testmethoden für Sozialwissenschaftler, 2. Aufl., Vahlen, München, 1990
- Zwillinger, D. - Kokoska, S.: Standart Probability and Statistics Tables and Formulae, 2. Aufl., CRC, Boca Raton etc., 2000

Course: Instrumentation and Control Technologies for Production Systems [2150683]

Coordinators: Gönnheimer
Part of the modules: Specialization in Production Engineering (p. 74)[WI3INGMB22]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20 min) taking place during the recess period (according to Section 4(2), 1 or 2) of the examination regulation).
The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes

Content

Course: Markov Decision Models I [2550679]

Coordinators: Karl-Heinz Waldmann
Part of the modules: Methodical Foundations of OR (p. 58)[WI3OR6], Stochastic Methods and Simulation (p. 59)[WI3OR7]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1/2	Winter term	de

Learning Control / Examinations
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulation. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3 (according to Section 4(2), 3 of the examination regulation).

Conditions
None.

Learning Outcomes
The lecture provides students with knowledge of modern techniques of stochastic modelling. Students are able to properly describe and analyze basic stochastic systems.

Content
Markov Chains, Poisson Processes, Markov Chains in Continuous Time, Queuing Systems

Media
Blackboard, Slides, Flash Animations, Simulation Software

Literature
Waldmann, K.H. , Stocker, U.M. (2004): Stochastische Modelle - eine anwendungsorientierte Einführung; Springer
Elective literature:
Norris, J.R. (1997): Markov Chains; Cambridge University Press
Bremaud, P. (1999): Markov Chains, Gibbs Fields, Monte Carlo Simulation, and Queues; Springer

Course: Material Flows in Industrial Production [2581960]

Coordinators: Frank Schultmann, Magnus Fröhling
Part of the modules: Industrial Production I (p. 29)[WI3BWLIIP]

ECTS Credits	Hours per week	Term	Instruction language
3.5	2/0	Winter term	de

Learning Control / Examinations
The examination will be in form of an oral or written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Conditions
Successful completion of module “Betriebswirtschaftslehre” [WI1BWL].

Learning Outcomes
Students shall be aware of issues concerning the material and energy flow in an economy and shall apply strategies to solve these issues.

Content
The analysis and management of material flows on the company level and above will be the focus of this lecture. Herein, the discussion will be about cost-effective and environmentally acceptable steps to avoid, abate and recycle emissions and waste as well as ways of efficient resources handling. As methods material flow analysis (MFA), life cycle assessment (LCA) and OR methods, e.g. for decision support, are introduced.
Topics:
- regulations related to materials and substances
- raw materials, reserves and their availabilities/lifetimes
- material and substance flow analysis (MFA/SFA)
- material related ecoprofiles, e.g. Carbon Footprint
- LCA
- resource efficiency
- emission abatement
- waste management and closed-loop recycling
- raw material oriented production systems
- environmental management (EMAS, ISO 14001, Ecoprofit), eco-controlling

Media
Media will be provided on e-learning platform.

Literature
will be announced in the course

Course: Mass and Energy Balances for Reacting Systems [22130]

Coordinators: Peter Pfeifer, Bettina Kraushaar-Czarnetzki
Part of the modules: Mass and Energy Balances for Reacting Systems (p. 21)[WI1ING1]

ECTS Credits	Hours per week	Term	Instruction language
2.5	2/0	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (according §4(2), 1 of the examination regulation).
Permitted utilities: calculator, script, its own formulary and own notes.

Conditions
None.

Learning Outcomes
The student

- knows and understands energy and mass balances and the analysis of balance envelopes,
- can apply energy and mass balances on selected systems and processes,
- knows the problems, methods and processes of process engineering.

Content

- Aims and approaches
- Mass balance
- Water
- Nitrogen and ammonia
- Energy balance
- Natural gas
- Carbon dioxide

Media
Lecture script (available at KIT-Studierendenportal: https://studium.kit.edu and in Studentenwerk)
Exercises and accompanying lecture material (available at KIT-Studierendenportal: https://studium.kit.edu)

Course: Structural and Functional Ceramics [2126775]

Coordinators: M. J. Hoffmann
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20-30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Conditions
Basic knowledge of experimental physics and chemistry is recommended.
It is recommended to attend the course *Introduction in Ceramics [21755].*

Learning Outcomes
Based on concrete examples the importance of microstructural constitution on mechanical, thermal, chemical and electrical properties is shown.

Content
The lecture gives an overview on structure and properties of technical relevant structural and functional ceramic materials and parts. The following groups of materials are presented: Silicon Nitride, Silicon Carbide, Alumina, Zirconia, Ferrolectric ceramics.

Literature
Elective literature:
H. Salmang, H. Scholze, „Keramik“, Springer-Verlag;
Kingery, Bowen, Uhlmann, „Introduction To Ceramics“, Wiley-Verlag

Course: Systematic Selection of Materials [2174576]

Coordinators: Wanner
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20-30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Conditions
The course *Material Science I* [21760] has to be completed beforehand.
Basic knowledge of natural science and knowledge of the content *Material Science II* [21782] is recommended.

Learning Outcomes
The students are able to select the best material for a given application. They are proficient in selecting materials on base of performance indices and materials selection charts. They can identify conflicting objectives and find sound compromises. They are aware of the potential and the limits of hybrid material concepts (composites, bimaterials, foams) and can determine whether following such a concept yields a useful benefit.

Content
Important aspects and criteria of materials selection are examined and guidelines for a systematic approach to materials selection are deeloped. The following topics are covered: the status of materials selection in mechanical design and product development; the most important classes of materials and their property profiles;

Literature
Elective literature:

- Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen, Easy-Reading-Ausgabe, Ashby, M. F.; Wanner, A. (Hrsg.); Fleck, C. (Hrsg.), Spektrum Akademischer Verlag, ISBN: 978-3-8274-1762-6, 2006

Course: System Dynamics and Control Engineering [23155]

Coordinators: Sören Hohmann
Part of the modules: Control Engineering (p. 84)[WI3INGETIT2]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) taking place at the beginn of the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
Knowledge of integral transformations is assumed.
Therefore it is recommeded to attend the course *Complex Analysis and Integral Transformations* beforehand or to acquire a good knowledge through private study (see literature), but a proof of performance is not necessary.

Learning Outcomes
As the system dynamics and control engineering fundamental lecture, the course familiars with the basic elements, structures and the behavior of dynamic systems. It gives them insight into the problems of control and intuition about methods available to solve such problems. Both frequency response and state space methods for anlisys and design of dynamic systems are considered.

Content

- *Introduction*
  open-loop and closed-loop control systems; basic concepts and definitions, structure of automation systems, control system design, examples of control systems
- *Elements of Control Circuits - Classification and Description*
  properties of dynamic systems, linear approximation about an operation point, information flow between transfer elements, block diagram models and transformations, behavior of elementary control circuit elements, polar plots (Nyquist diagrams), Bode diagrams
- *Frequency Response Analysis of Continuous Linear Control Circuits*
  control system characteristics, stability, stability criterions, steady-state behavior of control circuits, sensitivity to parameter variations
- *Frequency Response Design*
  system performance specification, classification of controller design methods, typical linear controllers, frequency response design using the Bode diagram, controller design according to Ziegler - Nichols, absolute value optimum design, feed forward control, secondary control, cascaded control, root locus analysis and design
- *State Space Representation of Continuous Systems*
  state space equations, controllability and observability, solution of state equations, Linear State Variable Feedback Systems,pole placement design, linear optimal control (Riccati-controller)
- *State Observers*
  full order observer, control through observers, separation principl

Literature

- Föllinger, Otto: Regelungstechnik, Hüthig-Verlag, 8.Auflage, 1994
- Lunze, Jan: Regelungstechnik 1, Springer-Verlag, 1996

Elective literature:
Will be announced in the lecture.

Remarks
The cycle for the lecture *System Dynamics and Control Engineering [23155]* has been changed from winterterm into summerterm. The reduced form of the lecture 3+1 (6 LP) will be offered in summerterm first time. Therefore the content could be changed.

Course: Tactical and Operational Supply Chain Management [2550488]

Coordinators: Stefan Nickel
Part of the modules: Supply Chain Management (p. 38)[WI3BWLISM2], Stochastic Methods and Simulation (p. 59)[WI3OR7], Applications of Operations Research (p. 56)[WI3OR5]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation.
The exam takes place in every the semester.
Prerequisite for admission to examination is the succesful completion of the online assessments.

Conditions
Successful completion of the module *Introduction to Operations Research* [WI1OR].

Learning Outcomes
The main goal of the lecture is the presentation of fundamental techniques from procurement and distribution logistics. A further aspect is set on methods from inventory management and lot sizing. Students acquire the ability to efficiently utilize quantitative models from transportation planning (long-distance and distribution planning), inventory management and lot sizing in production. The introduced methods will be discussed in more detail and illustrated with case-studies in the accompanying exercises

Content
The planning of material transport is an essential element of Supply Chain Management. By linking transport connections across different facilities, the material source (production plant) is connected with the material sink (customer).
The general supply task can be formulated as follows (cf. Gudehus): For given material flows or shipments, 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. The main goal of the inventory management is the optimal determination of order quantities in terms of minimization of fixed and variable costs subject to resource constraints, supply availability and service level requirements. Similarly, the problem of lot sizing in production considers the determination of the optimal amount of products to be produced in a time slot.
The course includes an introduction to basic terms and definitions of Supply Chain Management and a presentation of fundamental quantitative planning models for distribution, vehicle routing, inventory management and lot sizing. Furthermore, case studies from practice will be discussed in detail.

Literature
Elective literature:

- Domschke: Logistik: Transporte, 5. Auflage, Oldenbourg, 2005
- Domschke: Logistik: Rundreisen und Touren, 4. Auflage, Oldenbourg, 1997
- Ghiani, Laporte, Musmanno: Introduction to Logistics Systems Planning and Control, Wiley, 2004
- Gudehus: Logistik, 3. Auflage, Springer, 2005
- Simchi-Levi, Kaminsky, Simchi-Levi: Designing and Managing the Supply Chain, 3rd edition, McGraw-Hill, 2008
- Silver, Pyke, Peterson: Inventory management and production planning and scheduling, 3rd edition, Wiley, 1998

Remarks
The planned lectures and courses for the next three years are announced online.

Course: Engineering Mechanics I [2161208]

Coordinators: Carsten Proppe
Part of the modules: Engineering Mechanics (p. 23)[WI1ING3]

ECTS Credits	Hours per week	Term	Instruction language
2.5	1/0.5	Winter term	de

Learning Control / Examinations
The assessment consists of a written examination taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place in every semester. Re-examinations are offered at eyery ordinary examination date.
Permitted utilities: non-programmable calculator, literature

Conditions
None.

Learning Outcomes
The student

- knows and understoods the basic elements of statics,
- is able to solve basic calculations in statics indipendently.

Content
Statics: force · moment · general equilibrium condistions · center of mass · inner force in structure · plane frameworks · theory of adhesion

Course: Engineering Mechanics II [2162226]

Coordinators: Carsten Proppe
Part of the modules: Emphasis in Fundamentals of Engineering (p. 77)[WI3INGMB8]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written examination (75 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination is offered every semester. Re-examinations are offered at every ordinary examination date.
Permitted utilities: non-programmable calculator, literature.

Conditions
The module *Technical Mechanics I* [WI1ING3] has to be completed beforehand.

Learning Outcomes

Content

Remarks
The credits have been changed from 4,5 to 5.

Course: Tectonic Stress in Petroleum Rock Mechanics [04013]

Coordinators: Müller
Part of the modules: Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5]

ECTS Credits	Hours per week	Term	Instruction language
3	1/1	Winter term	

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Remarks
Block course.
For further information see http://www-gpi.physik.uni-karlsruhe.de/

Course: Metal Forming [2150681]

Coordinators: Herlan
Part of the modules: Specialization in Production Engineering (p. 74)[WI3INGMB22]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20 min) taking place during the recess period (according to Section 4(2), 1 or 2) of the examination regulation).
The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes

Content

Course: Corporate Governance in Energy Economics [2581005]

Coordinators: Hans-Peter Villis
Part of the modules: Energy Economics (p. 30)[WI3BWLIIP2]

ECTS Credits	Hours per week	Term	Instruction language
3,5	2/0	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes

Content

Course: Management and Strategy [2577900]

Coordinators: Hagen Lindstädt
Part of the modules: Strategy and Organization (p. 27)[WI3BWLUO1]

ECTS Credits	Hours per week	Term	Instruction language
4	2/0	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (60 min) taking place at the beginn of the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The participants learn about central concepts of strategic management along the ideal-typical strategy process: internal and external strategic analysis, concept and sources of competitive advantages, their importance when establishing competitive and corporate strategies as well as strategy assessment and implementation. This aims in particular to provide a summary of the basic concepts and models of strategic management, i.e. to provide in particular an action-oriented integration.

Content

- Corporate management principles
- Strategic management principles
- Strategic analysis
- Competitive strategy: modelling and selection on a divisional level
- Strategies for oligopolies and networks: anticipation of dependencies
- Corporate strategy: modelling and evaluation on a corporate level
- Strategy implementation

Media
Slides.

Literature

- Grant, R.M.: *Contemporary Strategy Analysis.* Blackwell, 5. Aufl. Massachusetts 2005.
- Lindstädt, H.; Hauser, R.: *Strategische Wirkungsbereiche von Unternehmen.* Gabler, Wiesbaden 2004.

The relevant excerpts and additional sources are made known during the course.

Course: Insurance Management Game [INSGAME]

Coordinators: Ute Werner
Part of the modules: Insurance Markets and Management (p. 33)[WI3BWLFBV4]

ECTS Credits	Hours per week	Term	Instruction language
3	0/2	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Combustion Engines A [2133101]

Coordinators: Spicher
Part of the modules: Engine Development (p. 69)[WI3INGMB17], Combustion Engines I (p. 67)[WI3INGMB18], Combustion Engines (p. 66)[WI3INGMB16]

ECTS Credits	Hours per week	Term	Instruction language
9	4/2	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) according to §4 (2), 1 of the examination regulation. The grade of the exam is included in the overall grade of the module with a weighting factor of 6.

Conditions
It is recommended to have basic knowledge of thermodynamics.

Learning Outcomes

Content

Course: Combustion Engines B [2134135]

Coordinators: Spicher
Part of the modules: Engine Development (p. 69)[WI3INGMB17], Combustion Engines II (p. 68)[WI3INGMB19], Combustion Engines (p. 66)[WI3INGMB16]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) according to Section 4 (2), 1 of the examination regulation. The grade of the exam is included in the overall grade of the module with a weighting factor of 5.

Conditions
The course *Combustion Engines A* [21101] has to be completed beforehand.
Knowledge of thermodynamics is recommended.

Learning Outcomes

Content

Course: Transportation Planning and Traffic Engineering Basics [19027]

Coordinators: Peter Vortisch, Bastian Chlond
Part of the modules: Fundamentals of Spatial and Infrastructural Development (p. 85)[WI3INGBGU1]

ECTS Credits	Hours per week	Term	Instruction language
3	2/0	Summer term	de

Learning Control / Examinations
See module description.

Conditions
None.

Learning Outcomes

Content

Course: Failure of Structural Materials: Fatigue and Creep [21715]

Coordinators: Gruber
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exa (30 min) according to Section 4(2), 2 of the examination regulation.

Conditions
None.

Learning Outcomes

- Mechanical Understanding of Load vs Material Strength
- Empirical Material Behavior
- Physical Understanding of Failure Phenomena
- Statistical Description of Failure
- Material Selection and Understanding Alloying Effects

Content
1 Fatigue
1.1 Introduction
1.2 Statistical Aspects
1.3 Lifetime
1.4 Fatigue Mechanisms
1.5 Material Selection
1.6 Thermomechanical Loading
1.7 Notches and Shape Optimization
1.8 Case Study: ICE-Desaster

2 Creep
2.1 Introduction
2.2 High Temperature Plasticity
2.3 Phänomenological DEsciption of Creep
2.4 Creep Mechanisms
2.5 Alloying Effects

Literature
Elective literature:

1. Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); sehr lesenswert, relativ einfach aber dennoch umfassend, verständlich
2. Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); Klassiker zu den mechanischen Eigenschaften der Werkstoffe, umfangreich, gut
3. Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe
4. Fatigue of Materials, Subra Suresh (2nd Edition, Cambridge University Press); Standardwerk über Ermüdung, alle Materialklassen, umfangreich, für Einsteiger und Fortgeschrittene

Course: Failure of Structural Materials: Deformation and Fracture [21711]

Coordinators: Weygand
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exa (30 min) according to Section 4(2), 2 of the examination regulation.

Conditions
None.

Learning Outcomes

- Mechanical Understanding of Load vs Material Strength
- Empirical Material Behavior
- Physical Understanding of Failure Phenomena

Content
1. Introduction
2. linear elasticity
3. classification of stresses
4. Failure due to plasticity
* tensile test
* dislocations
* hardening mechanisms
* guidelines for dimensioning
5. composite materials
6. fracture mechanics
6.1 hypotheses for failure
6.2 linear elasic fracture mechanics
6.3 crack resitance
6.4 experimental measurement of fracture toughness
6.5 defect measurement
6.6 crack propagation
6.7 application of fracture mechanics
6.8 atomistics of fracture

Literature
Elective literature:

1. Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); sehr lesenswert, relativ einfach aber dennoch umfassend, verständlich
2. Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); Klassiker zu den mechanischen Eigenschaften der Werkstoffe, umfangreich, gut
3. Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe

Course: Gear Cutting Technology [2149655]

Coordinators: Felten
Part of the modules: Specialization in Production Engineering (p. 74)[WI3INGMB22]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30 min) taking place during the recess period (according to Section 4(2), 1 or 2) of the examination regulation).
The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
The student

- has the knowledge about the presented content,
- understands the within the lecture taught theory of gears and gear cutting as well as the taught basics and characteristics of the covered gear cutting processes,
- is able to transfer the within the lecture learned knowledge about the basics of the gearing geometry and the manufacturing of gears on new problematic issues and
- is able to analyze and to evaluate the applicability of the taught processes and techniques for various problems.

Content
This lecture is focused on the demands of the modern manufacturing process of gears on the basis of the gearing geometry and the theory of gears and transmission types. For this purpose the processes for manufacturing various gearing types are covered, which are state of the technology in current operational practice. The subdivision of the processes is made in soft and hard machining, in each case in cutting and non-cutting methods. For the comprehensive understanding of the taught processes initially the description of the kinematics, the machine technology, the tools, the fields of application and the speciality as well as the current trends are made. Subsequent for the evaluation and classification in the fields of application and the capability of the processes finally the sequence of manufacturing of gears in mass production and the manufacturing errors are covered in the lecture.
The content of the lecture will be rounded off by demonstrative example parts and the possibility of the visit of real manufacturing environments within two short excursions to gear manufacturing companies.
Inhaltliche Schwerpunkte der Vorlesung:
1. History of gears
2. Basics of gearing geometry
3. Overview of processes for soft machining of gears (subdivided in cutting and non-cutting, description of particular kinematics, machine tools, tools and trends)
4. Overview of processes for hard machining of gears (subdivided in geometrically defined and geometrically undefined cutting edge, description of the particular kinematics, machine tools, tools and trends)
5. Processes for bevel gear manufacturing
6. Manufacturing errors of gears
7. Sequence of manufacturing in mass production

Course: Economics I: Microeconomics [2600012]

Coordinators: Gernot Liedtke
Part of the modules: Economics (p. 18)[WI1VWL]

ECTS Credits	Hours per week	Term	Instruction language
5	3/0/2	Winter term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation.
There may be offered a practice exam in the middle of the semester. The results of this exam may be used to improve the grade of the main exam. A detailed descritpion of the examination modalities will be given by the respective lecturer.
The main exam takes place subsequent to the lectur. The re-examination is offered at the same examination period. Only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

Conditions
None.

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

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

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

- to analyze the structure of microeconomics relationships and possibly to present own problem solutions,

Content
The students learn the basic concepts in Microeconomics and some basics in game theory. The student will understand the working of markets in modern economies and the role of decision making. Furthermore, she should be able to understand simple game theoretic argumentation in different fields of Economics.
In the two main parts of the course problems of microeconomic decision making (household behavior, firm behavior) and problems of commodity allocation on markets (market equilibria and efficiency of markets) as well are discussed. In the final part of the course basics of imperfect competition (oligopolistic markets) and of game theory are presented.

Media
downloadable from IT server

Literature

- H. Varian, Grundzüge der Mikroökonomik, 5. edition (2001), Oldenburg Verlag
- Pindyck, Robert S./Rubinfeld, Daniel L., Mikroökonomie, 6. Aufl., Pearson. Münschen, 2005
- Frank, Robert H., Microeconomics and Behavior, 5. Aufl., McGraw-Hill, New York, 2005

Elective literature:

- Offer for interested and top students: detailed top articles with proofs, algorithms, ... state-of-the-art surveys, industrial magazines and scientific journals, pointers to recent developments related to the course.
- Tutorials and perhaps simpler literature alternatives for students to fill in gaps in prerequisites (or to fresh up their memory). Alternatives with a different mode of explanation to help students understand ...

Course: Economics II: Macroeconomics [2600014]

Coordinators: Berthold Wigger
Part of the modules: Economics (p. 18)[WI1VWL]

ECTS Credits	Hours per week	Term	Instruction language
5	3/0/2	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (120 min) according to Section 4(2), 1 of the examination regulation.
The assessment takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes

Content
The lecture deals with the following topics:
Chapter 1: Macroeconomic targets
Chapter 2: Gross domestic product: a classical model
Chapter 3: Economic growth
Chapter 4: Money and inflation
Chapter 5: The open economy
Chapter 6: IS-LM model and business cycles
Chapter 7: Mundell-Fleming Model
Chapter 8: Macroeconomic equilibrium
Chapter 9: Unemployment

Literature
Elective literature:
Sieg, G. (2008): *Volkswirtschaftslehre*; 2nd ed., Oldenbourg.

Course: Economics III: Introduction in Econometrics [2520016]

Coordinators: Markus Höchstötter
Part of the modules: Statistical Applications of Financial Risk Management (p. 52)[WI3STAT]

ECTS Credits	Hours per week	Term	Instruction language
5	2/2	Summer term	de

Learning Control / Examinations
The assessment consists of an 1h written exam according to Section 4(2), 1 of the examination regulation.

Conditions
Knowledge of the lectures Statistics I + II is required.

Learning Outcomes
Familiarity with the basic concepts and methods of econometrics
Preparation of simple econometric surveys

Content
Simple and multiple linear regression (estimating parameters, confidence interval, testing, prognosis, testing assumptions)
Multi equation models
Dynamic models

Literature

- Von Auer: Ökonometrie ISBN 3-540-00593-5
- Goldberger: A course in Econometrics ISBN 0-674-17544-1
- Gujarati. Basic Econometrics ISBN 0-07-113964-8
- Schneeweiß: Ökonometrie ISBN 3-7908-0008-2

Elective literature:
Additional literature will be suggested in course

Remarks
The course Economics III: Introduction in Econometrics [2520016] will not be offered any more from summer term 2013 on. The examination will be offered latest until summer term 2012.

Course: Theory of Economic Growth [2520543]

Coordinators: Marten Hillebrand
Part of the modules: Macroeconomic Theory (p. 50)[WI3VWL8]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Summer term	en

Learning Control / Examinations
According to the attendance the assessment consists of a written or an oral exam at the beginning of the recess period (according to Section 4 (2), 1 or 2 of the examination regulation.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
The courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014] have to be completed beforehand.
According the focus of the course quantitativ-mathematical modelling should be in participiant's interest.

Recommendations
Basic knowledge in micro- and macroeconomics, as conveyed in the courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014], is assumed.
According the focus of the course quantitativ-mathematical modelling should be in participiant's interest.

Learning Outcomes

Content

Course: Elective Foreig Languages [SQ HoC3]

Coordinators: House of Competence
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
2-4	2-4	Winter / Summer Term	

Learning Control / Examinations

Conditions
Depending on the choice of the language and the level prior knowledge is assumed.
Basic level english language courses can only be attended if english language skills were not acquired in school before.

Learning Outcomes

Content

Course: Elective “Workshops for Competence and Creativity” [SQ HoC2]

Coordinators: House of Competence
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	meist 2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Elective “Culture - Policy - Science - Technology” [SQ HoC1]

Coordinators: House of Competence
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	meist 2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Literature
Will be announced in the respective course.

Course: Elective “Personal Fitness & Emotional Competence” [SQ HoC4]

Coordinators: House of Competence
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
2-3	k.A.	Winter / Summer Term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Literature
Will be announced in the respective course.

Course: Elective “Tutor Programmes” [SQ HoC5]

Coordinators: House of Competence
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
2 / 3	k.A.	Winter / Summer Term	de

Learning Control / Examinations

Conditions
The participation in this program requires that the student has been or will be a tutor for at least two semesters.
The application for this program takes place via the dean’s office and in consultation with the corresponding chair.

Learning Outcomes

Content

Course: Hydraulic Engineering and Water Ressource Management I [19055]

Coordinators: Franz Nestmann
Part of the modules: Understanding and Prediction of Disasters III (p. 90)[WI3INGINTER5], Understanding and Prediction of Disasters I (p. 88)[WI3INGINTER1], Understanding and Prediction of Disasters II (p. 89)[WI3INGINTER2]

ECTS Credits	Hours per week	Term	Instruction language
6	2/2	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Remarks
For further information, see http://www.iwk.uni-karlsruhe.de/kurse_grundfachstudium.php

Course: Materials of Leightweight Construction [2174574]

Coordinators: Weidenmann
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
4	2	Summer term	de

Learning Control / Examinations
The assessment consists of an oral exam (20-30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Conditions
Successfull completion of the course *Material Science I* [2125760].
Basic knowledge of natural science and knowledge of the content *Material Science II* [2126782] is recommended.

Learning Outcomes
The students know different lightweight materials, their composition, properties and fields of application and can apply this knowledge effectively and precisely.
They master the hardening mechanisms of lightweight materials and can transfer this knowledge to applied problems.
The students have a basic understanding of basic mechanical models of composites - mainly polymer matrix composites - and can depict differences in the mechanical properties depending on composition and structure.

Content

- Introduction
- Constructive, production-orientied and material aspects of lightweight construction
- Aluminium-based alloys
- Aluminium wrought alloys
- Aluminium cast alloys
- Magnesium-based alloys
- Magnesium wrought alloys
- Magnesium cast alloys
- Titanium-based alloys
- Titanium wrought alloys
- Titanium cast alloys
- High-strength steels
- High-strength structural steels
- Heat-treatable and hardenable steels
- Composites - mainly PMC
- Matrices
- Reinforcements

Media
lecture notes are handed out during the lecture

Literature
Elective literature:

- Anwendungstechnologie Aluminium: Ostermann, F., Springer-Verlag, ISBN: 978-3-540-23882-9, 2007
- Magnesium Technology: Friedrich, H.; Mordike, B. L., Springer-Verlag, ISBN: 978-3-540-20599-9, 2005
- Titanium: Lütjering, G.; Williams, J. C., Springer-Verlag, ISBN: 978-3-540-71397-5, 2007
- Handbuch der Verbundwerkstoffe: Neitzel, M.; Mitschang, P., Hanser Fachbuchverlag, ISBN: 978-3-446-22041-6, 2004
- Werkstoffe 2: Metalle, Keramiken und Gläser, Kunststoffe und Verbundwerkstoffe, Ashby, M. F.; Jones, D. R. H.; Heinzelmann, M. (Hrsg.), Spektrum Akademischer Verlag, ISBN: 978-3-8274-1709-1, 2007

Course: Material Science I [2125760]

Coordinators: M. J. Hoffmann
Part of the modules: Material Science (p. 22)[WI1ING2]

ECTS Credits	Hours per week	Term	Instruction language
2.5	2/1	Winter term	de

Learning Control / Examinations
The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.

Conditions
None.

Learning Outcomes
The student

- knows and understands the correlation between atomic structure, microstructure and related macroscopic properties (e.g. mechanical or electrical behaviour)
- has basic knowledge on materials development and characterization

Content

- Atomic structure and interatomic bonding
- Structure of crystalline solids
- Imperfections in solids
- Mechanical behaviour
- Physical properties
- Solidification
- Thermodynamics of heterogeneous systems
- Phase diagrams
- Ferrous alloys

Literature
Elective literature:
Werkstoffwissenschaften - Eigenschaften, Vorgänge, Technologien, B. Ilscher, Springer – Verlag, Berlin Heidelberg New York, ISBN 3-540-10725-5
Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
Metallkunde für das Maschinenwesen I/II, K.G. Schmitt-Thomas, Springer-Verlag, ISBN 3-540-51913-0
Materials Science and Engineering – An Introduction, William D. Callister (Jr.), John Wiley & Son, ISBN-10: 978-0-471-73696-7.

Course: Material Science II for Business Engineers [2126782]

Coordinators: M. J. Hoffmann
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9], Emphasis in Fundamentals of Engineering (p. 77)[WI3INGMB8]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the winter term is carried out by a written or oral exam.

Conditions
The module *Material Science* [WI1ING2] has to be completed beforehand.

Learning Outcomes

Content

Literature
Elective literature:

- Werkstoffwissenschaften - Eigenschaften, Vorgänge, Technologien, B. Ilscher, Springer – Verlag, Berlin Heidelberg New York, ISBN 3-540-10725-5
- Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
- Metallkunde für das Maschinenwesen I/II, K.G. Schmitt-Thomas, Springer-Verlag, ISBN 3-540-51913-0
- Materials Science and Engineering – An Introduction, William D. Callister (Jr.), John Wiley & Son, ISBN-10: 978-0-471-73696-7

Course: Material Science and Engineering III [2173553]

Coordinators: Wanner
Part of the modules: Emphasis Material Science (p. 78)[WI3INGMB9]

ECTS Credits	Hours per week	Term	Instruction language
6	4/1	Winter term	de

Learning Control / Examinations
The assessment consists of an oral exam (30-40 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Conditions
The course *Material Science I* [2125760] is a prerequisite.
It is recommeded to have basic knowledge of natural science and knowledge of the content of the course *Material Science II* [2126782].

Learning Outcomes
The students are familiar with the thermodynamic foundations of phase transformations, the kinetics of phase transformations in the solid states (nucleation and growth phenomena), the mechanisms of microstructure formation and microstructure-property relationships. They can assess the effects of heat treatmens and of alloying on the microstructure and the properties of iron-based materials (steels in particular). The can select steels for structural applications in mechanical engineering and subject them to appropriate heat treatmens.

Content
Properties of pure iron; thermodynamic foundations of single-component and of binary systems; nucleation and growth; diffusion processes in crystalline iron; the phase diagram Fe-Fe3C; effects of alloying on Fe-C-alloys; nonequilibrium microstructures; multicomponent iron-based alloys; heat treatment technology; hardenability and hardenability tests.

Media
Lecture notes and working material will be released within the leture.

Literature
Elective literature:

1. VDEh: Werkstoffkunde Stahl, Bd. 1: Grundlagen, Springer-Verlag, 1984
2. Honeycombe, R., Bhadeshia, H.: Steels - Microstructure and Properties, Edward Arnold, 1995
3. Macherauch: Praktikum in Werkstoffkunde, 10. Aufl., 1992

Course: Machine Tools an Industrial Handling [2149902]

Coordinators: Jürgen Fleischer
Part of the modules: Machine Tools an Industrial Handling (p. 76)[WI3INGMB32]

ECTS Credits	Hours per week	Term	Instruction language
9	4/2	Winter term	de

Learning Control / Examinations
The assessment is carried out as written exam of 120 min (according to Section 4(2),1 of the examination regulation) of the course of this module.

Conditions
None.

Learning Outcomes
The student

- has knowledge about the application of machine tools.
- comprehends the assembly and the operation purpose of the major components of a machine tool.
- is able to apply methods of selection and assessment of production machines to new tasks.
- is able to assess the dimensioning of a machine tool.

Content
The lecture 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.

Literature
Script of the lecture

Course: Machine Tools and Industrial Handling II [2149901]

Coordinators: Munzinger
Part of the modules: Production Engineering II (p. 71)[WI3INGMB4], Production Engineering III (p. 72)[WI3INGMB7], Production Engineering I (p. 70)[WI3INGMB10]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Competition in Networks [26240]

Coordinators: Kay Mitusch
Part of the modules: Economic Policy I (p. 48)[WI3VWL8], Microeconomic Theory (p. 49)[WI3VWL6], Specialization in Customer Relationship Management (p. 42)[WI3BWLISM5]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1	Winter term	de

Learning Control / Examinations

Conditions
None.

Recommendations
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required. Useful, but not necessary, are basic knowledge of industrial economics, prinicpal agent theory, and contract theory.

Learning Outcomes
The lecture provides the students with the basic economic understanding of network industries like telecom, utilities, IT and transport sectors.
Students are prepared for a possible job in the network industries. The student should get a vivid idea of the special characteristics of network industries concerning planning, competition, competitive distortion and state intervention. He should be able to apply abstract concepts and formal methods to use in these fields.

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

Literature
Will be announced in the lecture.

Course: Seminar Economic Theory [SemWIOR2]

Coordinators: Clemens Puppe
Part of the modules: Seminar Module (p. 97)[WI3SEM]

ECTS Credits	Hours per week	Term	Instruction language
3	2	Winter / Summer Term	de

Learning Control / Examinations

Conditions
See corresponding module information.
At least one of the courses *Game Theory I* [2520525] and *Welfare Economics* [2520517] should have been attended beforehand.

Learning Outcomes

Content

Literature
Will be announced at the end of the recess period.

Course: Knowledge Management [2511300]

Coordinators: Rudi Studer
Part of the modules: Emphasis Informatics (p. 53)[WI3INFO1], Electives in Informatic (p. 55)[WI3INFO2]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter term	de

Learning Control / Examinations
Written Examination (60 min) according to §4, Abs. 2, 1 of the examination regulations or oral examination of 20 minutes according to §4, Abs. 2, 2 of the examination regulations. The exam takes place every semester and can be repeated at every regular examination date.

Conditions
Basics in logic, e.g. from lecture Foundations of Informatics 1.

Learning Outcomes
Making students sensitive to the problems of corporate knowledge management, knowledge about the central dimensions of influence as well as of relevant technologies for supporting knowledge management.

Content
In modern companies, knowledge is increasingly important for fullfilling central tasks (such as continuous business process improvement, increasing innovation, increasing customer satisfaction, strategic planning etc). Therefore, knowledge management has become a critical success factor.
The lecture covers different types of knowledge that play a role in knowledge management, the corresponding knowledge processes (generation, capture, access and usage of knowledge) as well as methodologies for the introduction of knowledge management solutions.
The lecture will emphasize computer-based support for knowledge management, such as:

- Ontology-based Knowledge Management
- Communities of Practice, Collaboration Tools, Social Software
- Business-process Oriented Knowledge Management
- Personal Knowledge Management
- Case Based Reasoning (CBR)
- Linked Open Data

Media
Slides and scientific publications as reading material.

Literature

- I. Nonaka, H. Takeuchi: The Knowledge Creating Company. Oxford University Press 1995.
- G. Probst, S. Raub, K. Romhardt: Wissen managen: Wie Unternehmen ihre wertvollste Ressource optimal nutzen. Gabler, Wiesbaden, 5. überarb. Auflage, 2006.
- S. Staab, R. Studer (eds.): Handbook on Ontologies, ISBN 3-540-70999-1, Springer Verlag, 2009.
- A. Back, N. Gronau, K. Tochtermann: Web 2.0 in der Unternehmenspraxis - Grundlagen, Fallstudien und Trends zum Einsatz von Social Software. Oldenbourg Verlag München 2008.
- C. Beierle, G. Kern-Isberner: Methoden wissensbasierter Systeme, Vieweg, Braunschweig/Wiesbaden, 2. überarb. Auflage, 2005

Elective literature:

1. P. Hitzler, M Krötzsch, S. Rudolph, Y. Sure: Semantic Web: Grundlagen, ISBN 3-540-33993-0, Springer Verlag, 2008
2. Abecker, A., Hinkelmann, K., Maus, H., Müller, H.J., (Ed.): Geschäftsprozessorientiertes Wissensmanagement, Mai 2002.VII, 472 S. 70 Abb. Geb. ISBN 3-540-42970-0, Springer Verlag
3. Dieter Fensel. Spinning the Semantic Web. 2003 (ISBN 0262062321).
4. Tim Berners-Lee. Weaving the Web. Harper 1999 geb. 2000 Taschenbuch.

Course: Welfare Economics [2520517]

Coordinators: Clemens Puppe
Part of the modules: Microeconomic Theory (p. 49)[WI3VWL6]

ECTS Credits	Hours per week	Term	Instruction language
4.5	2/1	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam at the end of the semester (according to Section 4 (2), 1 or 2 of the examination regulation.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
The courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014] have to be completed beforehand.

Learning Outcomes

Content

Literature
Elective literature:

- J. Rawls: *A Theory of Justice*. Harvard University Press (1971)
- J. Roemer: *Theories of Distributive Justice*. Harvard University Press (1996)

222

Neubekanntmachung der Studien- und Prüfungsordnung der Universität Karlsruhe (TH) für den Bachelorstudiengang Wirtschaftsingenieurwesen

in der Fassung vom 15. August 2008

Aufgrund von § 34 Absatz 1 Satz 1 des Landeshochschulgesetzes (LHG) vom 1. Januar 2005 hat der Senat der Universität Karlsruhe (TH) am 26. Februar 2007 die folgende Studien- und Prüfungsordnung für den Bachelorstudiengang Wirtschaftsingenieurwesen beschlossen.

Der Rektor hat seine Zustimmung am 06. März 2007 erteilt.

Aus Gründen der Lesbarkeit ist in dieser Satzung nur die männliche Sprachform gewählt worden. Alle personenbezogenen Aussagen gelten jedoch stets für Frauen und Männer gleichermaßen.

Inhaltsverzeichnis

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 berufsfeldbezogen anzuwenden sowie einen konsekutiven Masterstudiengang erfolgreich absolvieren zu können.

§ 2 Akademischer Grad

Aufgrund der bestandenen Bachelorprüfung wird der akademische Grad „Bachelor of Science" (abgekürzt: „B.Sc.") für den Bachelorstudiengang Wirtschaftsingenieurwesen verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) Die Regelstudienzeit beträgt sechs Semester. Sie umfasst ein Betriebspraktikum, Prüfungen und die Bachelorarbeit.

(2) Die im Studium zu absolvierenden Lehrinhalte sind auf Fächer verteilt. Die Fächer sind in Module gegliedert, die jeweils aus einer Lehrveranstaltung oder mehreren thematisch und zeitlich aufeinander bezogenen Lehrveranstaltungen bestehen. Studienplan oder Modulhandbuch beschreiben Art, Umfang und Zuordnung der Module zu einem Fach sowie die Möglichkeiten, Module untereinander zu kombinieren. Die Fächer und ihr Umfang werden in § 17 definiert.

(3) Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (Credits) ausgewiesen. Die Maßstäbe für die Zuordnung von Leistungspunkten entsprechen dem ECTS (European Credit Transfer System). Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30 Stunden.

(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

(1) Die Bachelorprüfung besteht aus einer Bachelorarbeit, Fachprüfungen und einem Seminarmodul. Jede der Fachprüfungen besteht aus einer oder mehreren Modulprüfungen. Eine Modulprüfung kann in mehrere Modulteilprüfungen untergliedert sein. Eine Modul(teil)prüfung besteht aus mindestens einer Erfolgskontrolle nach Absatz 2 Nr. 1 und 2. Ausgenommen hiervon sind Seminarmodule.

(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.

224

(3) In den Fachprüfungen (nach § 17 Absatz 2 und Absatz 3 Nr. 1 bis 7) sind mindestens 50 vom Hundert einer Modulprüfung in Form von schriftlichen oder mündlichen Prüfungen (Absatz 2 Nr. 1 und 2) abzulegen, die restliche Prüfung erfolgt durch Erfolgskontrollen anderer Art (Absatz 2 Nr. 3).

§ 5 Anmeldung und Zulassung zu den Prüfungen

(1) Die Zulassung zu den Prüfungen nach § 4 Absatz 2 Nr. 1 und 2 sowie zur Bachelorarbeit erfolgt im Studienbüro.

Um zu Prüfungen in einem Modul zugelassen zu werden, muss beim Studienbüro eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach, wenn diese Wahlmöglichkeit besteht, abgegeben werden.

(2) Die Zulassung darf nur abgelehnt werden, wenn

1. der Studierende in einem mit Wirtschaftsingenieurwesen vergleichbaren oder einem verwandten Studiengang bereits eine Diplomvorprüfung, Diplomprüfung, Bachelor- oder Masterprüfung endgültig nicht bestanden hat, sich in einem Prüfungsverfahren befindet oder den Prüfungsanspruch in einem solchen Studiengang verloren hat oder
2. die in § 18 genannte Voraussetzung nicht erfüllt ist.

In Zweifelsfällen entscheidet der Prüfungsausschuss.

§ 6 Durchführung von Prüfungen und Erfolgskontrollen

(1) Erfolgskontrollen werden studienbegleitend, in der Regel im Verlauf der Vermittlung der Lehrinhalte der einzelnen Module oder zeitnah danach, durchgeführt.

(2) Die Art der Erfolgskontrollen (§ 4 Absatz 2 Nr. 1 bis 3) eines Moduls wird im Studienplan oder Modulhandbuch in Bezug auf die Lehrinhalte der betreffenden Lehrveranstaltungen und die Lehrziele des Moduls festgelegt. Die Art der Erfolgskontrollen, ihre Häufigkeit, Reihenfolge und Gewichtung, die Grundsätze zur Bildung der Modulteilprüfungsnoten und der Modulnote sowie Prüfer müssen mindestens sechs Wochen vor Semesterbeginn bekannt gegeben werden. Im Einvernehmen von Prüfer und Studierendem kann die Art der Erfolgskontrolle auch nachträglich geändert werden. Dabei ist jedoch § 4 Absatz 3 zu berücksichtigen.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfung auch mündlich oder eine mündlich durchzuführende Prüfung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfung bekannt gegeben werden.

Bei Einvernehmen zwischen Prüfer und Kandidat kann der Prüfungsausschuss in begründeten Ausnahmefällen auch kurzfristig die Änderung der Prüfungsform genehmigen.

Wird die Wiederholungsprüfung einer schriftlichen Prüfung in mündlicher Form abgelegt, entfällt die mündliche Nachprüfung nach § 8 Absatz 2.

(4) Macht ein Studierender glaubhaft, dass er wegen länger andauernder oder ständiger körperlicher Behinderung nicht in der Lage ist, die Erfolgskontrollen ganz oder teilweise in der 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.

(6) Schriftliche Prüfungen (§ 4 Absatz 2 Nr. 1) sind in der Regel von zwei Prüfern nach § 15 Absatz 2 oder § 15 Absatz 3 zu bewerten. Die Note ergibt sich aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in § 7 Absatz 2 Satz 2 definierten Notenstufen, so ist auf die nächstliegende Notenstufe zu runden. Bei gleichem Abstand ist auf die nächstbessere Notenstufe zu runden. Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. Schriftliche Einzelprüfungen dauern in der Regel mindestens 60 und höchstens 240 Minuten.

(7) Mündliche Prüfungen (§ 4 Absatz 2 Nr. 2) sind von mehreren Prüfern (Kollegialprüfung) oder von einem Prüfer in Gegenwart eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört der Prüfer die anderen an der Kollegialprüfung mitwirkenden Prüfer an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 45 Minuten pro Studierendem.

(8) 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.

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

(10) Für Erfolgskontrollen anderer Art sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Studienleistung dem Studierenden zurechenbar ist.

(11) 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.

(12) Bei mündlich durchgeführten Erfolgskontrollen anderer Art muss neben dem Prüfer ein Beisitzer anwesend sein, der zusätzlich zum Prüfer die Protokolle zeichnet.

§ 7 Bewertung von Prüfungen und Erfolgskontrollen

(1) Das Ergebnis einer Erfolgskontrolle wird von den jeweiligen Prüfern in Form einer Note festgesetzt.

(2) Im Bachelorzeugnis dürfen nur folgende Noten verwendet werden:

1	=	sehr gut (very good)	=	hervorragende Leistung
2	=	gut (good)	=	eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt
3	=	befriedigend (satisfactory)	=	eine Leistung, die durchschnittlichen Anforderungen entspricht
4	=	ausreichend (sufficient)	=	eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt
5	=	nicht ausreichend (failed)	=	eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt

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

226

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 angerechnet werden.

(6) Erfolgskontrollen anderer Art dürfen in Modulteilprüfungen oder Modulprüfungen nur eingerechnet werden, wenn die Benotung nicht nach Absatz 3 erfolgt ist. Die zu dokumentierenden Erfolgskontrollen und die daran geknüpften Bedingungen werden im Studienplan oder Modulhandbuch festgelegt.

(7) Eine Modulteilprüfung ist bestanden, wenn die Note mindestens „ausreichend" (4.0) ist.

(8) Eine Modulprüfung ist dann bestanden, wenn die Modulnote mindestens „ausreichend" (4.0) ist. Die Modulprüfung und die Bildung der Modulnote werden im Studienplan oder Modulhandbuch geregelt. Die differenzierten Noten der betreffenden Erfolgskontrollen sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden. Enthält der Studienplan oder das Modulhandbuch keine Regelung darüber, wann eine Modulprüfung bestanden ist, so ist diese Modulprüfung dann bestanden, wenn alle dem Modul zugeordneten Modulteilprüfungen bestanden wurden.

(9) Eine Fachprüfung ist bestanden, wenn die für das Fach erforderliche Anzahl von Leistungspunkten über die im Studienplan oder Modulhandbuch definierten Modulprüfungen nachgewiesen wird.

Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein.

(10) Die Ergebnisse der Bachelorarbeit, der Modulprüfungen bzw. der Modulteilprüfungen, der Erfolgskontrollen anderer Art sowie die erworbenen Leistungspunkte werden durch das Studienbüro der Universität erfasst.

(11) Innerhalb der Regelstudienzeit, einschließlich der Urlaubssemester für das Studium an einer ausländischen Hochschule (Regelprüfungszeit), können in einem Fach auch mehr Leistungspunkte erworben werden als für das Bestehen der Fachprüfung erforderlich sind. In diesem Fall werden bei der Festlegung der Fachnote nur die Modulnoten berücksichtigt, die unter Abdeckung der erforderlichen Leistungspunkte die beste Fachnote ergeben.

Die in diesem Sinne für eine Fachprüfung nicht gewerteten Erfolgskontrollen und Leistungspunkte können im Rahmen der Zusatzfachprüfung nach § 13 nachträglich geltend gemacht werden.

(12) Die Gesamtnote der Bachelorprüfung, die Fachnoten und die Modulnoten lauten:

bis 1,5	=	sehr gut
1.6 bis 2.5	=	gut
2.6 bis 3.5	=	befriedigend
3.6 bis 4.0	=	ausreichend

(13) Zusätzlich zu den Noten nach Absatz 2 werden ECTS-Noten für Fachprüfungen, Modulprüfungen und für die Bachelorprüfung nach folgender Skala vergeben:

ECTS-Note	Quote	Definition
A	10	gehört zu den besten 10 % der Studierenden, die die Erfolgskontrolle bestanden haben
B	25	gehört zu den nächsten 25 % der Studierenden, die die Erfolgskontrolle bestanden haben
C	30	gehört zu den nächsten 30 % der Studierenden, die die Erfolgskontrolle bestanden haben
D	25	gehört zu den nächsten 25 % der Studierenden, die die Erfolgskontrolle bestanden haben
E	10	gehört zu den letzten 10 % der Studierenden, die die Erfolgskontrolle bestanden haben
FX		nicht bestanden (failed) – es sind Verbesserungen erforderlich, bevor die Leistungen anerkannt werden
F		nicht bestanden (failed) – es sind erhebliche Verbesserungen erforderlich

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.

(4) Wiederholungsprüfungen nach Absatz 2 und Absatz 3 müssen in Inhalt, Umfang und Form (mündlich oder schriftlich) der ersten Prüfung entsprechen. Ausnahmen kann der Prüfungsausschuss auf Antrag zulassen. Fehlversuche an anderen Hochschulen sind anzurechnen.

(5) Die Wiederholung einer Erfolgskontrolle anderer Art (§ 4 Absatz 2 Nr. 3) wird im Modulhandbuch geregelt.

228

(6) Eine zweite Wiederholung derselben schriftlichen oder mündlichen Prüfung ist nur in Ausnahmefällen zulässig. Einen Antrag auf Zweitwiederholung hat der Studierende schriftlich beim Prüfungsausschuss zu stellen. Über den ersten Antrag auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet der Rektor. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses der Rektor. Absatz 2 Satz 2 und Satz 3 gilt entsprechend.

Bei nicht bestandener Erfolgskontrolle sind dem Kandidaten Umfang und Frist der Wiederholung in geeigneter Weise bekannt zu machen.

(7) Die Wiederholung einer bestandenen Erfolgskontrolle ist nicht zulässig.

(8) Eine Fachprüfung ist nicht bestanden, wenn mindestens ein Modul des Faches nicht bestanden ist.

(9) Die Bachelorarbeit kann bei einer Bewertung mit „nicht ausreichend" einmal wiederholt werden. Eine zweite Wiederholung der Bachelorarbeit ist ausgeschlossen.

(10) 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.

(11) 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.
4. Der Prüfungsausschuss hat dem Studierenden nach § 9 Absatz 5 den Prüfungsanspruch entzogen.

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

(1) Der Studierende kann bei Erfolgskontrollen gemäß § 4 Absatz 2 Nr. 1 ohne Angabe von Gründen noch vor Ausgabe der Prüfungsaufgaben zurücktreten. Bei mündlichen Erfolgskontrollen muss der Rücktritt spätestens drei Werktage vor dem betreffenden Prüfungstermin erklärt werden. Die verbindlichen Regelungen zur ordentlichen Abmeldung werden gemäß § 6 Absatz 2 bekannt gegeben. Eine durch Widerruf abgemeldete Prüfung gilt als nicht angemeldet.

(2) 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.

(3) Der für den Rücktritt nach Beginn der Prüfung oder das Versäumnis geltend gemachte Grund muss dem Prüfungsausschuss unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit des Studierenden oder eines von ihm allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann in Zweifelsfällen die Vorlage des Attestes eines vom Prüfungsausschuss benannten Arztes oder ein amtsärztliches Attest verlangt werden.

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.

(5) Ein Studierender, der den ordnungsgemäßen Ablauf der Prüfung stört, kann vom jeweiligen Prüfer oder der aufsichtsführenden Person von der Fortsetzung der Modulprüfung ausgeschlossen werden. In diesem Fall wird die betreffende Prüfungsleistung mit „nicht ausreichend" (5.0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss den Studierenden von der Erbringung weiterer Prüfungsleistungen ausschließen.

(6) Der Studierende kann innerhalb einer Frist von einem Monat verlangen, dass Entscheidungen gemäß Absatz 4 und Absatz 5 vom Prüfungsausschuss überprüft werden. Belastende Entscheidungen des Prüfungsausschusses sind unverzüglich schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben.

(7) Näheres regelt die Allgemeine Satzung der Universität Karlsruhe (TH) zur Redlichkeit bei Prüfungen und Praktika.

§ 10 Mutterschutz, Elternzeit

(1) Auf Antrag sind die Mutterschutzfristen, wie sie im jeweils gültigen Gesetz zum Schutz der erwerbstätigen Mutter (MuSchG) festgelegt sind, entsprechend zu berücksichtigen. Dem Antrag sind die erforderlichen Nachweise beizufügen. Die Mutterschutzfristen unterbrechen jede Frist nach dieser Prüfungsordnung. Die Dauer des Mutterschutzes wird nicht in die Frist eingerechnet.

(2) Gleichfalls sind die Fristen der Elternzeit nach Maßgabe des jeweiligen gültigen Gesetzes (BErzGG) auf Antrag zu berücksichtigen. Der Studierende muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem er die Elternzeit antreten will, dem Prüfungsausschuss unter Beifügung der erforderlichen Nachweise schriftlich mitteilen, in welchem Zeitraum er Elternzeit in Anspruch nehmen will. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einem Arbeitnehmer den Anspruch auf Elternzeit auslösen würden, und teilt dem Studierenden das Ergebnis sowie die neu festgesetzten Prüfungszeiten unverzüglich mit. Die Bearbeitungszeit der Bachelorarbeit kann nicht durch Elternzeit unterbrochen werden. Die gestellte Arbeit gilt als nicht vergeben. Nach Ablauf der Elternzeit erhält der Studierende ein neues Thema.

§ 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.

230

Auf Antrag des Studierenden sorgt der Vorsitzende des Prüfungsausschusses dafür, dass der Studierende innerhalb von vier Wochen nach Antragstellung von einem Betreuer ein Thema für die Bachelorarbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über den Vorsitzenden des Prüfungsausschusses.

(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.

(3) Der Bachelorarbeit werden 12 Leistungspunkte zugeordnet. Die empfohlene Bearbeitungsdauer beträgt drei Monate. Die maximale Bearbeitungsdauer beträgt einschließlich einer Verlängerung vier Monate. Die Bachelorarbeit soll zeigen, dass der Studierende in der Lage ist, ein Problem aus seinem Fach selbstständig und in begrenzter Zeit nach wissenschaftlichen Methoden zu bearbeiten. Sie kann auch in englischer Sprache abgefasst werden.

(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.

(6) Der Zeitpunkt der Ausgabe des Themas der Bachelorarbeit und der Zeitpunkt der Abgabe der Bachelorarbeit sind beim Prüfungsausschuss aktenkundig zu machen. Das Thema kann nur einmal und nur innerhalb des ersten Monats der Bearbeitungszeit zurückgegeben werden. Ein neues Thema ist binnen vier Wochen zu stellen und auszugeben. Auf begründeten Antrag des Studierenden kann der Prüfungsausschuss die in Absatz 3 festgelegte Bearbeitungszeit um höchstens einen Monat verlängern. Wird die Bachelorarbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend" bewertet, es sei denn, dass der Studierende dieses Versäumnis nicht zu vertreten hat. § 8 gilt entsprechend.

(7) Die Bachelorarbeit wird von einem Betreuer sowie in der Regel von einem weiteren Prüfer bewertet. Einer der beiden muss Juniorprofessor oder Professor sein. Bei nicht übereinstimmender Beurteilung der beiden Prüfer setzt der Prüfungsausschuss im Rahmen der Bewertung der beiden Prüfer die Note der Bachelorarbeit fest. Der Bewertungszeitraum soll sechs Wochen nicht überschreiten.

§ 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.

Zusatzmodule werden bei der Festsetzung der Gesamtnote nicht mit einbezogen. Alle Zusatzleistungen werden im Transcript of Records automatisch aufgenommen und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach § 7 vorgesehenen Noten gelistet. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein.

(3) Der Studierende hat bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

§ 14 Prüfungsausschuss

(1) Für den Bachelorstudiengang Wirtschaftsingenieurwesen wird ein Prüfungsausschuss gebildet. Er besteht aus fünf stimmberechtigten Mitgliedern: vier Professoren, Juniorprofessoren, Hochschul- oder Privatdozenten, einem Vertreter der Gruppe der wissenschaftlichen Mitarbeiter nach § 10 Absatz 1 Satz 2 Nr. 2 LHG und einem Vertreter der Studierenden mit beratender Stimme. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) Der Vorsitzende, sein Stellvertreter, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter werden vom Fakultätsrat bestellt, die Mitglieder der Gruppe der wissenschaftlichen Mitarbeiter nach § 10 Absatz 1 Satz 2 Nr. 2 LHG und der Vertreter der Studierenden auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Der Vorsitzende und dessen Stellvertreter müssen Professor oder Juniorprofessor sein. Der Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch ein Prüfungssekretariat unterstützt.

(3) Der Prüfungsausschuss regelt die Auslegung und die Umsetzung der Prüfungsordnung in die Prüfungspraxis der Fakultät. Er achtet darauf, dass die Bestimmungen der Prüfungsordnung eingehalten werden. Er berichtet regelmäßig dem Fakultätsrat über die Entwicklung der Prüfungen und Studienzeiten sowie über die Verteilung der Fach- und Gesamtnoten und gibt Anregungen zur Reform des Studienplans und der Prüfungsordnung.

(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben in dringenden Angelegenheiten und für alle Regelfälle auf den Vorsitzenden des Prüfungsausschusses übertragen.

(5) Die Mitglieder des Prüfungsausschusses haben das Recht, an Prüfungen teilzunehmen. Die Mitglieder des Prüfungsausschusses, die Prüfer und die Beisitzenden unterliegen der Amtsverschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch den Vorsitzenden zur Verschwiegenheit zu verpflichten.

(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.

(7) Belastende Entscheidungen des Prüfungsausschusses sind schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Widersprüche gegen Entscheidungen des Prüfungsausschusses sind innerhalb eines Monats nach Zugang der Entscheidung schriftlich oder zur Niederschrift an den Prüfungsausschuss zu richten. Hilft der Prüfungsausschuss dem Widerspruch nicht ab, ist er zur Entscheidung dem für die Lehre zuständigen Mitglied des Rektorats vorzulegen.

232

§ 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

(1) Studienzeiten und gleichwertige Studienleistungen und Modulprüfungen, die in gleichen oder anderen Studiengängen an anderen Hochschulen erbracht wurden, werden auf Antrag angerechnet. Gleichwertigkeit ist festzustellen, wenn Leistungen in Inhalt, Umfang und in den Anforderungen denjenigen des Studiengangs im Wesentlichen entsprechen. Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung vorzunehmen. Bezüglich des Umfangs einer zur Anerkennung vorgelegten Studienleistung und Modulprüfung werden die Grundsätze des ECTS herangezogen; die inhaltliche Gleichwertigkeitsprüfung orientiert sich an den Qualifikationszielen des Moduls.

(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

(1) Die Bachelorprüfung besteht aus den Fachprüfungen nach Absatz 2 und Absatz 3, dem Seminarmodul nach Absatz 4 sowie der Bachelorarbeit nach § 11.

(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,
7. Wahlpflichtfach: Informatik, Operations Research, Betriebswirtschaftslehre, Volkswirtschaftslehre, Ingenieurwissenschaften, Statistik, Recht oder Soziologie.

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.

(4) Ferner sind im Rahmen des Seminarmoduls bestehend aus zwei Seminaren mindestens sechs Leistungspunkte nachzuweisen. Neben den hier im Umfang von drei Leistungspunkten vermittelten Schlüsselqualifikationen müssen zusätzliche Schlüsselqualifikationen im Umfang von mindestens drei Leistungspunkten erworben werden.

(5) Als weitere Prüfungsleistung ist eine Bachelorarbeit gemäß § 11 anzufertigen. Der Bachelorarbeit werden 12 Leistungspunkte zugeordnet.

(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.

234

§ 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

(1) Über die Bachelorprüfung wird nach Bewertung der letzten Prüfungsleistung eine Bachelorurkunde und ein Zeugnis erstellt. Die Ausfertigung von Bachelorurkunde und Zeugnis soll nicht später als sechs Wochen nach der Bewertung der letzten Prüfungsleistung erfolgen. Bachelorurkunde und Bachelorzeugnis werden in deutscher und englischer Sprache ausgestellt. Bachelorurkunde und Zeugnis tragen das Datum der letzten nachgewiesenen Prüfungsleistung. Sie werden dem Studierenden gleichzeitig ausgehändigt. In der Bachelorurkunde wird die Verleihung des akademischen Bachelorgrades beurkundet. Die Bachelorurkunde wird vom Rektor und vom Dekan unterzeichnet und mit dem Siegel der Universität versehen.

(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.

(3) Weiterhin erhält der Studierende als Anhang ein Diploma Supplement in deutscher und englischer Sprache, das den Vorgaben des jeweils gültigen ECTS User's Guide entspricht. Das Diploma Supplement enthält eine Abschrift der Studiendaten des Studierenden (Transcript of Records).

(4) Die Abschrift der Studiendaten (Transcript of Records) enthält in strukturierter Form alle erbrachten Prüfungsleistungen. Dies beinhaltet alle Fächer, Fachnoten und ihre entsprechende ECTS-Note samt den zugeordneten Leistungspunkten, die dem jeweiligen Fach zugeordneten Module mit den Modulnoten, entsprechender ECTS-Note und zugeordneten Leistungspunkten sowie die den Modulen zugeordneten Lehrveranstaltungen samt Noten und zugeordneten Leistungspunkten. Aus der Abschrift der Studiendaten soll die Zugehörigkeit von Lehrveranstaltungen zu den einzelnen Modulen und die Zugehörigkeit der Module zu den einzelnen Fächern deutlich erkennbar sein. Angerechnete Studienleistungen sind im Transcript of Records aufzunehmen.

(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.

(5) Eine Entscheidung nach Absatz 1 und Absatz 2 Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Zeugnisses ausgeschlossen.

(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.

(2) Die Einsichtnahme in die schriftlichen Modulprüfungen bzw. Prüfungsprotokolle erfolgt zu einem durch den Prüfer festgelegten, angemessenen Termin innerhalb der Vorlesungszeit. Der Termin ist mit einem Vorlauf von mindestens 14 Tagen anzukündigen und angemessen bekannt zu geben.

(3) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 24 In-Kraft-Treten

(1) Diese Studien- und Prüfungsordnung tritt am 1. Oktober 2007 in Kraft.

(2) Gleichzeitig tritt die Prüfungsordnung der Universität Karlsruhe (TH) für den Diplomstudiengang Wirtschaftsingenieurwesen vom 15. November 2001 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 29 vom 24. November 2001), zuletzt geändert durch Satzung vom 4. Juli 2004 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 36 vom 14. Juli 2004)

236

außer Kraft, behält jedoch ihre Gültigkeit bis zum 30. September 2013 für Prüflinge, die auf Grundlage der Prüfungsordnung der Universität Karlsruhe (TH) für den Studiengang Wirtschaftsingenieurwesen vom 15. November 2001 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 29 vom 24. November 2001) ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben. Über eine Fristverlängerung darüber hinaus entscheidet der Prüfungsausschuss auf Antrag des Studierenden.

Über einen Antrag an den Prüfungsausschuss können Studierende, die auf Grundlage der Prüfungsordnung der Universität Karlsruhe (TH) für den Studiengang Wirtschaftsingenieurwesen vom 15. November 2001 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 29 vom 24. November 2001) ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben, ihr Studium auf Grundlage dieser Prüfungsordnung fortsetzen. Der Prüfungsausschuss stellt dabei fest, ob und wie die bisher erbrachten Prüfungsleistungen in den neuen Studienplan integriert werden können und nach welchen Bedingungen das Studium nach einem Wechsel fortgeführt werden kann.

Karlsruhe, den 06. März 2007

Professor Dr. sc. tech. Horst Hippler
(Rektor)

Index

N

O

P

Q

R

S

T

U

V

W