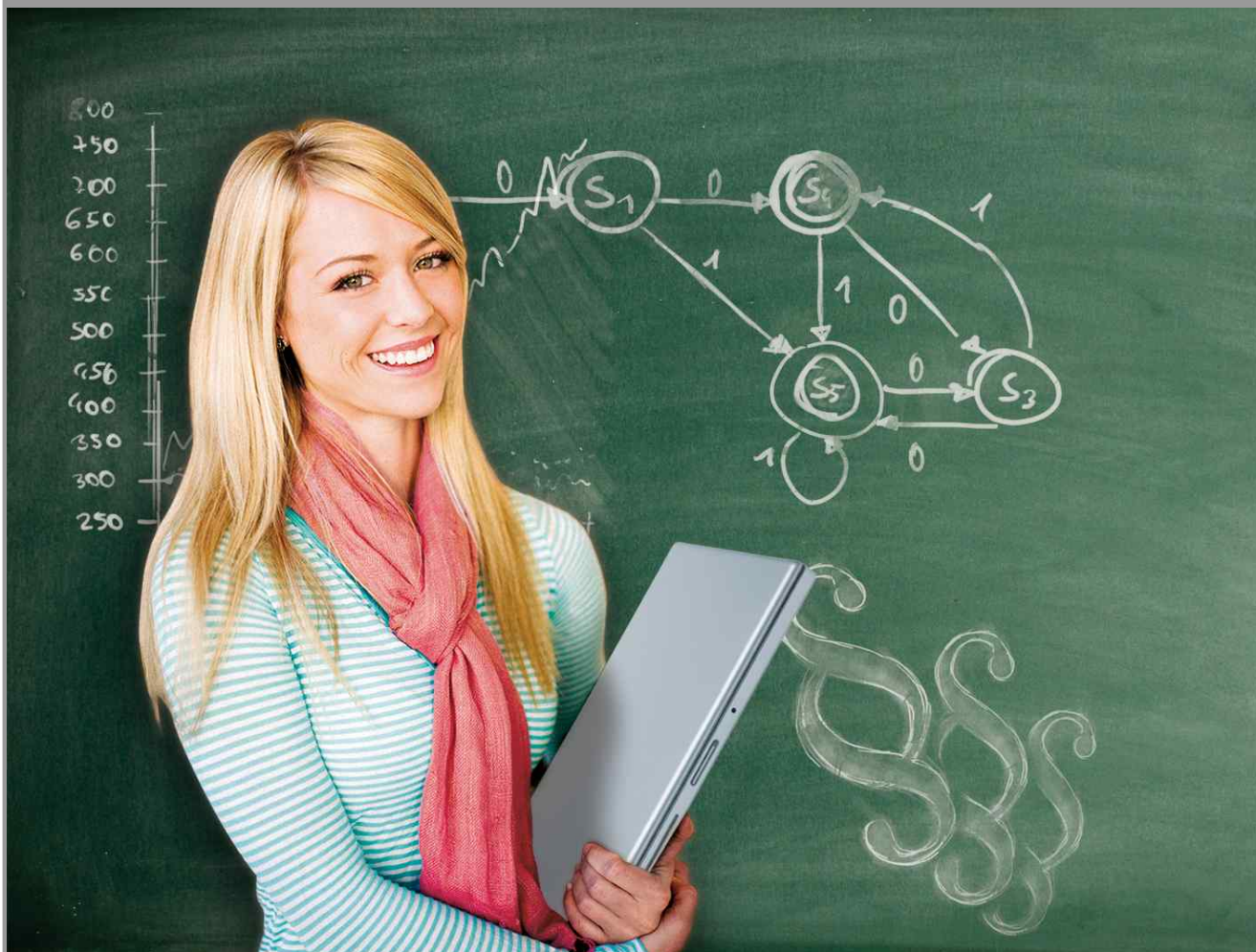# KIT

Karlsruher Institut für Technologie

Information Engineering and Management (B.Sc.)

Winter Term 2015/2016
SPO 2009
04.08.2015

Department of Economics and Management
Department of Informatics

Contents

1   Structure of the Bachelor Programme in Information Engineering and Management

The Bachelor programme in *Information Engineering and Management* has 6 terms. The first four terms have a methodological orientation and provides the student with the foundations of informatics, business administration, economics and law. Terms 5 and 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.

Information Engineering and Management (B.Sc.)							
Semester	**Core Programme**						
Subject	INFO	BA	EC	OR	STAT	MATH	LAW
1	Foundations in Informatics 10 CP	Foun-Dations in BA 8 CP	EC 5 CP			Math I 8 CP	Introduction to Civil Law 4 CP
2	Algorithms I 6 CP			OR 9 CP	Stat 10 CP	Math II 8 CP	Commerical Law 9 CP
3	Theor. Inform. 7 CP	Applied Inform. 8 CP	BA 8 CP				Constitutional and Adminis-trative Law 6 CP
4	Computer Eng./ Software Eng. I 6 CP						
	Internship 8 CP						

Specialization Programme						
Semester						
Subject	INFO		BA/EC/OR			LAW	
5	Modules 18 CP	Seminar* 3 CP	BA-Module 9 CP	Module 9 CP	Seminar* 3 CP	Module 6 CP	Seminar* 3 CP
6	Bachelor Thesis 12 CP						
	180 CP (Core programme+ specialization programme + Bachelor thesis)						

Seminar*: 2 out of 3 Seminars have to be chosen.

Figure 1: Structure of Bachelor Programme in Information Engineering and Management

Based on a solid mathematical education, the modules of the first four terms of the Bachelor programme in information engineering and management are allocated in the proportion 40/40/20 to informatics (informatics, applied informatics, and computer engineering), economic sciences (business administration, economics, operations research), and law. The internship prepares the student for his profession. Table 1 shows the allocation of courses to modules and the curriculum for the first four terms.

ModulID	Course	Hours per week	CP
1st Term			
IW1BWL1	Business Administration: Finance and Accounting	2/0/2	4.0
IW1VWL	Economics I	3/0/2	5.0
IW1MATH1	Mathematics I	4/2/2	8.0
IW1INF1	Basic Notions of Computer Science	2/1/2	5.0
IW1INF1	Programming	2/0/2	5.0
IW1JURA1	Civil Law for Beginners	4/0	4.0
			31.0
2nd Term			
IW1BWL1	Introduction to Information Engineering and Management	2/0/2	4.0
IW1STAT	Statistics I	4/0/2	5.0
IW1OR	Introduction to Operations Research I	2/2/2	4.5
IW1MATH2	Mathematics II	4/2/2	8.0
IW2INF2	Algorithms I	3/1/2	6.0
IW1JURA2	Advanced Civil Law	2/0	3.0
			30.5
3rd Term			
IW1BWL2	Financial Accounting and Cost Accounting	2/2	4.0
IW1STAT	Statistics II	4/0/2	5.0
IW1OR	Introduction to Operations Research II	2/2/2	4.5
IW2INF3	Theoretical Foundation of Computer Science	3/1/2	7.0
IW1INF5	Applied Informatics I	2/1	4.0
IW1JURA2	Commercial and Corporate Law	2/0	3.0
IW1JURA3	Public Law I	2/0	3.0
			30.5
4th Term			
IW1BWL2	Business Administration: Production Economics and Marketing	2/0/2	4.0
IW1INF5	Applied Informatics II	2/1/1	4.0
IW2INF4/IW2INSWT1	Computer Engineering / Software Engineering I	3/1/2	6.0
IW1JURA3	Public Law II	2/0	3.0
IW1JURA2	Exercises in Civil Law	2/2/0	3.0
IW1PRAK	Internship		8.0
			28.0
			120.0

Table 1: Curriculum in the terms 1-4

In the 3rd year (5th and 6th term) of the Bachelor programme the student must pass

1. module(s) with 18 credits in informatics

2. a module with 9 credits in the subject Business Administration

3. a module with 9 credits in the subject BA/OR/EC,

4. a module with 6 credits in law,

5. two out of the three seminar modules with 3 credits each,

6. and the bachelor thesis with 12 credits.

2   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 (https://campus.studium.kit.edu/).

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

3 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.

Particularly modules and courses of the Department of Informatics may be updated after the editorial deadline. Please check our errata on http://www.wiwi.kit.edu/lehreMHB.php#mhb_aktuell or https://www.informatik.kit.edu/889.php for editorial changes.

IW3VWL - Statistical Applications of Financial Risk Management (S. 53)

Anmerkungen

This module will not be offered any more from winter term 2015/2016 on.

IW3VWL14 - Statistics and Econometrics (S. 54)

Anmerkungen

New module starting winter term 2015/2016. It replaces the old module "Statistical Applications of Financial Risk Management" [WW3STAT].

2595466 - Foundations of Digital Services (S. 141)

Anmerkungen

This course was formerly named "eServices".
The credits have been changed from 5 to 4,5.

2550491 - Seminar in Discrete Optimization (S. 234)

Erfolgskontrolle

The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).
The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.
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.

SemFBV1 - Seminar Risk and Insurance Management (S. 227)

Erfolgskontrolle

Oral presentation and written report of about 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 tasks delivered.

2560550 - Auction & Mechanism Design (S. 101)

Erfolgskontrolle

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
Students can earn a bonus to the final grade by successfully participating in the exercises.

SemPÖ1 - Seminar on Morals and Social Behavior (S. 224)

Erfolgskontrolle

Students write a seminar paper on an assigned topic (10 pages), present it in class and discuss results during seminar sessions. These three elements are graded individually. The seminar grade is the weighted average of these individual grades where the weighting is announced on the course syllabus.

2550550 - Analysis of multivariate Data (S. 92)

Anmerkungen

New course starting winter term 2015/2016.
The lecture is offered irregularly. The curriculum of the next three years is available online.

4 Modules of term 1-4

4.1 Informatics

Module: Foundations in Informatics [IW1INF1]

Coordination: M. Zitterbart
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24001	Basic Notions of Computer Science (p. 146)	2/1/2	W	5	T. Worsch
24004	Programming (p. 195)	2/0/2	W	5	R. Reussner, G. Snelting

Learning Control / Examinations
The assessment of this module consists of

1. Completion of *Basic Notions of Computer Science* [24001]

2. Completion of *Programming* [24004]

Assessment is described in the courses of this module. The overall grade is determined by weighting the grades from each course according to the number of credits.
Attention: This module is part of the so–called "orientation" examination according to §8 (1) of the examination regulation 2009. The examination for this module (including repetitions if necessary) must be passed until the end of the examination period of the third term in order not to be forced to drop out of the degree programme.

Conditions
None.

Qualification Goals
Students should learn

- methods of defining properties and how to read and understand definitions.

- the difference between syntax and semantics

- basic concepts of discrete mathematics and informatics and the ability to apply them to problem descriptions and proofs.

- basic structures of the programming language Java and how to apply them (in particular control and simple data structures, object orientation and implementation of basic algorithms) as well as basics of programming methodology

- the ability to autonomously write executable small to medium sized executable Java programs

Content
This module and the associated courses cover an introduction to foundations in informatics as well as basic programming skills with Java. Topics in „Grundbegriffe der Informatik" are for example algorithms, formal languages, definitions, relations, functions, graphs and syntax and semantics. The discussed concepts will be exemplified by the associated exercies. Programming covers the concepts and methodology of programming using the programming language Java.
Both courses come along with exercises which apply the theoretical knowledge and reinforce them.

Module: Algorithms I [IW2INF2]

Coordination: P. Sanders, D. Wagner, D. Hofheinz, H. Meyerhenke
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24500	Algorithms I (p. 87)	3/1/2	S	6	P. Sanders, H. Meyerhenke, D. Hofheinz

Learning Control / Examinations
The assessment of this module consists of a written exam (120 min) according to sec. 4 subsec. 2 no. 1 study and examination regulations.
The grade of the module corresponds to the grade of the written exam.

Conditions
None.

Qualification Goals
The student is supposed to

- know and understand basic, frequently used algorithms, their conception, analysis of their efficiency, implementation, documentation and application

- be able to use their comprehension to work on new algorithmic problems

- apply the knowledge acquired in the module Grundlagen der Informatik (B.Sc. Information Engineering and Management) to non-trivial algorithms

- apply the knowledge acquired in the module "Grundbegriffe der Informatik" (Bachelor Informatics) or in "Grundlagen der Informatik" (B.Sc. Information Engineering and Management) and the mathematical methodologies learned in the mathematics lectures to solve problems, the focus being on mathematical efficiency analysis

Content
The module provides basic algorithms and data structures.
The following topics are covered in particular:

- basic terms of algorithm engineering

- asymptotic algorithm analysis (worst case, average case, probabilistic, amortised)

- data structures like arrays, heaps, queues and linked lists

- hash tables

- sorting: comparsion based algorithms (e.g. mergesort, quicksort), lower border, radix sort

- sorted sequences, search trees and selection

- graphs (representation, traversing: breadth search, deep search, shortest path, spanning trees)

- generic optimisation algorithms (greedy, dynamic programming, systematic search, local search)

- geometric algorithms

Module: Theoretical Informatics [IW2INF3]

Coordination: D. Wagner, J. Müller-Quade
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24005	Theoretical Foundations of Computer Science (p. 259)	3/1/2	W	7	J. Müller-Quade, D. Wagner

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

Conditions
None.

Qualification Goals
The student

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

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

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

Module: Computer Engineering [IW2INF4]

Coordination: W. Karl
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24502	Computer Organization (p. 202)	3/1/2	S	6	T. Asfour, J. Henkel, W. Karl, Ömer Terlemez

Learning Control / Examinations
The assessment consists of a written examination (60 minutes) according to sec. 4 subsec. 2, no. 1 study and examination regulations.

Conditions
None.

Qualification Goals
The students are to be enabled to

- gain fundamental knowledge of computer organization, i.e. the architecture and the operation principle of computer systems,
- understand the relationship between hardware concepts and their effects on the software, in order to build efficient programs,
- comprehend the fundamental principles of the design process and being able to apply them, based on the understanding of the interdependencies of technology, computer concepts and applications,
- build up a computer from basic components.

Content
This course deals with the fundamentals of computer organisation; the instruction set architecture in conjunction with the discussion RISC – CISC; pipelining, pipeline constraints and methods for the resolution of pipeline conflicts; memory organization, cache memory; I/O system and interface modules; interrupt handling; bus systems; support of operating system functions: virtual memory management and protection mechanisms.

Module: Applied Informatics [IW1INF5]

Coordination: A. Oberweis
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics

ECTS Credits	Cycle	Duration
8	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2511030	Applied Informatics I - Modelling (p. 96)	2/1	W	4	A. Oberweis, Y. Sure-Vetter
2511032	Applied Informatics II - IT Systems for e-Commerce (p. 97)	2/1/1	S	4	J. Zöllner, N.N.

Learning Control / Examinations
See german version.

Conditions
None.

Recommendations
Knowledge of the module *Foundations in Informatics* [IW1INF1] as well as *Algorithms I* [IW2INF2] is expected.

Qualification Goals
The student should:

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

Content
The course Applied Informatics I [2511030] mainly adresses the early phases of the development of database-supported information systems, distributed systems for information services, intelligent systems and software systems in general. Main topics are modelling concepts and languages for describing application domains as well as static and dynamic aspects of early software system design. The course addresses in detail the following approaches: Entity-Relationship model, advanced aspects of UML, description logic, relational model, Petri nets, and event-driven process chains.
The course Applied Informatics II [2511032] covers various facets of electronic commerce which have to be supported by adequate and efficient distributed information systems. Key topics are middleware technologies and distributed application architectures. Document description and exchange (incl. XML), Java EE, Web technologies, and Web services are additional topics.

4.2   Business Administration

Module: Foundations in Business Administration [IW1BWL3]

Coordination: C. Weinhardt, M. Uhrig-Homburg
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Business Administration

ECTS Credits	Cycle	Duration
8	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2610026	Business Administration: Finance and Accounting (p. 107)	2/0/2	W	4	M. Ruckes, M. Uhrig-Homburg
2540490	Introduction to Information Engineering and Management (p. 129)	2/0/2	S	4	C. Weinhardt, A. Geyer-Schulz

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

Conditions
None.

Qualification Goals
The objectives of this module are that the student is capable of dealing with issues in finance, investments, accounting and information engineering and management.

Content
The institutional framework and the modelling and formal description of a company's decisions play an essential role in this module. The basic idea and the foundations of static and dynamic investment rules are presented and applied to problems in procurement and materials management as well as in logistics. Modern production processes for goods and services are systematically presented. Marketing research and knowledge of the range of marketing instruments are fundamental for decisions in a competitive market environment. The foundations of corporate finance are treated with a strong emphasis of the links to the capital market. Investment rules and corporate finance are instrumental for answering questions of source and application of funds, comparable to the lending and deposit business in banking. also an introduction to financial and management accoutning is provided. The organisation of company and the problems of management and control constitute an other important aspect of business administration and management science. Finally, the process of value creation and distribution as well as the principles of the taxation of a company are treated with an emphasis on the analysis of the profit and loss statement.

Two case studies, namely the foundation of an innovative information service company and the process chain of a B2B direct marketing company from the customer to the producer, focus on the interdisciplinary links between legal framework, advanced information technology, and the resulting design options for business processes.

Module: Foundations in Business Administration [IW1BWL1]

Coordination: C. Weinhardt, M. Uhrig-Homburg
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Business Administration

ECTS Credits	Cycle	Duration
8	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. 204)	2/2	W	4	J. Strych
2540490	Introduction to Information Engineering and Management (p. 129)	2/0/2	S	4	C. Weinhardt, A. Geyer-Schulz

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

Conditions
None.

Qualification Goals
The institutional framework and the modelling and formal description of a company's decisions play an essential role in this module. The basic idea and the foundations of static and dynamic investment rules are presented and applied to problems in procurement and materials management as well as in logistics. Modern production processes for goods and services are systematically presented. Marketing research and knowledge of the range of marketing instruments are fundamental for decisions in a competitive market environment. The foundations of corporate finance are treated with a strong emphasis of the links to the capital market. Investment rules and corporate finance are instrumental for answering questions of source and application of funds, comparable to the lending and deposit business in banking. The organisation of company and the problems of management and control constitute an other important aspect of business administration and management science. Finally, the process of value creation and distribution as well as the principles of the taxation of a company are treated with an emphasis on the analysis of the profit and loss statement.

Two case studies, namely the foundation of an innovative information service company and the process chain of a B2B direct marketing company from the customer to the producer, focus on the interdisciplinary links between legal framework, advanced information technology, and the resulting design options for business processes.

Content
The institutional framework and the modelling and formal description of a company's decisions play an essential role in this module. The basic idea and the foundations of static and dynamic investment rules are presented and applied to problems in procurement and materials management as well as in logistics. Modern production processes for goods and services are systematically presented. Marketing research and knowledge of the range of marketing instruments are fundamental for decisions in a competitive market environment. The foundations of corporate finance are treated with a strong emphasis of the links to the capital market. Investment rules and corporate finance are instrumental for answering questions of source and application of funds, comparable to the lending and deposit business in banking. The organisation of company and the problems of management and control constitute an other important aspect of business administration and management science. Finally, the process of value creation and distribution as well as the principles of the taxation of a company are treated with an emphasis on the analysis of the profit and loss statement.

Two case studies, namely the foundation of an innovative information service company and the process chain of a B2B direct marketing company from the customer to the producer, focus on the interdisciplinary links between legal framework, advanced information technology, and the resulting design options for business processes.

Remarks
The module *Foundations in Business Administration [IW1BWL1]* will not be offered from winter semester 2012/13. It will be replaced by module Foundations in Business Administration [IW1BWL3]. Students who have already been enrolled in the summer semester 2012 can complete the module.

Module: Business Administration [IW1BWL4]

Coordination: C. Weinhardt, M. Uhrig-Homburg
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Business Administration

ECTS Credits	Cycle	Duration
8	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. 204)	2/2	W	4	J. Strych
2600024	Business Administration: Production Economics and Marketing (p. 108)	2/0/2	S	4	M. Ruckes, W. Fichtner, M. Klarmann, Th. Lützkendorf, F. Schultmann

Learning Control / Examinations
The assessments of the courses are written examinations (90 minutes each) according to §4(2), 1 of the examination regulation. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
None.

Recommendations
It is highly recommended to fulfil this module only after completing the module *Foundations in Business Administration* [IW1BWL1].

Qualification Goals
The student should be able to

- deal with advanced topics in accounting,

- describe the impacts and features of marketing instruments,

- knows the problem formulation and theories of production management, including the areas of energy, construction, real-estate and ergonomics,

- evaluate information as a competitive factor and is in control of the terminology and the methods to asses information.

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

Module: Business Administration [IW1BWL2]

Coordination: C. Weinhardt, M. Uhrig-Homburg
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Business Administration

ECTS Credits	Cycle	Duration
8	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2610026	Business Administration: Finance and Accounting (p. 107)	2/0/2	W	4	M. Ruckes, M. Uhrig-Homburg
2600024	Business Administration: Production Economics and Marketing (p. 108)	2/0/2	S	4	M. Ruckes, W. Fichtner, M. Klarmann, Th. Lützkendorf, F. Schultmann

Learning Control / Examinations
The assessments of the courses are written examinations (90 minutes each) according to §4(2), 1 of the examination regulation. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
None.

Recommendations
It is highly recommended to fulfil this module only after completing the module *Foundations in Business Administration* [IW1BWL1].

Qualification Goals
The student should be able to

- formulate, asses and chose strategies , and is in control of the terminology, the goals and the requirements of organisational management,

- know three kinds of information asymmetry in organisations and their implications on the desing of contracts,

- know the basics of the capital market theory and methods of business financing,

- know the notions, functions, areas and tools of controlling,

- describe the impacts and features of marketing instruments,

- knows the problem formulation and theories of production management, including the areas of energy, construction, real-estate and ergonomics,

- evaluate information as a competitive factor and is in control of the terminology and the methods to asses information.

Content
The institutional framework and the modelling and formal description of a company's decisions play an essential role in this module. This module contains problems in procurement and materials management as well as in logistics. Modern production processes for goods and services are systematically presented. Marketing research and knowledge of the range of marketing instruments are fundamental for decisions in a competitive market environment. The foundations of corporate finance are treated with a strong emphasis of the links to the capital market. Investment rules and corporate finance are instrumental for answering questions of source and application of funds, comparable to the lending and deposit business in banking. The organisation of company and the problems of management and control constitute an other important aspect of business administration and management science. Finally, the process of value creation and distribution as well as the principles of the taxation of a company are treated with an emphasis on the analysis of the profit and loss statement.

Remarks
The module *Business Administration [IW1BWL2]* will not be offered from winter semester 2012/13. It will be replaced by module Business Administration [IW1BWL4]. Students who have already been enrolled in the summer semester 2012 can complete the module.

4.3 Economics

Module: Economics [IW1VWL]

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

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2610012	Economics I: Microeconomics (p. 263)	3/0/2	W	5	C. Puppe, P. Reiss

Learning Control / Examinations
The assessment of the module is a written examination according to §4(2), 1 of the examination regulation.
The grade of the module corresponds to the grade of this examination.
Additionally, there **can** be a midterm written examen where students can improve their grades in the final examen.
Attention: This module is part of the Orientierungsprüfung according to §10 (1), SPO 2009 resp. §8 (1) SPO 2005. The examen needs to be passed until the end of the examination period of the second semester or in case of repetition until the the end of the examination period of the third semester.

Conditions
None.

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

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

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

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

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

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

4.4 Operations Research

Module: Introduction to Operations Research [IW1OR]

Coordination: S. Nickel, O. Stein, K. Waldmann
Degree programme: Informationswirtschaft (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. 126)	2/2/2	S	4,5	S. Nickel, O. Stein, K. Waldmann
2530043	Introduction to Operations Research II (p. 127)	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].

Qualification Goals
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.

4.5 Statistics

Module: Statistics [IW1STAT]

Coordination: W. Heller
Degree programme: Informationswirtschaft (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. 252)	4/0/2	S	5	W. Heller
2610020	Statistics II (p. 253)	4/0/2	W	5	W. Heller

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
None.

Recommendations
To some extend knowledge of the content of the module Mathematics is assumed. Therefore it is advisable to pass the course *Mathematik I für Informationswirtschaft* [01360] before attending the module *Statistics* [IW1STAT].
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.

Qualification Goals
See German version.

Content
The module contains the fundamental methods and scopes of Statistics.
A. Descriptive Statistics: univariate und bivariate analysis
B. Probability Theory: probability space, conditional and product probabilities, transformation of probabilities, parameters of location and dispersion, most 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)

4.6   Law

Module: Introduction to Civil Law [IW1JURA1]

Coordination: T. Dreier
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Law

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24012	Civil Law for Beginners (p. 109)	4/0	W	4	T. Dreier, O. Knöfel

Learning Control / Examinations
The assessment of this module consists of a written examination according to § 4(2), 1 of the examination regulation.
The grade of the module is the grade of the written examination.

Conditions
None.

Qualification Goals
The student

Content
The module genrally introduces 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.

Module: Commercial Law [IW1JURA2]

Coordination: Z. (ZAR)
Degree programme: Informationswirtschaft (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)
24504	Advanced Civil Law (p. 110)	2/0	S	3	T. Dreier
24011	Commercial and Corporate Law (p. 148)	2/0	W	3	Z. (ZAR), O. Knöfel
24506	Exercises in Civil Law (p. 192)	2/0	W/S	3	T. Dreier

Learning Control / Examinations

Conditions
None.

Qualification Goals
The student

- possesses in-depth knowledge of the general and specific law of obligations and of property law;

- is able to penetrate the interaction of the statutory provisions of the German Civil Code (different types of contracts and the respective rules on liability; performance; impairment of performance; the different ways by which property may be transferred and the *in rem* security rights) and of commercial and company law (especially in respect of the peculiarities of commercial transactions, commercial agency, the law of merchants as well as German law of business organizations);

- in the Private Law Exercises ("Privatrechtliche Übung") gains the skill to solve legal problems using legal methods.

Content
The module is based on the module "Introduction in Civil Law". The students get profound Knowledge in special contract types of the German Civil Law as well as in complex constructions in business law. In addition to that the module wants to impart the competence in solving legal problems with legal methods.

Module: Constitutional and Administrative Law [IW1JURA3]

Coordination: G. Sydow
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Law

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24016	Public Law I - Basic Principles (p. 176)	2/0	W	3	G. Sydow
24520	Public Law II - Public Economic Law (p. 177)	2/0	S	3	G. Sydow

Learning Control / Examinations
The assessment of this module consists of a written examination according to § 4(2), 1 of the examination regulation for each course.
The grade of the module is the average of the single grades weighted by the related credit points.

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)

- The course *Public Law I* [24016] should be attend before the course *Public Law II* [24520].

Qualification Goals
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

4.7   Mathematics

Module: Mathematics I [IW1MATH1]

Coordination: C. Wieners
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Mathematics

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
01360	Mathematics I for Information Engineering and Management (p. 165)	4/2/2	W	8	A. Rieder, C. Wieners

Learning Control / **Examinations**
The assessment in this module consists of

1. a graded certificate of exercise following §4(2), 3 of the examination regulation from the exercises to mathematics I (1 credit) and

2. a written examination of 60 minutes on the lectures mathematics I following §4(2), 1 of the examination regulations (7 credits).

The grade of the module is computed as a weighted sum, where the grade of the written examiniation has a weight of 80% and the certificate a weight of 20%.

Conditions
None.

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

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

The provides the foundations for

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

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

Remarks
None.

Module: Mathematics II [IW1MATH2]

Coordination: C. Wieners
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Mathematics

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
01877	Mathematics II for Information Engineering and Management (p. 166)	4/2/2	S	8	A. Rieder, C. Wieners

Learning Control / Examinations
The assessment in this module consists of

1. a graded certificate of exercise following §4(2), 3 of the examination regulation from the exercises to mathematics II and

2. a written examination of 60 minutes on the lectures mathematics II following §4(2), 1 of the examination regulations.

The grade of the module is computed as a weighted sum, where the grade of the written examiniation has a weight of 80% and the certificate a weight of 20%.

Conditions
None.

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

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

The provides the foundations for

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

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

5 Modules of term 5-6

5.1 Law

Module: Intellectual Property and Data Protection [IW3JURA]

Coordination: T. Dreier
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Law (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24070	Industrial Property and Copyright Law (p. 143)	2/0	W	3	T. Dreier
24018	Data Protection Law (p. 120)	2/0	W	3	G. Sydow

Learning Control / Examinations

Conditions
From the law modules in the core programme, *Introduction to Civil Law* [IW1INJURA1], *Commercial Law* [IW1INJURA2], and *Constitutional and Administrative Law* [IW1INJURA2], 2 out of 3 have to be completed successfully.

Qualification Goals

Content
Building onto what the students have learned in law during the first two years of Bachelor studies, the module *Law* in the third Bachelor years has the purpose of both deepening and specialising the legal studies in areas of practical importance for information economics and management...

5.2   Business Administration

Module: eBusiness and Service Management [IW3BWLISM1]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2595466	Foundations of Digital Services (p. 141)	2/1	S	4,5	C. Weinhardt, H. Fromm
2590452	Management of Business Networks (p. 160)	2/1	W	4,5	C. Weinhardt
2540454	eFinance: Information Engineering and Management for Securities Trading (p. 125)	2/1	W	4,5	C. Weinhardt
2540498	Special Topics in Information Engineering & Management (p. 245)	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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals

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 [IW3BWLISM2]

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

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. 160)	2/1	W	4,5	C. Weinhardt
2540496	Management of Business Networks (Introduction) (p. 161)	2	W	3	C. Weinhardt
2550486	Facility Location and Strategic Supply Chain Management (p. 250)	2/1	W	4,5	S. Nickel
2118078	Logistics - organisation, design and control of logistic systems (p. 159)	3/1	S	6	K. Furmans
2550488	Tactical and Operational Supply Chain Management (p. 257)	2/1	S	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
At least one of the courses *Management of Business Networks [2590452]* and *Management of Business Networks (Introduction) [2540496]* has to be taken.
Successful completion of the modules in semester 1–4 except for up to two modules. The module Internship [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Recommendations
None.

Qualification Goals
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 [IW3BWLISM3]

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

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. 125)	2/1	W	4,5	C. Weinhardt
2530550	Derivatives (p. 121)	2/1	S	4,5	M. Uhrig-Homburg
2530296	Exchanges (p. 111)	1	S	1,5	J. Franke
2530570	International Finance (p. 153)	2	S	3	M. Uhrig-Homburg, Dr. 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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
The course *eFinance: Information Engineering and Management for Securities Trading* [2540454] is compulsory and must be examined.

Qualification Goals
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 [IW3BWLISM4]

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

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. 113)	2/1	W	4,5	A. Geyer-Schulz
2540522	Analytical CRM (p. 94)	2/1	S	4,5	A. Geyer-Schulz
2540520	Operative CRM (p. 178)	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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals
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* [IW3BWLISM4] 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.

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

Module: Specialization in Customer Relationship Management [IW3BWLISM5]

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

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. 94)	2/1	S	4,5	A. Geyer-Schulz
2540520	Operative CRM (p. 178)	2/1	W	4,5	A. Geyer-Schulz
2561204	Competition in Networks (p. 267)	2/1	W	4,5	K. Mitusch
2595466	Foundations of Digital Services (p. 141)	2/1	S	4,5	C. Weinhardt, H. Fromm

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 modules in semester 1–4 except for up to two modules is required. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

- It is only possible to choose this module in combination with the module *CRM and Servicemanagement* [IW3BWLISM4]. 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.

Qualification Goals
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, . . .)

Remarks

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

Module: Strategy and Organization [IW3BWLUO1]

Coordination: H. Lindstädt
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Business Administration (Specialization)

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. 261)	2/0	S	3.5	H. Lindstädt
2577902	Managing Organizations (p. 182)	2/0	W	3.5	H. Lindstädt
2577910	Problem solving, communication and leadership (p. 193)	1/0	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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals
See German version.

Content

Module: Industrial Production I [IW3BWLIIP1]

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

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. 147)	2/2	S	5,5	F. Schultmann
2581960	Production Economics and Sustainability (p. 194)	2/0	W	3,5	M. Fröhling
2581996	Logistics and Supply Chain Management (p. 158)	2/0	S	3,5	M. Wiens

Learning Control / Examinations
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course "Fundamentals of Production Management" [2581950] and one further single course of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
Specific precondition "Information Engineering and Management" (B.Sc.): Successful passing of all modules in semesters 1-4 (keys [IW1. . .]) with at maximum two modules left to complete, not considering the internship [IW1EXPRAK] and "Business and Public Law" [IW1INJURA] modules.
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].

Qualification Goals

- 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.

Module: Energy Economics [IW3BWLIIP2]

Coordination: W. Fichtner
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Business Administration (Specialization)

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. 128)	2/2	S	5,5	W. Fichtner
2581012	Renewable Energy – Resources, Technology and Economics (p. 205)	2/0	W	3,5	R. McKenna
2581005	Corporate Governance in Energy Economics (p. 260)	2/0	S	3,5	H. Villis
2581959	Energy Policy (p. 133)	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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
The lecture *Introduction into Energy Economics* [2581010] has to be examined.

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

Qualification Goals
The student

- is able to understand interdependencies in energy economics and to evaluate ecological impacts in energy supply,

- is able to assess the different energy carriers and their characteristics,

- knows the energy political framework conditions,

- gains knowledge about new market-based conditions and the cost and potentials of renewable energies in particular.

Content
Introduction to Energy Economics: Characterisation (reserves, suppliers, cost, technologies) of different energy carriers (coal, gas, oil, electricity, heat etc.)
Renewable Energy - Resources, Technology and Economics: Characterisation of different renewable energy carriers (wind, solar, hydro, geothermal etc.)
Corporate Governance in Energy Economics: Challenges of the management of a large company in energy economics (superior leadership role, structures, processes and projects from a leadership perspective etc.)
Energy Policy: Management of energy flows, energy-political targets and instruments (emission trading etc.)

Remarks
Upon request, the authorisation for taking the examinations for modules of specialisation can be granted by the examination committee even if the mentioned conditions are not fulfilled. The approving statement of the coordinator of the module of specialisation claimed on the application form is not required for the module Energy Economics [TVWLIIP2]. The application form has to be submitted to the examination committee of the faculty along with a current transcript of records (e.g. via letterbox). Upon request at the institute, additional recognition of studies (e.g. from other universities) is possible in the module.

Module: Essentials of Finance [IW3BWLFBV1]

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

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. 155)	2/1	S	4,5	M. Uhrig-Homburg
2530216	Financial Management (p. 138)	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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals
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: Topics in Finance I [IW3BWLFBV5]

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

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	Cost and Management Accounting (p. 154)	2/1	S	4,5	T. Lüdecke
2530232	Financial Intermediation (p. 139)	3	W	4,5	M. Ruckes
2530550	Derivatives (p. 121)	2/1	S	4,5	M. Uhrig-Homburg
2530296	Exchanges (p. 111)	1	S	1,5	J. Franke
2530299	Business Strategies of Banks (p. 142)	2	W	3	W. Müller
2530570	International Finance (p. 153)	2	S	3	M. Uhrig-Homburg, Dr. Walter
2540454	eFinance: Information Engineering and Management for Securities Trading (p. 125)	2/1	W	4,5	C. Weinhardt
2560129	Specific Aspects in Taxation (p. 249)	3	W	4,5	B. Wigger, Armin Bader
2530219	Asset Management (p. 100)	2	W	3	A. Sauer

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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
It is only possible to choose this module in combination with the module *Essentials in Finance* [IW3BWLFBV1]. The module is passed only after the final partial exam of *Essentials in Finance* is additionally passed.

Qualification Goals
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: Risk and Insurance Management [IW3BWLFBV3]

Coordination: U. Werner
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Business Administration (Specialization)

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. 191)	3/0	S	4,5	U. Werner
2530326	Enterprise Risk Management (p. 135)	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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals
See German version.

Content
See German version.

Module: Design, Construction and Sustainability Assessment of Buildings [IW3BWLOOW1]

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

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)
2586404	Design and Construction of Buildings (p. 105)	2/1	W	4,5	T. Lützkendorf
2585404	Sustainability Assessment of Buildings (p. 106)	2/1	S	4,5	T. Lützkendorf

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 modules in semester 1–4 except for up to two modules. The module Internship [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Recommendations
The combination with the module *Real Estate Management* [IW3BWLOOW2] 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.

Qualification Goals
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 [IW3BWLOOW2]

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

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)
2586400	Real Estate Management I (p. 200)	2/2	W	4,5	T. Lützkendorf
2585400	Real Estate Management II (p. 201)	2/2	S	4,5	T. Lützkendorf

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 modules in semester 1–4 except for up to two modules. The module Internship [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Recommendations
The combination with the module *Design Constructions and Assessment of Green Buildings* [IW3BWLOOW1] 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.

Qualification Goals
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 [IW3BWLMAR]

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

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. 162)	2/1	W	4,5	B. Neibecker
2571152	Managing the Marketing Mix (p. 164)	2/1	S	4,5	M. Klarmann
2572158	Services Marketing and B2B Marketing (p. 122)	2	W	3	M. Klarmann, J. Kim
2572155	International Marketing (p. 152)	1	W	1,5	M. Klarmann

Learning Control / Examinations

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

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

Conditions

Successful completion of the modules in semester 1–4 except for up to two modules. The module Internship [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
The course *Marketing Mix* is compulsory and must be examined.

Qualification Goals

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

Content

The core course of the module is "Marketing Mix". This course is compulsory and must be examined. "Marketing Mix" contains instruments and methods that enable you to goal-oriented decisions in the operative marketing management (product management, pricing, promotion and sales management).
To deepen the marketing knowledge students can complete the module in two ways:

   • by choosing the course "Brand Management".

   • by choosing the combination of the courses "Services- and B2B-Marketing" and "International Marketing".

Remarks

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

Module: Human Resources and Organizations [IW3BWLIAP2]

Coordination: P. Nieken
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Business Administration (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2573001	Personnel Policies and Labor Market Institutions (p. 184)	2/1	S	4,5	P. Nieken
253003	Human Resource Management (p. 183)	2/1	W	4,5	P. Nieken

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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Recommendations
Completion of module Business Administration is recommended.
Basic knowledge of microeconomics, game theory and statistics is recommended.

Qualification Goals
The student

- knows and analyzes basic concepts, instruments, and challenges of present human resource and organizational management.

- uses the techniques he / she has learned to evaluate strategic situations which occur in human resource management.

- knows the relevant labor market institutions and can explains their tasks.

- has basic knowledge of fit and challenges of different scientific methods in the context of personnel and organizational economics.

Content
Students' acquire basic knowledge in the field of human resource and organizational management. Strategic as well as operative aspects of human resource management practices are analyzed. The students learn to apply methods and instruments to plan, select, and manage staff. Labor market institutions and selected aspects of personnel politics are examined and evaluated.
The focus lies on the strategic analysis of decisions and the use microeconomic or behavioral approaches. Empirical results of field or lab studies are discussed critically.

Remarks
This module has been added summer 2015.

5.3 Economics

Module: Economic Theory [IW3VWL12]

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

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2520525	Introduction to Game Theory (p. 131)	2/1	S	4,5	C. Puppe, P. Reiss
252517	Welfare Economics (p. 270)	2/1	S	4,5	C. Puppe
2560238	Industrial Organization (p. 149)	2/1	S	4,5	P. Reiss
2520527	Advanced Topics in Economic Theory (p. 85)	2/1	S	4,5	M. Hillebrand, K. Mitusch
2560550	Auction & Mechanism Design (p. 101)	2/1	S	4,5	N. Szech
2560137	Economics and Behavior (p. 123)	2/1	W	4,5	N. Szech

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 modules in semester 1–4 except for up to two modules. The module Internship [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals
See German version.

Content

Module: Applied Microeconomics [IW3VWL13]

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

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2520525	Introduction to Game Theory (p. 131)	2/1	S	4,5	C. Puppe, P. Reiss
2560238	Industrial Organization (p. 149)	2/1	S	4,5	P. Reiss
2561204	Competition in Networks (p. 267)	2/1	W	4,5	K. Mitusch
2560120	Public Revenues (p. 175)	2/1	S	4,5	B. Wigger, Assistenten
2560550	Auction & Mechanism Design (p. 101)	2/1	S	4,5	N. Szech
2560137	Economics and Behavior (p. 123)	2/1	W	4,5	N. Szech
2520365	Decision Theory (p. 136)	2/1	S	4,5	K. Ehrhart

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 modules in semester 1–4 except for up to two modules. The module Internship [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Recommendations

None.

Qualification Goals

Students

- are introduced to the basic theoretical analysis of strategic interaction situations and shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings, (course „Introduction to Game Theory");

- are exposed to the basic problems of imperfect competition and its implications for policy making; (course „Industrial Organization");

- are provided with the basic economics of network industries (e.g., telecom, utilities, IT, and transport sectors) and should get a vivid idea of the special characteristics of network industries concerning planning, competition, competitive distortion, and state intervention, (course "Competition in Networks").

Content

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

Remarks

Starting summer term 2015, the lecture "Decision Theory" [2520365] can be chosen in the module.

5.4 Statistics

Module: Statistical Applications of Financial Risk Management [IW3VWL]

Coordination: M. Schienle, O. Grothe
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Economics (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2521325/2521326	Statistics and Econometrics in Business and Economics (p. 251)	2/2	W	4,5	W. Heller
2520016	Economics III: Introduction in Econometrics (p. 264)	2/2	S	5	M. Schienle
2550550	Analysis of multivariate Data (p. 92)	2/2	W	4,5	O. Grothe

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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

The lecture *Statistics and Econometrics in Business and Economics* has to be taken.

Qualification Goals

See German version.

Content

Remarks

This module will not be offered any more from winter term 2015/2016 on.

Module: Statistics and Econometrics [IW3VWL14]

Coordination: M. Schienle, O. Grothe
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Economics (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2520016	Economics III: Introduction in Econometrics (p. 264)	2/2	S	5	M. Schienle
2550550	Analysis of multivariate Data (p. 92)	2/2	W	4,5	O. Grothe
2520022	Financial Econometrics (p. 137)	2/2	W	4,5	M. Schienle
2521350	Statistical Modeling of generalized regression models (p. 254)	2/2	W	4,5	W. Heller
2520375	Data Mining and Applications (p. 115)	2	S	4,5	G. Nakhaeizadeh

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 modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
The course "*Economics III: Introduction in Econometrics*" *[2520016]*is compulsory and must be examined.

Qualification Goals
The student

- shows an advanced understanding of Econometric techniques and statistical model building.

- is able to develop Econometric models for applied problems based on available data

- is able to apply techniques and models with statistical software, to interpret results and to judge on different approaches with appropriate statistical criteria.

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

Remarks
New module starting winter term 2015/2016. It replaces the old module "Statistical Applications of Financial Risk Management" [IW3VWL].

5.5 Operations Research

Module: Applications of Operations Research [IW3OR5]

Coordination: S. Nickel
Degree programme: Informationswirtschaft (B.Sc.)
Subject: OR (Specialization)

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. 250)	2/1	W	4,5	S. Nickel
2550488	Tactical and Operational Supply Chain Management (p. 257)	2/1	S	4,5	S. Nickel
2550490	Software Laboratory: OR Models I (p. 241)	1/2	W	4,5	S. Nickel
2550134	Global Optimization I (p. 144)	2/1	W	4,5	O. Stein
2550662	Simulation I (p. 239)	2/1/2	W/S	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

Successful completion of the modules from terms 1-4 except for at most two modules. The module *internship* [IW1EXPRAK] as well as modules of *Law* [IW1JURA1,2,3] are not considered.
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.

Qualification Goals

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 [IW3OR6]

Coordination: O. Stein
Degree programme: Informationswirtschaft (B.Sc.)
Subject: OR (Specialization)

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. 173)	2/1	S	4,5	O. Stein
2550113	Nonlinear Optimization II (p. 174)	2/1	S	4,5	O. Stein
2550134	Global Optimization I (p. 144)	2/1	W	4,5	O. Stein
2550136	Global Optimization II (p. 145)	2/1	W	4,5	O. Stein
2550486	Facility Location and Strategic Supply Chain Management (p. 250)	2/1	W	4,5	S. Nickel
2550679	Markov Decision Models I (p. 255)	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.
The lecture *Stochastische Entscheidungsmodelle I* [2550679] cannot be examined.

Qualification Goals
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 [IW3OR7]

Coordination: K. Waldmann
Degree programme: Informationswirtschaft (B.Sc.)
Subject: OR (Specialization)

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. 255)	2/1/2	W	5	K. Waldmann
2550682	Markov Decision Models II (p. 256)	2/1/2	S	4,5	K. Waldmann
2550662	Simulation I (p. 239)	2/1/2	W/S	4,5	K. Waldmann
2550665	Simulation II (p. 240)	2/1/2	W/S	4,5	K. Waldmann
2550111	Nonlinear Optimization I (p. 173)	2/1	S	4,5	O. Stein
2550488	Tactical and Operational Supply Chain Management (p. 257)	2/1	S	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
Succesful completion of the modules in semester 1-4 except for up to two modules.
The module Internship [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
The course Simulation I [2550662] has to be attended.
The course Markov Decision Models [2550679] cannot be examined.

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

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

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

5.6   Informatics

Module: Semantic Knowledge Management [IW3INAIFB2]

Coordination: R. Studer
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2511300	Knowledge Management (p. 269)	2/1	W	4	R. Studer
25860sem	Special Topics of Knowledge Management (p. 248)	2/1	W/S	5	R. Studer
2511210	Business Process Modelling (p. 169)	2/1	W	5	A. Oberweis
25070p	Advanced Lab Applied Informatics (p. 185)	2	W/S	4	A. Oberweis, H. Schmeck, R. Studer
25070s	Seminar in Applied Informatics (p. 207)	2	W/S	3	A. Oberweis, H. Schmeck, R. Studer
2511310	Semantic Web Technologies (p. 206)	2/1	S	5	R. Studer, A. Harth

Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
Lecture *Semantic Web Technologien [2511310]* is mandatory.

Qualification Goals
Students

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

Content
In modern companies the availability and usability of knowledge is an essential factor of success for central managerial tasks and duties such as the improvement of business processes, product innovation and the amelioration of customer satisfaction. This module illustrates the typical problems of knowledge management in organizations and presents IT methods to approach these questions. The relevant groups of knowledge management systems are analyzed and expanded in the subject areas knowledge representation/semantic modeling and document management/groupware systems.

Module: Semantic Web and Applications [IW3INAIFB3]

Coordination: R. Studer
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
8	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25070s	Seminar in Applied Informatics (p. 207)	2	W/S	3	A. Oberweis, H. Schmeck, R. Studer
2511310	Semantic Web Technologies (p. 206)	2/1	S	5	R. Studer, A. Harth

Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals
The student

- understands the koncepts behind Semantic Web and Linked Data technologies
- develops ontologies to be employed in semantic web-based applications and chooses suitable representation languages,
- is familiar with approaches in the area of knowledge representation and modelling,
- is able to transfer the methods and technologies of semantic web technologies to new application sectors,
- evaluates the potential of semantic web for new application sectors,
- understands the challenges in the areas of Data and system integration on the web is able to develop solutions.

Content

Module: Information Services in Networks [IW3INAIFB4]

Coordination: H. Schmeck
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2511102	Algorithms for Internet Applications (p. 91)	2/1	W	5	H. Schmeck
24124	Web Engineering (p. 265)	2/0	W	4	H. Hartenstein, M. Nußbaumer
xIDLp	Practical Course Internet Services (p. 188)	4	W/S	4	H. Schmeck, W. Tichy, R. Studer, H. Hartenstein
24074	Data and Storage Management (p. 114)	2	W	3	B. Neumair
2400004	Integrated Network and Systems Management (p. 151)	2	S	3	B. Neumair
2511310	Semantic Web Technologies (p. 206)	2/1	S	5	R. Studer, A. Harth

Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Conditions
None.

Qualification Goals

Content

Module: Algorithms and Applications [IW3INAIFB5]

Coordination: H. Schmeck
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2511100	Efficient Algorithms (p. 124)	2/1	S	5	H. Schmeck
2511102	Algorithms for Internet Applications (p. 91)	2/1	W	5	H. Schmeck
2590458	Computational Economics (p. 112)	2/1	W	4,5	P. Shukla, S. Caton
2511106	Nature-inspired Optimisation Methods (p. 171)	2/1	S	5	P. Shukla
2511104	Organic Computing (p. 180)	2/1	S	5	H. Schmeck
25700sp	Special Topics of Efficient Algorithms (p. 247)	2/1	W/S	5	H. Schmeck
25700p	Advanced Lab in Efficient Algorithms (p. 187)	3	W/S	4	H. Schmeck

Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Conditions
None.

Qualification Goals
The student

- gets comprehensive knowlegde about different application areas of algorithms

- acquires knowledge and capabilities for systematic design, evaluation, and improvement of algorithms in different scientific and technical contexts and by reasonable utilization of available resources

- can transfer the acquired knowledge about algorithms from original environments into new contexts

Content
Algorithms have a broad range of applications in various scientific and technical contexts. The courses of this module provide a detailed insight into different application areas of algorithms and into the effective and efficient use of available computing infrastructures. The Modul focuses on classic problem settings in information processing as well as in optimisation and economics.

Module: Business Processes and Information Systems [IW3INAIFB8]

Coordination: A. Oberweis
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2511204	Workflow-Management (p. 271)	2/1	S	5	A. Oberweis
2511210	Business Process Modelling (p. 169)	2/1	W	5	A. Oberweis
2511600	Enterprise Architecture Management (p. 134)	2/1	W	5	T. Wolf
2511216	Capability maturity models for software and systems engineering (p. 262)	2	S	4	R. Kneuper
PraBI	Computing Lab Information Systems (p. 186)	2	W/S	4	A. Oberweis, R. Studer
Platzhalter	Special Topics of Applied Informatics (p. 246)	2/1	W/S	5	A. Oberweis, H. Schmeck, R. Studer

Learning Control / Examinations

The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Conditions

At least one of the courses Workflowmangement [2511204] or *Modellierung von Geschäftsprozessen* [2511210] has to be attended.
Successful completion of the modules in semester 1–4 except for up to two modules. The module Internship [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals

Students

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

Content

Modeling the relevant aspects of a business process is the basis for efficient and effective support of this process in an enterprise information system.Detailed knowledge of languages, methods and software tools for supporting business process modeling is taught in this module.
Additionally fundamentals of software quality management are considered in this module. Maturity models like CMMI or SPICE for evaluation and improvement of a software development process are introduced.

Remarks

Starting summ term 2015, the new course *"Special Topics of Applied Informatics"* replaces the old course *"Special Topics of Enterprise Information Systems"*

Module: Introduction to Data and Information Management [IW3INGDI]

Coordination: K. Böhm
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24114	Big Data Analytics (p. 93)	2/1	W	5	K. Böhm, E. Müller
2400020	Deployment of Database Systems (p. 117)	2/1	W	5	K. Böhm
24605	Data Privacy Protection in Interconnected Information Systems (p. 119)	2	S	3	K. Böhm
PLV	Selling IT-Solutions Professionally (p. 190)	2	W/S	1,5	K. Böhm, Hellriegel
PUB	Consulting in Practice (p. 189)	2	W/S	1,5	K. Böhm, Stefan M. Lang
2400005	Project Management in Practice (p. 196)	2	W/S	1,5	K. Böhm, W. Schnober
24111	Mechanisms and Applications of Workflow Systems (p. 157)	3	W	5	J. Mülle, Silvia von Stackelberg
24317	(p. 98)	2	W	4	K. Böhm
24516	Database Systems (p. 118)	2/1	S	4	K. Böhm

Learning Control / Examinations

Conditions
None.

Qualification Goals
The students

- see the necessity of specialised systems for information and data management and are able to define and deploy decision criteria for purchasing such software,

- are aware of the fundamental approaches in information and database systems and are able to judge their potential applications,

- understand database applications and develop simple database applications on their own,

- are able to communicate at a professional level about technical aspects of information and knowledge management

Content
This module aims at exposing students to modern information and database systems. Beyond fundamental theory and concepts, this module covers the deployment of such technology.

Module: Foundations of Information Systems [IW3INGIS]

Coordination: K. Böhm
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
10	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24114	Big Data Analytics (p. 93)	2/1	W	5	K. Böhm, E. Müller
2400020	Deployment of Database Systems (p. 117)	2/1	W	5	K. Böhm
24605	Data Privacy Protection in Interconnected Information Systems (p. 119)	2	S	3	K. Böhm
PLV	Selling IT-Solutions Professionally (p. 190)	2	W/S	1,5	K. Böhm, Hellriegel
PUB	Consulting in Practice (p. 189)	2	W/S	1,5	K. Böhm, Stefan M. Lang
2400005	Project Management in Practice (p. 196)	2	W/S	1,5	K. Böhm, W. Schnober
24522	(p. 266)	0/1	S	1	K. Böhm
24111	Mechanisms and Applications of Workflow Systems (p. 157)	3	W	5	J. Mülle, Silvia von Stackelberg
24317	(p. 98)	2	W	4	K. Böhm

Learning Control / Examinations

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
At least one of the lectures *Data Warehousing and Mining*, *Deployment of Database Systems*, *Mechanisms and Applications of Workflow Systems* has to be taken.

Recommendations
It is recommended to take this module after completition of the module *Communication and Database Systems* [IW3INKD].

Qualification Goals
The students

- see the necessity of specialised systems for information management and are able to define and deploy decision criteria for purchasing such software,

- are aware of the fundamental approaches in information systems and are able to judge their potential applications,

- understand database applications and develop simple database applications on their own,

- are able to communicate at a professional level about technical aspects of information and knowledge management.

Content
This module aims at exposing students to modern information systems. Beyond fundamental theory and concepts, this module covers the deployment of such technology.

Remarks
The courses in this module are offered irregularly, however, the exam can be taken anytime.

Module: Communication and Database Systems [IW3INKD]

Coordination: K. Böhm, M. Zitterbart
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24516	Database Systems (p. 118)	2/1	S	4	K. Böhm
24519	Introduction in Computer Networks (p. 132)	2/1	S	4	M. Zitterbart

Learning Control / Examinations
The assessment of the lecture *Introduction in Computer Networks* consists of a written exam according to section 4 subsection 2 no. 1 study and examination regulations.
The assessment of the lecture *Database Systems* consists of a written exam according to section 4 subsection 2 no. 1 study and examination regulations.
The grade of the module is the average of the single grades weighted with the related credit points and cut off after the first decimal place.

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Recommendations
Knowledge of the lecture *Software Engineering I* is recommended.

Qualification Goals
The students will

- have learned fundamentals of data communication as well as the design of communication systems,
- be familiar with the composition of the different protocols and their mechanisms and be able to design simple protocols on their own,
- have understood the relationships between the different communication layers,
- be able to explain the benefits of database technology at the end of the course,
- have understood the development of database applications and be able to set up and access simple databases,
- be familiar with the terminology and the underlying database theory.

Content
Distributed information systems are worldwide information repositories which are accessible by everybody at any place of the world at any time. The physical distance is bridged by telecommunication systems, while database management technology manages and coordinates data for arbitrary periods of time. In order to understand globally running processes, one has to understand both data transmission techniques and database technology. Besides the telecommunication and database technologies on their own, an understanding of their cooperation is required, too.

Module: Information and Database Systems [IW3INIDS]

Coordination: K. Böhm
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24111	Mechanisms and Applications of Work-flow Systems (p. 157)	3	W	5	J. Mülle, Silvia von Stackelberg
24317	(p. 98)	2	W	4	K. Böhm
24605	Data Privacy Protection in Interconnected Information Systems (p. 119)	2	S	3	K. Böhm
PUB	Consulting in Practice (p. 189)	2	W/S	1,5	K. Böhm, Stefan M. Lang
PLV	Selling IT-Solutions Professionally (p. 190)	2	W/S	1,5	K. Böhm, Hellriegel
2400005	Project Management in Practice (p. 196)	2	W/S	1,5	K. Böhm, W. Schnober
24519	Introduction in Computer Networks (p. 132)	2/1	S	4	M. Zitterbart

Learning Control / Examinations

Conditions
None.

Qualification Goals
The students

- see the necessity of specialised systems for information management and are able to define and deploy decision criteria for purchasing such software,

- are aware of the fundamental approaches in information systems and are able to judge their potential applications,

- understand database applications and develop simple database applications on their own,

- are able to communicate at a professional level about technical aspects of information and knowledge management.

Content
This module aims at exposing students to modern information systems. Beyond fundamental theory and concepts, this module covers the deployment of such technology.

Module: Database Systems in Theory and Practice [IW3INDBSTP]

Coordination: K. Böhm
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
9	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2400020	Deployment of Database Systems (p. 117)	2/1	W	5	K. Böhm
24317	(p. 98)	2	W	4	K. Böhm
24114	Big Data Analytics (p. 93)	2/1	W	5	K. Böhm, E. Müller

Learning Control / Examinations
It will be announced at least 6 weeks in advance if the assessment consists of an written exam (usually 1h) according to sec. 4 subsec. 2 no. 1 study and examination regulations or of an oral exam (usually 20min) according to sec. 4 subsec. 2 no. 2 study and examination regulations.
The practical course has to be passed in order to successfully complete the module.

Conditions
None.

Qualification Goals

Content

Module: Telematics [IW3INTM]

Coordination: M. Zitterbart
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
10	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24519	Introduction in Computer Networks (p. 132)	2/1	S	4	M. Zitterbart
24128	Telematics (p. 258)	3	W	6	M. Zitterbart

Learning Control / Examinations

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Recommendations
The lecture *Telematics* [24128] builds on the content of the lecture *Introduction in Computer Networks* [24519] and should therefore only be taken after successful completion of the lecture *Introduction in Computer Networks* [24519].

Qualification Goals
The students will broaden their knowledge of computer networks initially learnt in the module Telematics [IW3INTM].
They learn about problems and solutions in the domains of wireless, multimedia, or secure communications and they will be able to analyse and evaluate specific solutions in those domains.

Content
Selected protocols, architectures, mechanisms, and algorithms in the chosen domains will be analysed in detail. The student hereby may choose among mobile and wireless communications, principles of the design of secure communication protocols, and protocols and techniques for multimedia communication.

Module: Telematics II [IW3INTM2]

Coordination: M. Zitterbart
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
8	Every term	2

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24643	Mobile Communication (p. 168)	2/0	W	4	O. Waldhorst, M. Zitterbart
24132	Multimedia Communications (p. 170)	2/0	W	4	R. Bless, M. Zitterbart
24601	Network Security: Architectures and Protocols (p. 172)	2/0	S	4	M. Zitterbart
24149	IT-Security Management for Networked Systems (p. 156)	2/1	W	5	H. Hartenstein
BPPE	Lab Protocol Engineering (p. 104)	4	W	4	M. Zitterbart

Learning Control / Examinations

Conditions
The module *Telematics* [IW3INTM] has to be taken.

Recommendations
The material covered in the courses of the module *Telematics* [IW3INTM] constitutes the basis for the lectures of this module and therefore should be known in advance.

Qualification Goals
The students will broaden their knowledge of computer networks initially learnt in the module Telematics [IW3INTM].
They learn about problems and solutions in the domains of wireless, multimedia, or secure communications and they will be able to analyse and evaluate specific solutions in those domains.

Content
Selected protocols, architectures, mechanisms, and algorithms in the chosen domains will be analysed in detail. The student hereby may choose among mobile and wireless communications, principles of the design of secure communication protocols, and protocols and techniques for multimedia communication.

Module: Algorithm Design [IW3INALGOTK]

Coordination: D. Wagner
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24079	Algorithms II (p. 89)	3/1	W	6	D. Wagner, P. Sanders
24614	Algorithms for Planar Graphs (p. 86)	2/1	W/S	4	D. Wagner
2400021	Algorithmic Methods for Hard Optimization Problems (p. 90)	2/1		4	H. Meyerhenke, D. Wagner

Learning Control / Examinations
The assessment consists of an oral overall exam (approx. 45 minutes) according to sec. 4 subsec. 2 no. 2 study and examination regulations.
The grade of the module corresponds to the grade of the oral exam.

Conditions

- Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

- Course Algorithmen II has to be passed.

Qualification Goals
The student

- identifies algorithmic problems from different areas and can formulate these formally,

- judges the computational complexity of algorithmic problems and recognizes suitable algorithmic techniques for solving these problems,

- knows the crucial methodical approaches for the design and analysis of algorithms,

- designs algorithms for specific applications,

- comments on methodical aspects of algorithmics in a qualified and well-structured manner.

Content
This module conveys profound knowledge concerning theoretical and practical aspects of algorithmics. Its theoretical focus is on algorithms for graphs and common algorithmical methods, particularly, on algorithmic methods concerning randomized algorithms, parallel algorithms and algorithms for NP-hard problems. Practical aspects involve methods from the field of algorithm engineering.

Module: Algorithms II [IW3INALG2]

Coordination: D. Wagner, P. Sanders
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24079	Algorithms II (p. 89)	3/1	W	6	D. Wagner, P. Sanders

Learning Control / Examinations
The assessment consists of a written exam (approx. 120 minutes) according to section 4 subsection 2 no. 1 study and examination regulations.
The grade of the module corresponds to the grade of the written exam.

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals
The student

- gains profound insight into the most important aspects of algorithmics
- identifies algorithmic problems in different areas of application and can formulate these in a formal manner
- comprehends and determines the running times of algorithms
- knows fundamental algorithms and data structures and can apply this knowledge to new problems.

Content
This module conveys knowledge of basic theoretical and practical aspects of algorithmics. It covers common methods for the design and analysis of basic algorithmic problems as well as the fundamentals of common algorithmic methods such as approximations algorithms, linear programming, randomized algorithms, parallel algorithms and parameterized algorithms.

Module: Security [IW3INSICH]

Coordination: J. Müller-Quade
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24941	Security (p. 238)	3/1	S	6	J. Müller-Quade

Learning Control / Examinations
The assessment consists of a written exam (approx. 60 minutes) according to sec. 4 subsec. 2 no. 1 study and examination regulations.

The grade of the module corresponds to the grade of the written exam.

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals
The student

- knows the theoretic background and the basic mechanisms of computer security and cryptography
- understands the mechanisms of computer security and can explain them,
- can read and understand the current scientific papers,
- can evaluate the safety procedures and can recognize hazards,
- can adapt mechanisms of computer security to new environment.

Content

- Theoretical and practical aspects of computer security
- Development of safety goals and classification of threats
- Presentation and comparison of different formal access control models
- Formal description of authentication systems, presentation and comparison of different authentication methods (passwords, biometrics, challenge-response protocols)
- Analysis of typical vulnerabilities in programs and web applications and development of appropriate protective protection methods / avoidance strategies
- Introduction to key management and Public Key Infrastructure
- Presentation and comparison of current safety certifications
- Block ciphers, hash functions, digital signature, public key encryption and digital signatures (RSA, ElGamal), and various methods of key exchange (e.g., Diffie-Hellman)
- Furthermore, an introduction to provable security is provided, which presents some of the key security concepts (e.g. IND-CCA).
- Presentation of combinations of cryptographic modules using currently used protocols such as Secure Shell (SSH) and Transport Layer Security (TLS).

Module: Software Engineering I [IW2INSWT1]

Coordination: W. Tichy, R. Reussner
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24518	Software Engineering I (p. 242)	3/1/2	S	6	W. Tichy, Korbinian Molitorisz

Learning Control / Examinations
The assessment consists of a written exam (approx. 60 minutes) according to section 4 subsection 2 no. 1 study and examination regulations.
The grade of this module corresponds to the grade of the written exam.
In addition the student needs to submit a certificate for the exercise (not graded) as an assessment according to section 4 subsection 2 no. 3 study and examination regulations.

Conditions
The successful completion of the module *Foundations in Informatic*s [IW1INF1] is required.

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

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

Module: Software Engineering II [IW3INSWT2]

Coordination: R. Reussner, W. Tichy
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24076	Software Engineering II (p. 243)	3/1	W	6	R. Reussner, W. Tichy, A. Koziolek

Learning Control / Examinations
The assessment consists of a written exam (approx. 60 minutes) according to section 4 subsection 2 no. 1 study and examination regulations.

The grade of the module corresponds to the grade of the written exam.

Conditions
None.

Recommendations
The lecture *Software engineering I* should have been attended before.

Qualification Goals
The students learn approaches and techniques for systematic software engineering. The lecture covers advanced topics.

Content
Requirements engineering, software development processes, software quality, software architectures, MDD, Enterprise Software Patterns software maintainability, software security, dependability, embedded software, middleware, statistic testing

Module: Advanced Object Orientation [IW4INFON]

Coordination: G. Snelting
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24665	Advanced object orientation (p. 140)	2/2	S	5	G. Snelting

Learning Control / Examinations

Conditions
None.

Recommendations
Good knowledge of Java

Qualification Goals

Participants in this course know the basics of different object oriented programming languages (e.g. Java, C#, Smalltalk, Scala). They know how inheritance and dynamic dispatch work, behave and are implemented, and how these are used in software engineering. They know innovative language constructs in objects oriented languages like generics, aspects and traits. The participants know the theoretic foundations of (e.g. type systems), software engineering tools for (e.g. refactoring) and techniques (e.g. points-to analysis) for analysing object oriented programs. They know current trends in research on object oriented programming

Content

- Behaviour and semantics of dynamic dispatch
- Implementation of single and multiple inheritance
- Genericity, refactoring
- Traits and mixins, virtual classes
- Cardelli's type system
- Analyses on the call graph, points-to analyses
- operational semantics, type safety
- bytecode JVM, bytecode verifier, dynamic compilation

Remarks

This is not a lecture on object-oriented software development! Rather, knowledge of object-oriented software engineering (e.g. Java, UML, Design Patterns) is required.

Module: Computer Architecture [IW3INRS]

Coordination: W. Karl
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24570	Computer Architecture (p. 203)	3/1	S	6	J. Henkel, W. Karl

Learning Control / Examinations
The assessment consists of a written exam (approx. 60 minutes) according to section 4 subsection 2 no. 1 study and examination regulations.
The grade of the module corresponds to the grade of the written exam.

Conditions
None.

Qualification Goals

Content

Module: Mobile Computing and Internet of Things [IW3INMC]

Coordination: M. Beigl
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

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

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
240051	Mobile Computing and Internet of Things (p. 167)	2/1	W	5	M. Beigl

Learning Control / Examinations

Conditions
None.

Qualification Goals

Content

5.7   General Modules

Module: Seminar Module Economic Sciences [IW3SEMWIWI]

Coordination: Studiendekan (Fak. f. Wirtschaftswissenschaften)
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Economics (Specialization), Business Administration (Specialization), OR (Specialization)

ECTS Credits	Cycle	Duration
3	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
2540524	Bachelor Seminar in Information Engineering and Management (p. 103)	2	W/S	3	A. Geyer-Schulz
SemIW	Seminar Information Engineering and Management (p. 221)	2	W/S	3	C. Weinhardt
SemIIP2	Seminar in Industrial Production (p. 220)	2	W/S	3	F. Schultmann, M. Fröhling
SemEW	Seminar Energy Economics (p. 215)	2	W/S	3	W. Fichtner, P. Jochem, D. Keles, R. McKenna, V. Bertsch
2577915	Seminar: Management and Organization (p. 237)	2	W/S	3	H. Lindstädt
2579904	Seminar Management Accounting (p. 223)	2	W/S	3	M. Wouters
2579905	Special Topics in Management Accounting (p. 244)	2		3	M. Wouters, F. Stadtherr
2572197	Seminar in strategic and behavioral marketing (p. 233)	2	W	3	B. Neibecker
2530280	Seminar in Finance (p. 218)	2	W/S	3	M. Uhrig-Homburg, M. Ruckes
SemFBV1	Seminar Risk and Insurance Management (p. 227)	2	W/S	3	U. Werner
2530353	Seminar Financial Economics and Risk Management (p. 219)	2	W/S	3	M. Ulrich
SemTuE1	Entrepreneurship Seminar (p. 216)			3	O. Terzidis
2585420/2586420	Topics of Sustainable Management of Housing and Real Estate (p. 99)	2	W/S	3	T. Lützkendorf, D. Lorenz
SemWIOR1	Seminar Stochastic Models (p. 231)	2	W/S	3	K. Waldmann
SemWIOR2	Seminar Economic Theory (p. 268)	2	W/S	3	C. Puppe
SemWIOR3	Seminar in Experimental Economics (p. 235)	2	W/S	3	N. N.
n.n.	Seminar in Behavioral and Experimental Economics (p. 217)	2	W/S	3	P. Reiss
n.n.	Seminar on Topics in Experimental Economics (p. 225)	2	S	3	P. Reiss
SemPÖ1	Seminar on Morals and Social Behavior (p. 224)	2	W/S	3	N. Szech
SemPÖ2	Seminar on Topics in Political Economics (p. 226)	2	W/S	3	N. Szech
n.n.	Selected Topics in Public Management and Governance (p. 102)	2	W	3	B. Wigger, N. Edwards
2550131	Seminar in Continous Optimization (p. 236)	2	W/S	3	O. Stein
2550491	Seminar in Discrete Optimization (p. 234)	2	W/S	3	S. Nickel
SemSTAT	Seminar Statistics (p. 230)	2		3	N.N.
semSTAT1	Applied Econometrics (p. 208)	2	W	3	M. Schienle
2521388	Seminar Data Mining I (p. 214)	2	W	3	G. Nakhaeizadeh

Learning Control / Examinations
The assessment is done by a seminar with at least 3 CP.
The assessment of the seminar (following §4(2), 3 ER) is described at the course description.

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.

Qualification Goals

- Students are able to independently deal with a defined problem in a specialized field based on scientific criteria.
- They are able to research, analyze the information, abstract and derive basic principles and regularities from unstructured information.
- They can solve the problems in a structured manner using their interdisciplinary know-how.
- They know how to validate the obtained results.
- Finally, they are able to logically and systematically present the results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Content
The module consists of a seminar, that is related to the research field of economic sciences. A complete list of available seminars is published in the internet.

Remarks
The mentioned seminars in this module handbook are place holders. For each semester, a complete list of seminars are published in the Vorlesungsverzeichnis or at the web pages of the participating institutes. Often, the seminar topics for a given semester are publishedat the end of the preceding semester. Some seminars require an early sign-in deadline at the end of the of the preceding semester.

Module: Seminar Module Informatics [IW3SEMINFO]

Coordination: S. Abeck
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Informatics (Specialization)

ECTS Credits	Cycle	Duration
3	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24074s	Seminar in Telematics (p. 210)	2	W/S	3	M. Zitterbart, H. Hartenstein
SemAIFB1	Seminar in Enterprise Information Systems (p. 213)	2	W/S	3	R. Studer, A. Oberweis, T. Wolf, R. Kneuper
xIDLs	Seminar Internet Services (p. 222)	2	W/S	3	H. Schmeck, R. Studer, H. Hartenstein, W. Tichy
SemAIFB4	Seminar Knowledge Management (p. 232)	2	W	3	R. Studer
SWSSem	Seminar Software Systems (p. 228)	2	W/S	3	R. Reussner
SWTSem	Seminar Software Engineering (p. 229)	2	W/S	3	W. Tichy, R. Reussner, G. Snelting
SemSich	Seminar in Security (p. 212)	2	W/S	3	J. Müller-Quade
SemiKryp3	Seminar in Cryptography (p. 209)	2	W/S	3	J. Müller-Quade
SemInfo	Informatics Seminar (p. 150)	2	W/S	3	M. Zitterbart
prosemis	Undergraduate Seminar Information Systems (p. 197)	2	S	3	K. Böhm
24530	Seminar: Cellular automata and discrete complex systems (p. 199)	2	S	3	R. Vollmar, T. Worsch
2400010	(p. 198)	2	W/S	3	M. Beigl, P. Jakimovski

Learning Control / Examinations
The assessment is done by a seminar with at least 3 CP.
The assessment of the seminar (following §4(2), 3 ER) is described at the course description.

Conditions
Successful completion of the modules in semester 1–4 except for up to two modules. The module *Internship* [IW1EXPRAK] and the law modules [IW1JURA1,2,3] are not relevant in this calculation.
see german version

Qualification Goals
The student

- deals with a well-defined problem in the Informatics domain in detail,

- analyses and discusses the given problems as part of the courses and in the final seminar papers,

- discusses, presents, and defends technical arguments within the given task specifications,

- organises the drafting of the final seminar paper mostly independently.

The competences gained as part of this seminar module serve as a preparation for the Bachelor thesis. Guided by the respective examiner, the student exercises independent scientific work in drafting and presenting the final seminar paper.

Content
The module consists of a seminar, that is related to the research field of informatics. A complete list of available seminars is published in the internet.

Remarks
The mentioned seminars in this module handbook are place holders. For each semester, a complete list of seminars are published in the Vorlesungsverzeichnis or at the web pages of the participating institutes. Often, the seminar topics for a given semester are published at the end of the preceding semester. Some seminars require an early sign-in deadline at the end of the of the preceding semester.

Module: Seminar Module Law [IW3SEMJURA]

Coordination: T. Dreier
Degree programme: Informationswirtschaft (B.Sc.)
Subject: Law (Specialization)

ECTS Credits	Cycle	Duration
3	Every term	1

Courses in module

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
rechtsem	Seminar in Law (p. 211)	2	W/S	3	T. Dreier

Learning Control / Examinations
The assessment is done by a seminar with at least 3 CP.
The assessment of the seminar (following §4(2), 3 ER) is described at the course description.

Conditions
From the law modules in the core programme, *Introduction to Civil Law* [IW1INJURA1], *Commercial Law* [IW1INJURA2], and *Constitutional and Administrative Law* [IW1INJURA2], 2 out of 3 have to be completed successfully.

Qualification Goals

Content
The module consists of a seminar, that is related to the research field of law. A complete list of available seminars is published in the internet.

Remarks
The mentioned seminars in this module handbook are place holders. For each semester, a complete list of seminars are published in the Vorlesungsverzeichnis or at the web pages of the participating institutes. Often, the seminar topics for a given semester are published at the end of the preceding semester. Some seminars require an early sign-in deadline at the end of the of the preceding semester.

Module: Internship [IW1EXPRAK]

Coordination: Studiendekan (Fak. f. Wirtschaftswissenschaften), Studiendekan/in Studiengang Informationswirtschaft
Degree programme: Informationswirtschaft (B.Sc.)
Subject:

ECTS Credits 8	Cycle	Duration

Learning Control / Examinations
The assessment is in the form of a certificate of employment about at least 6 weeks, a written report (typewritten, not handwritten) and a short presentation.

Conditions
The internship is regulated in §12 of the examination regulation.
Examiners are all lecturers of the degree programme.
The choice of the examiner has to be **prior** to the start of the internship (cf. content description).

Recommendations
It is recommended that the internship is taken between the 4th and the 5th term of the Bachelor programme Information Engineering and Management.

Qualification Goals

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

Content
It is the responsibility of the students to apply for an internship in a suitable company or public organization at which the internship can be fulfilled.
The process for the internship has the following (sequential) steps:

1. **Choice of the examiner and of the company or organization by the student.**
   During the internship each student is attended by an examiner of the degree programme and by an advisor of the company. In case a student does not succeed in finding an examiner for the internship, he can request the assignment of an examiner from the examination board of the Bachelor programme in Information Engineering and Management. When enrolling for the internship, the student fills the form for the internship and he hands the form over to the examiner and the students' secretary. If required, the students' secretary certifies the compulsory character of the internship as part of the Bachelor programme in Information Engineering and Management.

2. **Internship**
   The student passes the internship in the chosen company or organization.

3. **Preparation of a short report and presentation:**
   At the end of the internship, the employment is proven by a certificate of employment. The examiner receives a report (maximal 2 A4 pages) and the student gives feedback on the internship with a short presentation (approx. 15 minutes) followed by a short discussion (approx. 5 minutes).

4. **Presentation and proof of performance.**
   The short presentation may by given in the form of a talk with the examiner, in a colloquium or in a seminar. The form is fixed at the registration of the internship with the examiner. The certificate of employment of the company and the short report must be delivered at the examiner *before* the presentation. Based on these, a certificate of performance if produced and transferred to the office of study ("Studienbüro").

Remarks
The form for the internship is available at the examination offices of the two faculties participating in the programme.

Module: Bachelor Thesis [IW3THESIS]

Coordination: Studiendekan (Fak. f. Wirtschaftswissenschaften), Studiendekan/in Studiengang Informationswirtschaft, Der
                           Vorsitzende des Prüfungsausschusses
Degree programme: Informationswirtschaft (B.Sc.)
Subject:

ECTS Credits	Cycle	Duration
12		

Learning Control / Examinations
The Bachelor thesis is examined by an examiner following the examination regulation. The examiner has to be involved in the degree programme. Involved in the degree programme are the persons that coordinate a module or a lecture of the degree programme.

Conditions
The regulations for the Bachelor thesis can be found in §11 of the examination regulation.

Qualification Goals
The student can independently work on a relevant topic in accordance with scientific criteria within the specified time frame.
He/she is in a position to research, analyze the information, abstract and identify basic principles and regulations from less structured information.
He/she reviews the task ahead, can select scientific methods and techniques and apply them to solve a problem or identify further potential. This is basically also done under consideration of social and/or ethical aspects.
He/she can interpret, evaluate and if required, graphically present the obtained results.
He/she is in a position to clearly structure a research paper and communicate in writing using the technical terminology.

Content
The Bachelor thesis is a written report which shows that the student can autonomously investigate a scientific problem in Information Engineering and Management. The work load for the Bachelor thesis should be 360h. The recommended project time is 6 months, the maximal project time is 9 months. The Bachelor thesis may also be written in English.

Remarks
None.

6   Courses

6.1   All Courses

Course: Advanced Topics in Economic Theory [2520527]

Coordinators:	M. Hillebrand, K. Mitusch
Part of the modules:	Economic Theory (p. 51)[IW3VWL12]

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

Learning Control / Examinations
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the beginning of the recess period or at the beginning of the following semester.

Conditions
None.

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

Learning Outcomes
The students

- will understand fundamental questions of General Equilibrium Theory and will be able to solve these questions with appropriate methods,
- will understand fundamental questions of information economics respectively contract theory and will be able to solve these questions with appropriate methods,
- will be able to apply advanced methods of formal economic modelling.

Content
The course deals with basic elements of modern economic theory. It is divided into two parts. The first part introduces the microeconomic foundations of general equilibrium á la Debreu ("The Theory of Value", 1959) and Hildenbrand/Kirman ("Equilibrium Analysis",1988). The second part deals with asymmetric information and introduces the basic techniques of contract theory.
The course is largely based on the textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

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.

Remarks
The course Advanced Topics in Economic Theory will not take place in summer semester 2015.

Course: Algorithms for Planar Graphs [24614]

Coordinators: D. Wagner
Part of the modules: Algorithm Design (p. 71)[IW3INALGOTK]

ECTS Credits	Hours per week	Term	Instruction language
4	2/1	Winter / Summer Term	de

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Recommendations
Basic knowledge of graph theory and algorithm design is helpful.

Learning Outcomes
The lecture aims at providing students with an overview on the field of planar graphs and especially focuses on algorithmic aspects. The students obtain a systematic understanding of the central concepts and techniques for tackling algorithmic questions on planar graphs, which builds upon the students' knowledge in the areas of graph theory and algorithmics. In this course problems are reduced to their algorithmic core and are afterwards, if possible from a complexity theoretical point of view, solved efficiently. The students learn to apply the presented methods and techniques autonomously to related problems. With the obtained knowledge they are able to to work on current reasearch problems in the area of planar graphs

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

Media
Blackboard, script.

Literature
Elective literature:
Takao Nishizeki and Norishige Chiba. Planar Graphs: Theory and Algorithms, volume 32 of Annals of Discrete Mathematics. North-Holland, 1988.

Remarks
The course is lectured irregular.

Course: Algorithms I [24500]

Coordinators: P. Sanders, H. Meyerhenke, D. Hofheinz
Part of the modules: Algorithms I (p. 15)[IW2INF2]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1/2	Summer term	de

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Learning Outcomes
The student is supposed to

- know and understand basic, frequently used algorithms, their conception, analysis of their efficiency, implementation, documentation and application
- be able to use their comprehension to work on new algorithmic problems
- apply the knowledge acquired in the module Grundlagen der Informatik (B.Sc. Information Engineering and Management) to non-trivial algorithms
- be able to analyze and compare basic algorithms,
- apply the knowledge acquired in the module "Grundbegriffe der Informatik" (Bachelor Informatics) or in "Grundlagen der Informatik" (B.Sc. Information Engineering and Management) and the mathematical methodologies learned in the mathematics lectures to solve problems, the focus being on mathematical efficiency analysis

Content
The module provides basic algorithms and data structures.
The following topics are covered in particular:

- basic terms of algorithm engineering
- asymptotic algorithm analysis (worst case, average case, probabilistic, amortised)
- data structures like arrays, heaps, queues and linked lists
- hash tables
- sorting: comparsion based algorithms (e.g. mergesort, quicksort), lower border, radix sort
- sorted sequences, search trees and selection
- graphs (representation, traversing: breadth search, deep search, shortest path, spanning trees)
- generic optimisation algorithms (greedy, dynamic programming, systematic search, local search)
- geometric algorithms

Media
slides, blackboard

Literature
Algorithmen - Eine Einführung
T. H. Cormen, C. E. Leiserson, R. L. Rivest, und C. Stein
Oldenbourg, 2007
Elective literature:
Algorithms and Data Structures – The Basic Toolbox
K. Mehlhorn und P. Sanders
Springer 2008

Algorithmen und Datenstrukturen
T. Ottmann und P. Widmayer
Spektrum Akademischer Verlag, 2002

Algorithmen in Java. Teil 1-4: Grundlagen, Datenstrukturen, Sortieren, Suchen
R. Sedgewick
Pearson Studium 2003

Algorithm Design
J. Kleinberg and É. Tardos
Addison Wesley, 2005
Vöcking et al.
Taschenbuch der Algorithmen
Springer, 2008

Course: Algorithms II [24079]

Coordinators: D. Wagner, P. Sanders
Part of the modules: Algorithm Design (p. 71)[IW3INALGOTK], Algorithms II (p. 72)[IW3INALG2]

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

Learning Control / Examinations
The assessment consists of a written exam (approx. 120 minutes) according to section 4 subsection 2 no. 1 study and examination regulations.

Conditions
See module description.

Learning Outcomes
The student

- gains profound insight into the most important aspects of algorithmics
- identifies algorithmic problems in different areas of application and can formulate these in a formal manner
- comprehends and determines the running times of algorithms
- knows fundamental algorithms and data structures and can apply this knowledge to new problems.

Content
This course conveys knowledge of basic theoretical and practical aspects of algorithmics. It covers common methods for the design and analysis of basic algorithmic problems as well as the fundamentals of common algorithmic methods such as approximations algorithms, linear programming, randomized algorithms, parallel algorithms and parameterized algorithms.

Course: Algorithmic Methods for Hard Optimization Problems [2400021]

Coordinators: H. Meyerhenke, D. Wagner
Part of the modules: Algorithm Design (p. 71)[IW3INALGOTK]

ECTS Credits	Hours per week	Term	Instruction language
4	2/1		de

Learning Control / Examinations
By solving particularly specified assignments successfully, the students can acquire a bonus (max. 0.4) for improving the grade of a passed exam

Conditions
None.

Recommendations
Knowledge of the lecture *Algorithmen II* [24079] is recommended.

Learning Outcomes
The student

- identifies algorithmic optimization problems from different areas and is able to formalize them,

- is able to discuss various aspects of optimization in a competent and structured manner,

- knows methods for the design and analysis of optimization algorithms,

- is able to execute algorithms on sample inputs and to explain the algorithms' idiosyncrasies,

- is able to derive and evaluate the complexity of algorithmic problems from different areas,

- is able to identify suitable algorithmic solution techniques and to apply them to related unknown problems.

Content
There are many practical problems that cannot be solved optimally - some not at all and some not in a resonable amount of time. An example is the "bin packing problem" where a collection of objects must be packed using a possibly small number of bins. Moreover, problems sometimes arise where knowledge about the future (or even about the present) is incomplete, but a decision is required nonetheless ("online problems"). Regarding bin packing, for example, there must be a point in time when you close the bins and send them away, even if more objects may arrive later. Besides approximation and online algorithms, the course covers solution methods that resemble or use human intuition or natural processes (heuristics and metaheuristics).

Course: Algorithms for Internet Applications [2511102]

Coordinators: H. Schmeck
Part of the modules: Algorithms   and   Applications   (p.   62)[IW3INAIFB5],   Information   Services   in   Networks
                           (p. 61)[IW3INAIFB4]

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
credits for all the Informatics modules of years 1 and 2 (except for at most one module).

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
- know new developments towards an Internet of Energy

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 new developments and challenges in the Internet of Energy.

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.

Remarks
This course will not be offered after WS 2016/17

Course: Analysis of multivariate Data [2550550]

Coordinators: O. Grothe
Part of the modules: Statistics and Econometrics (p. 54)[IW3VWL14], Statistical Applications of Financial Risk Management (p. 53)[IW3VWL]

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

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. The exam is offered every semester. Re-examinations are offered only for repeaters.

Conditions
None.

Recommendations
It is recommended to attend the courses *Statistics 1 [2600008]* und *Statistics 2 [2610020]* in advance.

Learning Outcomes
Students

- choose appropriate methods for the illustration of multivariate data, for structure analysis as well as dimension reduction, and apply these.
- apply software.

Content

- Multivariate Data
- Correlation Analysis
- Variance Analysis
- Factor- and Principal Component Analysis
- Discriminant function analysis
- Cluster Analysis

Media
Script

Literature
see lecture

Remarks
New course starting winter term 2015/2016.
The lecture is offered irregularly. The curriculum of the next three years is available online.

Course: Big Data Analytics [24114]

Coordinators: K. Böhm, E. Müller
Part of the modules: Foundations of Information Systems (p. 65)[IW3INGIS], Introduction to Data and Information Management (p. 64)[IW3INGDI], Database Systems in Theory and Practice (p. 68)[IW3INDBSTP]

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

Learning Control / Examinations
The assessment consists of an oral exam according to section 4 subsection 2 no. 2 study and examination regulations.

Conditions
This course cannot be combined with the courses *Knowledge Discovery* [2511302] and/or *Data Mining* [2520375].

Recommendations
Knowledge about database systems, e.g. from the lecture *Database Systems*

Learning Outcomes

Content

Media
Slides.

Literature

- Data Mining: Concepts and Techniques (3rd edition):
  Jiawei Han, Micheline Kamber, Jian Pei, Morgan Kaufmann Publishers 2011

- Data Mining and Analysis, Fundamental Concepts and Algorithms: Mohammed J. Zaki, Wagner Meira JR., Campridge University Press 2014

- Introduction to Data Mining:
  Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Addison-Wesley 2006

- Knowledge Discovery in Databases:
  Martin Ester, Jörg Sander, Springer 2000

Course: Analytical CRM [2540522]

Coordinators: A. Geyer-Schulz
Part of the modules: Specialization in Customer Relationship Management (p. 38)[IW3BWLISM5], CRM and Service
                           Management (p. 36)[IW3BWLISM4]

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 10) from excersise work will be added. The grades of this lecture are assigned following the table below:

Grade	Minimum points
1.0	95
1.3	90
1.7	85
2.0	80
2.3	75
2.7	70
3.0	65
3.3	60
3.7	55
4.0	50
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.

Remarks

The lecture ultimately takes place in summer term of 2014. Afterwards the lecture is hold in alternation with "2540520 - Operative CRM". The current schedule can be seen on the chair's website (http://www.em.uni-karlsruhe.de/studies/).

Course: Applied Informatics I - Modelling [2511030]

Coordinators: A. Oberweis, Y. Sure-Vetter
Part of the modules: Applied Informatics (p. 18)[IW1INF5]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
Students

- explain the strengths and weaknesses of various modeling approachesfor Information Systems and choose an appropriate method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- model given problems in Description Logics and apply description logic rules,
- describe the main ontology concepts and languages and explain SPARQL queries,
- create and evaluate a relational database schema and express queries in relational algebra.

Content
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 2009.
- W. Reisig. Petrinetze, Springer-Verlag, 2010.

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: J. Zöllner, N.N.
Part of the modules: Applied Informatics (p. 18)[IW1INF5]

ECTS Credits	Hours per week	Term	Instruction language
4	2/1/1	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 successful completion of the compulsory exercises is prerequisite for the admission to the written exam.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
Knowledge of content of the modules Foundations in Informatics [IW1INF1] and Algorithms I [IW2INF2] is expected.

Recommendations
Knowledge of content of the module [WI1INFO].

Learning Outcomes
The student learns about concepts and technologies for designing big, distributed application architectures. Students apply industry-relevant technology to solve application-oriented problems in lab classes.

Content
The course Applied Informatics II [2511032] covers various facets of electronic commerce which have to be supported by adequate and efficient distributed information systems. Key topics are middleware technologies and distributed application architectures. Document description and exchange (incl. XML), Java EE, Web technologies, and Web services are additional topics.

Media
Slides, internet resources.

Literature
Tba in the lecture.

Course: [24317]

Coordinators: K. Böhm
Part of the modules: Foundations of Information Systems (p. 65)[IW3INGIS], Database Systems in Theory and Practice (p. 68)[IW3INDBSTP], Introduction to Data and Information Management (p. 64)[IW3INGDI], Information and Database Systems (p. 67)[IW3INIDS]

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

Learning Control / Examinations
The assessment will be an assessment according to sec. 4 subsec. 2 no. 3 study and examination regulations and consists of multiple parts. The performance is assessed on the basis of projects, experiments, presentations and reports.
The course will be assessed with "passed" or "failed" (according to sec. 9 subsec. 3 study and examination regulations). For passing the practical course, all partial exercises must have been passed successfully. If the course is dropped after the first session, it will be marked with "failed".

Conditions
None.

Learning Outcomes

Content

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

Coordinators: T. Lützkendorf, D. Lorenz
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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: Asset Management [2530219]

Coordinators: A. Sauer
Part of the modules: Topics in Finance I (p. 44)[IW3BWLFBV5]

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

Conditions
None.

Recommendations
Proficiency of the topics covered in the course "Investments" is required.

Learning Outcomes
Students are able to name the terms and definitions of professional asset management. They are able to structure, formally describe and analyze problems of professional asset management. Students are in a position to apply the instruments and methods of asset management.

Content
The course familiarizes students with the instruments, methods and terms of professional asset management. It conveys the knowledge of applying the relevant methods to students via practical exercises.

Media
Slides.

Literature
Investments and Portfolio Management,
Zvi Bodie, Alex Kane, Alan J. Marcus,
Mcgraw-Hill Publ.Comp., 9. Auflage (2011)
The Theory and Practice of Investment Management: Asset Allocation, Valuation, Portfolio Construction, and Strategies
Frank J. Fabozzi, Harry Markowitz
John Wiley & Sons; 2. Auflage (2011)

Course: Auction & Mechanism Design [2560550]

Coordinators: N. Szech
Part of the modules: Applied Microeconomics (p. 52)[IW3VWL13], Economic Theory (p. 51)[IW3VWL12]

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

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
Students can earn a bonus to the final grade by successfully participating in the exercises.

Conditions
None.

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

Learning Outcomes
The students

- can analyze strategic behavior in auctions;

- can compare auction formats with regard to efficiency and revenue;

- are familiar with the basic theory of (Bayesian) mechanism design;

- master the revenue equivalence theorem for standard auctions;

- can apply mechanism design to one object auctions and bilateral trade.

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

Literature
Krishna, V.: Auction Theory, Academic Press, 2009.
Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2010.
Mathews, S.: A Technical Primer on Auction Theory I: Independent Private Values No. 1096. Northwestern University, Center for Mathematical Studies in Economics and Management Science, 1995.

Remarks
The lecture will be held in English.

Course: Selected Topics in Public Management and Governance [n.n.]

Coordinators: B. Wigger, N. Edwards
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
Non exam assessment (following §4(2), 3 of the examination regulation).

Conditions
None.

Recommendations
Prior knowledge of public management and public governance, as evidenced by participation in courses such as Introduction to Public Management and Case Studies in Public Management, is strongly recommended.

Learning Outcomes
The student will demonstrate an advanced understanding of key topics dealt with in the seminar.

Content
Selected topics in public management and governance.

Media
Academic journal articles

Literature
Will be announced on Ilias.

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

Coordinators: A. Geyer-Schulz
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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.

Recommendations
At least one of the following lectures should 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

Course: Lab Protocol Engineering [BPPE]

Coordinators: M. Zitterbart
Part of the modules: Telematics II (p. 70)[IW3INTM2]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Design and Construction of Buildings [2586404]

Coordinators: T. Lützkendorf
Part of the modules: Design, Construction and Sustainability Assessment of Buildings (p. 46)[IW3BWLOOW1]

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 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Conditions
None.

Recommendations
A combination with the module *Real Estate Management* [IW3BWLUO1] and with engineering science modules in the area of building physics and structural design is recommended.

Learning Outcomes
The student

- has an in-depth knowledge of aspects of energy-saving, resource-saving and health-oriented design, construction and operation of buildings (design for environment)
- has a critical understanding of the essential requirements, concepts and technical solutions for green buildings
- is able to integrate aspects of energy-saving, resource-saving and health-conscious construction into a holistic environmental design approach and to assess the advantages and disadvantages of different individual solutions.

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

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 Buildings [2585404]

Coordinators: T. Lützkendorf
Part of the modules: Design, Construction and Sustainability Assessment of Buildings (p. 46)[IW3BWLOOW1]

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 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Re-examinations are offered at every ordinary examination date.

Conditions
None.

Recommendations
A combination with the module *Real Estate Management* [IW3BWLOOW2] and with engineering science modules from the areas building physics and structural designis recommended.

Learning Outcomes
The student

- has an in-depth knowledge of the classification of environmental design and construction of buildings within the overall context of sustainability
- has a critical understanding of the main theories and methods of assessing the environmental performance of buildings
- is able to use methods and tools to evaluate the environmental performance in design and decision processes or to interpret existing results

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

Literature
Elective literature:
See german version.

Course: Business Administration: Finance and Accounting [2610026]

Coordinators: M. Ruckes, M. Uhrig-Homburg
Part of the modules: Business   Administration   (p.   22)[IW1BWL2],   Foundations   in   Business   Administration
                          (p. 19)[IW1BWL3]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
Students

- are able to valuate bonds and cash flows in general,
- can valuate stocks,
- can make investment decisions,
- can analyse portfolios,
- are able to recognise business events in financial reports,
- can determine depreciation expenses,
- are able to valuate inventories,
- can analyse costs,
- knows the difference between financial and management accounting,
- knows cost center accounting,
- can estimate product costs.

Content

- **Investment and Finance:**
    - Valuation of Bonds and Stocks
    - Capital Budgeting
    - Portfolio Theory
- **Financial Accounting**
- **Management Accounting**

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

Remarks
Key qualifications can be shown in an active participation through presentations of solutions and discussions in the tutorials which accompany the course. Each part of the course is taught by instructors specialised in the field of that part.

Course: Business Administration: Production Economics and Marketing [2600024]

Coordinators: M. Ruckes, W. Fichtner, M. Klarmann, Th. Lützkendorf, F. Schultmann
Part of the modules: Business Administration (p. 22)[IW1BWL2], Business Administration (p. 21)[IW1BWL4]

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
Students

- are able to analyse and implement the marketing strategy and marketing measures (marketing mix: 4 Ps),
- can analyse, implement and manage procurement and production processes,
- are able to plan projects, and
- have skills about selected issues in energy economics.

Content
The course is made up of the following topics:
Marketing

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

Production economics
In the part of production economics the student will learn basics in the field of production theory, procurement and resource aquisitions, production and operations management and industrial engineering.
Aspects of energy economics, technological foresights, construction industry and real estate markets will be treated.

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

Remarks
Key qualifications can be shown in an active participation through presentations of solutions and discussions in the tutorials which accompany the course.
Each part of the course is taught by instructors specialised in the field of that part.

Course: Civil Law for Beginners [24012]

Coordinators: T. Dreier, O. Knöfel
Part of the modules: Introduction to Civil Law (p. 26)[IW1JURA1]

ECTS Credits	Hours per week	Term	Instruction language
4	4/0	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
The Students grasp the differences between civil law, public law and criminal law. In particular, students know 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 are able to recognize 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 behavior, 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 basics 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: Advanced Civil Law [24504]

Coordinators: T. Dreier
Part of the modules: Commercial Law (p. 27)[IW1JURA2]

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

Learning Control / Examinations
The assesment ist explained in the module description.

Conditions
The course *Civil law for beginners* [24012] is required.

Learning Outcomes
Following what the students have learned in the course *Civil law for beginners* about the basic notions of law and, in particular, the general part of the German Civil Code (Bürgerliches Gesetzbuch, BGB), in this course the students shall acquire knowledge of contract and of property law. They will learn about the statutory regulation of place, time and modalities of the performance of contractual duties, as well as the statutory rules governing defaults of performing contractual promises (impossibility of performance; non-performance; delayed performance, defective performance). In addition the students will be presented with the different types of contracts and with both liability for fault and strict liability. As far as property law is concerned, the students shall understand the different types of transfer of ownership and of securities the German Civil Code provides for.

Content
Following what the students have learned in the course Civil law for beginners about the basic notions of law and, in particular, the general part of the German Civil Code (Bürgerliches Gesetzbuch, BGB), in this course the students shall acquire knowledge of contract and of property law. On the one hand, this includes the statutory rules on place, time and modalities of performance, and the statutory rules governing defaults of performing contractual promises (impossibility of performance; non-performance; delayed performance, defective performance). On the other hand, the statutory types of contracts will be discussed (in particular, sale, lease, contract for work and contract for services, lending and borrowing) as well as new types of combined contracts (e.g., leasing, factoring, computer contracts). Moreover, legal liability will be discussed both with regard to liability for fault and with regard to strict liability. As regards property law, possession and ownership will be discussed as well as the different forms of transfer of ownership and the most important of the security rights.

Media
Transparencies/Slides

Literature
Tba at the beginning of the course.
Elective literature:
tba at the beginning of the course

Course: Exchanges [2530296]

Coordinators: J. Franke
Part of the modules: eFinance (p. 35)[IW3BWLISM3], Topics in Finance I (p. 44)[IW3BWLFBV5]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
Students are in a position to discuss and evaluate current developments regarding the organisation of exchanges and securities trading.

Content

- Organisation of exchanges: Changing Zeitgeist - Corporates instead of 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: Computational Economics [2590458]

Coordinators: P. Shukla, S. Caton
Part of the modules: Algorithms and Applications (p. 62)[IW3INAIFB5]

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

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation). By successful completion of the exercises (according to §4(2), 3 of the examination regulation) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The bonus only applies to the first and second exam of the semester in which it was obtained.

Conditions
None.

Learning Outcomes
The student

- understands the methods of Computational Economics and applies them on practical issues,
- evaluates agent models considering bounded rational behaviour and learning algorithms,
- analyses agent models based on mathematical basics,
- knows the benefits and disadvantages of the different models and how to use them,
- examines and argues the results of a simulation with adequate statistical methods,
- is able to support the chosen solutions with arguments and can explain them.

Content
Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.

Media

- PowerPoint

Literature

- R. Axelrod: "Advancing the art of simulation in social sciences". R. Conte u.a., Simulating Social Phenomena, Springer, S. 21-40, 1997.
- R. Axtel: "Why agents? On the varied motivations for agent computing in the social sciences". CSED Working Paper No. 17, The Brookings Institution, 2000.
- K. Judd: "Numerical Methods in Economics". MIT Press, 1998, Kapitel 6-7.
- A. M. Law and W. D. Kelton: "Simulation Modeling and Analysis", McGraw-Hill, 2000.
- R. Sargent: "Simulation model verification and validation". Winter Simulation Conference, 1991.
- L. Tesfation: "Notes on Learning", Technical Report, 2004.
- L. Tesfatsion: "Agent-based computational economics". ISU Technical Report, 2003.

Elective literature:

- Amman, H., Kendrick, D., Rust, J.: "Handbook of Computational Economics". Volume 1, Elsevier North-Holland, 1996.
- Tesfatsion, L., Judd, K.L.: "Handbook of Computational Economics". Volume 2: Agent-Based Computational Economics, Elsevier North-Holland, 2006.
- Marimon, R., Scott, A.: "Computational Methods for the Study of Dynamic Economies". Oxford University Press, 1999.
- Gilbert, N., Troitzsch, K.: "Simulation for the Social Scientist". Open University Press, 1999.

Remarks
This course is offered in cooperation with the Institute of Applied Informatics and Formal Description Models (AIFB).
Summer Term 2011: The course has been added to the Module *Algorithms and Applications* [IW3INAIFB5] and is thus also eligible for 3rd year B.Sc. students majoring in Information Engineering and Management.

Course: Customer Relationship Management [2540508]

Coordinators: A. Geyer-Schulz
Part of the modules: CRM and Service Management (p. 36)[IW3BWLISM4]

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 10) from excersise work will be added. The grades of this lecture are assigned following the table below:

Grade	Minimum points
1.0	95
1.3	90
1.7	85
2.0	80
2.3	75
2.7	70
3.0	65
3.3	60
3.7	55
4.0	50
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 and Storage Management [24074]

Coordinators: B. Neumair
Part of the modules: Information Services in Networks (p. 61)[IW3INAIFB4]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Learning Outcomes

Content

Course: Data Mining and Applications [2520375]

Coordinators: G. Nakhaeizadeh
Part of the modules: Statistics and Econometrics (p. 54)[IW3VWL14]

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

Learning Control / Examinations

- Oral examination 70%
- Conduction of a small empirical study 30%

Conditions
None.

Learning Outcomes
After completing of the course the students:

- know the definition of Data Mining
- are familiar with the CRISP-DM
- are Familiar with at least six important Data Mining Tasks
- can recognize whether a given problem can be formulated as a data mining problem
- are familiar with the most important Data Mining Algorithms like Decision Tree, K-Means, Artificial Neural Networks, Association Rules, Regression Analysis
- are familiar with evaluation of DM-algorithms
- will be able to use a DM-Tool

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.

Remarks

The credits for the course have been changed from 5 to 4,5 from summer term 2015 on.

Course: Deployment of Database Systems [2400020]

Coordinators: K. Böhm
Part of the modules: Foundations of Information Systems (p. 65)[IW3INGIS], Introduction to Data and Information Management (p. 64)[IW3INGDI], Database Systems in Theory and Practice (p. 68)[IW3INDBSTP]

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

Learning Control / Examinations
It will be announced at least 6 weeks in advance if the assessment consists of an 1h written exam according to section 4 subsection 2 no. 1 study and examination regulations or of a 20 minute oral exam according to section 4 subsection 2 no. 2 study and examination regulations.

Conditions
None.

Recommendations
Knowledge about database systems, e.g., from the lecture *Database Systems* [24516] and *Introduction in Computer Networks* [24519].

Learning Outcomes
At the end of the course, the participants should be able to explain and compare database concepts (especially data models and query languages) - in more breadth, compared to database courses at the undergraduate level. They should know and be able to assess the different possibilities to store complex user data using database technology.

Content
This course introduces students to the deployment of modern database technology, in both breadth and depth. 'Breadth' is reached by the detailed study and comparison of different philosophies and data models, together with respective query languages. For instance, we address both so-called NoSQL database concepts as well as semistructured databases (i.e., XML databases, with XQuery as one query language) and graph databases. 'Depth' is reached by the study of several non-trivial applications, such as management of XML or e-commerce data using relational database technology. Since all these applications are generic problems themselves, the study of such applications is interesting in itself already.

Media
Slides.

Literature

-
- Andreas Heuer, Gunther Saake: Datenbanken - Konzepte und Sprachen. 2. Aufl., mitp-Verlag, Bonn, Januar 2000.
- Alfons Kemper, Andre Eickler: Datenbanksysteme. 6. Aufl., Oldenbourg Verlag, 2006.

Elective literature:

-
- Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: Database Systems: The Complete Book. Prentice Hall, 2002
- Ramez Elmasri, Shamkant B. Navathe: Fundamentals of Database Systems.

Course: Database Systems [24516]

Coordinators: K. Böhm
Part of the modules: Communication and Database Systems (p. 66)[IW3INKD], Introduction to Data and Information
                        Management (p. 64)[IW3INGDI]

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

Learning Control / Examinations

Conditions
None.

Recommendations
It is recommended but not mandatory to attend lectures covering communication networks, system architecture and software
engineering.

Learning Outcomes

Content

Media
Slides.

Literature

- Andreas Heuer, Kai-Uwe Sattler, Gunther Saake: Datenbanken - Konzepte und Sprachen, 3. Aufl., mitp-Verlag, Bonn,
  2007
- Alfons Kemper, André Eickler: Datenbanksysteme. Eine Einführung, 7. Aufl., Oldenbourg Verlag, 2009

Elective literature:

- S. Abeck, P. C. Lockemann, J. Seitz, J. Schiller: Verteilte Informationssysteme, dpunkt-Verlag, 1. Aulage,2002, ISBN-13:
  978-3898641883
- R. Elmasri, S.B. Navathe: Fundamentals of Database Systems, 4. Auflage, Benjamin/Cummings, 2000.
- Gerhard Weikum, Gottfried Vossen: Transactional Information Systems, Morgan Kaufmann, 2002.
- C. J. Date: An Introduction to Database Systems, 8. Auflage, Addison-Wesley, Reading, 2003.

Course: Data Privacy Protection in Interconnected Information Systems [24605]

Coordinators: K. Böhm
Part of the modules: Information and Database Systems (p. 67)[IW3INIDS], Introduction to Data and Information Management (p. 64)[IW3INGDI], Foundations of Information Systems (p. 65)[IW3INGIS]

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

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam according to section 4 subsection 2 no. 1 study and examination regulations or of a 20 minute oral exam according to section 4 subsection 2 no. 2 study and examination regulations.

Conditions
Knowledge about database systems, distributed information systems, system architecture and communication infrastructures, e.g. from the lectures *Database Systems* [24516] and *Introduction in Computer Networks* [24519].

Learning Outcomes
At the end of the lecture, the participants are aware of the objectives and basic principles of informational self-determination. The participants are able to name and explain the fundamental challenges and impacts of data privacy protection for both individuals and society. Furthermore, the participants are expected to know and to apply current methods and technologies for data privacy protection, e.g., spatial and temporal cloaking. The objective of the lecture is to enable the participants to assess and analyze the risks of unknown technologies towards privacy, to propose methods that can be expected to deal with such risks, and to measure the effectiveness of the methods proposed.

Content
This lecture is intended to explain the impacts of interconnected information systems on data privacy. The lecture addresses both current information systems that can be observed on the Internet and information systems that are under development yet. In order to tackle these challenges, a number of technical methods have been proposed and discussed in research and practice. The lecture introduces such approaches, and points out how effective they are in ensuring data privacy. An examination of the social implications of data privacy challenges and privacy enhancing technologies concludes the lecture.

Media
lecture slides

Literature
Will be announced in the lecture.

Course: Data Protection Law [24018]

Coordinators: G. Sydow
Part of the modules: Intellectual Property and Data Protection (p. 31)[IW3JURA]

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

Learning Control / Examinations
The assessment consists of an written exam (approx. 60 min.) according to § 4(2), 1 SPO.

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
Increasing significance of information technology for data processing and interconnectedness of the society by means of telecommunication does not only enhance the social and economical relevance of data in general, it raises the question about legal rules for the protection of personalised data as well. The problem for those who are responsible for the application of law is that national rules in this area are in constant flux due to technological progress and Europeanisation of law. Additionally there is a vast number of sector-specific regulation (such as labour law). Bearing all this in mind, the lecture's main focus is the presentation of the basic principles of the German Federal Act on Data Protection (Bundesdatenschutzgesetz). In doing so, new concepts of data protection like self-data protection or system data protection will be analysed. A further focal point is the examination of evolution of sector-specific data protection law, considering as example regulation of data protection in connection with teleservice or mediaservice. Students should learn how to negotiate their ways in the interaction of different levels of legal norms and solve simple problems of data protection law.

Content
After illustrating contents and history of data protection law there will be presented backgrounds with respect to Community law and under constitutional law. Further on, the German Federal Act on Data Protection will be focussed. At this will be set forth basic principles of regulation (such as necessity), personalised data as an object of regulation, rights of those who are affected as well as the legitimacy of different procedures of data processing. Oranisational regulations, particularly data security official will be approached as well. Further on, in a case study current concepts of data protection and the problem of video surveillance will be discussed. Finally, there are three units on sector-specific regulation of telecommunication and teleservice / mediaservice.

Media
extensive script with cases; content structure, further information in the lectures

Literature
Will be announced in the course.
Elective literature:
Wil be announced in the course.

Remarks
In cooperation with the House of Competence, Students should be rhetorical trained asking and answering questions (short-answer-and-question-technique). Therefor most likely a coach will attend several lessons.

Course: Derivatives [2530550]

Coordinators: M. Uhrig-Homburg
Part of the modules: eFinance (p. 35)[IW3BWLISM3], Topics in Finance I (p. 44)[IW3BWLFBV5]

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 (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

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

Course: Services Marketing and B2B Marketing [2572158]

Coordinators: M. Klarmann, J. Kim
Part of the modules: Foundations of Marketing (p. 48)[IW3BWLMAR]

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.

Learning Outcomes
See German version.

Content
The aim of this course is to prepare students for two certain marketing perspectives. The service marketing is concentrated on the particularities coming up when a company sells services instead of products. Subjects in this section are for example:

- Measuring service quality
- Pricing services
- Management of service staff

The second part of the course contains a business-to-business marketing perspective. Topics are below others:

- Management of buying centers
- Competitive Bidding
- B2B-Branding

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

Course: Economics and Behavior [2560137]

Coordinators: N. Szech
Part of the modules: Economic Theory (p. 51)[IW3VWL12], Applied Microeconomics (p. 52)[IW3VWL13]

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

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
The grade will be determined in a final written exam. Students can earn a bonus to the final grade by successfully participating in the exercises.

Conditions
None.

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

Learning Outcomes
The students

- gain insight into fundamental topics in behavioral economics;

- get to know different research methods in the field of behavioral economics;

- learn to critically evaluate experimental designs;

- get introduced to current research papers in behavioral economics;

- become acquainted with the technical terminology in English.

Content
The course covers topics from behavioral economics with regard to contents and methods. In addition, the students gain insight into the design of economic experiments. Furthermore, the students will become acquainted with reading and critically evaluating current research papers in the field of behavioral economics.

Literature
Kahnemann, Daniel: Thinking, Fast and Slow. Farrar, Straus and Giroux, 2011.
Ariely, Dan: Predictably irrational. New York: Harper Collins, 2008.
Ariely, Dan: The Upside of Irrationality. New York: HarperCollins, 2011.

Remarks
The lecture will be held in English.

Course: Efficient Algorithms [2511100]

Coordinators: H. Schmeck
Part of the modules: Algorithms and Applications (p. 62)[IW3INAIFB5]

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. The course covers algebraic problems like matrix multiplication, evaluation of polynomials, fast Fourier transformation as well as sorting and searching, computational geometry, and leader election in distributed algorithms.

Media

- powerpoint slides with annotations using a tablet pc

- access to applets and Internet resources

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

Coordinators: C. Weinhardt
Part of the modules: eBusiness and Service Management (p. 32)[IW3BWLISM1], Topics in Finance I (p. 44)[IW3BWLFBV5], eFinance (p. 35)[IW3BWLISM3]

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

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation) and by submitting written essays as part of the exercise (according to §4(2), 3 of the examination regulation). 70% of the final grade is based on the written exam and 30% is based on assignments from the exercises. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Conditions
None.

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 Operations Research I [2550040]

Coordinators: S. Nickel, O. Stein, K. Waldmann
Part of the modules: Introduction to Operations Research (p. 24)[IW1OR]

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

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

Literature

- Nickel, Stein, Waldmann: Operations Research, 2nd edition, Springer, 2014
- 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: S. Nickel, O. Stein, K. Waldmann
Part of the modules: Introduction to Operations Research (p. 24)[IW1OR]

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
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
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, 2nd edition, Springer, 2014

- 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: W. Fichtner
Part of the modules: Energy Economics (p.)[IW3BWLIIP2]

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
None.

Learning Outcomes
The student is able to

- characterize and judge the different energy carriers and their peculiarities,

- understand contexts related to energy economics.

Content
1. Introduction: terms, units, conversions
2. The energy carrier gas (reserves, resources, technologies)
3. The energy carrier oil (reserves, resources, technologies)
4. The energy carrier hard coal (reserves, resources, technologies)
5. The energy carrier lignite (reserves, resources, technologies)
6. The energy carrier uranium (reserves, resources, technologies)
7. The final carrier source electricity
8. The final carrier source heat
9. Other final energy carriers (cooling energy, hydrogen, compressed air)

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

Literature
Complementary literature:
Pfaffenberger, Wolfgang. Energiewirtschaft. ISBN 3-486-24315-2
Feess, Eberhard. Umweltökonomie und Umweltpolitik. ISBN 3-8006-2187-8
Müller, Leonhard. Handbuch der Elektrizitätswirtschaft. ISBN 3-540-67637-6
Stoft, Steven. Power System Economics. ISBN 0-471-15040-1
Erdmann, Georg. Energieökonomik. ISBN 3-7281-2135-5

Course: Introduction to Information Engineering and Management [2540490]

Coordinators: C. Weinhardt, A. Geyer-Schulz
Part of the modules: Foundations in Business Administration (p. 19)[IW1BWL3], Foundations in Business Administration (p. 20)[IW1BWL1]

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 (60 min) (according to §4(2), 1 of the examination regulation) and by submitting written essays in conjunction with the exercise (according to §4(2), 3 of the examination regulation). The final grade is based on the written exam and on the assignments from the exercises. The exact allocation will be announced during the first lecture. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Conditions
None.

Learning Outcomes
The student

- is able to handle interdisciplinary case studies of information management and engineering and to consider the impact of juridical framework of information technology on the design of business processes,
- knows the basic principles of informations as source for economic decision support,
- can develop and design venture creation and independently develop and create a business plan with external help,
- knows the fundamentals of strategic and operative marketing and logistic systems,
- can model and analyze dynamic systems,
- can apply with external help causal loop diagrams and methods from System Dynamics to a well defined business problem, describe system behavior and analyze the consequences of decisions on the system behavior,
- learns to work team-oriented and independently in small groups, learns English terminology in the context of information management and he is able to read and comprehend international literature to solve the tutorial assignments.

Content
The last years have seen the rise of information companies whose company purpose is the generation and distribution of informations. In these companies, as well as companies of the old economy, the role of information, communication, and their cost is increasing. Some of the problems related with this trend are presented and treated in-depth in the course *Introduction to Information Engineering and Management*.
The goal of this course is to present the foundation of information engineering and management and the necessary linking of the different disciplines in today's information society. The course is completely motivated by authentic, real-world examples. With the help of these examples, the following topics as well as the interdependencies between business administration, economics, information technology, and law, are treated:

- The foundation of a company: Choosing the legal form and financing
- Information for economic decision support.
- Organizing information flows, valuation of information
- Network Economies
- Service Engineering
- Electronic markets
- Logistics/SCM
- Web/Internet-Marketing
- Production and Procurement

Media

- PowerPoint
- Full Text Documents

Literature

- Shapiro, C. and Varian, H.R., (1999) Information rules: a strategic guide to the network economy, Harvard Business School Press

- Fensel, D. et al. (2001) Product data integration in B2B e-commerce, IEEE Intelligent Systems, 16(4). Pages 54–59.
- Kotler (1980) Marketing Management - Analysis, Planning and Control. Prentice-Hall, Englewood Cliffs, 4th Edition. Pages 3–92.
- Porter (1998) Competitive Advantage: Creating and Sustaining Superior Performance. Free Press, New York. Pages 33–53.
- Sterman (2000) Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill, Boston. Chapters 4, 5.1, 5.2, 5.3, and 5.5. Pages 107–133, 137–159, 169–177.

Elective literature:

- Geyer-Schulz (1998) Fuzzy Genetic Algorithms. In: Hung T. Nguyen and Michio Sugeno (Eds.) Fuzzy Systems: Modeling and Control, Kluwer Academic Publishers, Boston. Pages 403–460.
- Porter (1998) Competitive Advantage: Creating and Sustaining Superior Performance. Free Press, New York. Pages 62-118.
- Senge (1994) The Fifth Discipline: The Art and Practice of the Learning Organization. Currency/Doubleday, New York. Chapters 2 and 3. Pages 17–54.
- Sterman (1989) Modeling Managerial Behavior: Misperceptions of Feedback in a Dynamic Decision Making Experiment, Management Science, 35(3). Pages 321–339.

Course: Introduction to Game Theory [2520525]

Coordinators: C. Puppe, P. Reiss
Part of the modules: Applied Microeconomics (p. 52)[IW3VWL13], Economic Theory (p. 51)[IW3VWL12]

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 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.

Learning Outcomes
This course offers an introduction to the theoretical analysis of strategic interaction situations. At the end of the course, students shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings.

Content
The course focusses on non-cooperative game theory. It discusses models, solution concepts, and applications for simultaneous games as well as sequential games. Various solution concepts, e.g., Nash equilibrium and subgame-perfect equilibrium, are introduced along with more advanced concepts. A short introduction to cooperative game theory is given if there is sufficient time.

Media
Slides, problem sets.

Literature
Compulsory textbook:
Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.
Additional Literature:
Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.
Binmore (1991): Fun and Games, DC Heath.
Fudenberg/Tirole (1991): Game Theory, MIT Press.
Heifetz (2012): Game Theory, Cambridge Univ. Press.

Course: Introduction in Computer Networks [24519]

Coordinators: M. Zitterbart
Part of the modules: Information and Database Systems (p. 67)[IW3INIDS], Communication and Database Systems
                        (p. 66)[IW3INKD], Telematics (p. 69)[IW3INTM]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Recommendations
It is recommended but not mandatory to attend lectures covering system architecture and software engineering.

Learning Outcomes

Content
Today's Internet is arguably the most well-known and most complex artefact ever created by mankind: hundreds of millions connected
computers and connecting networks. Millions of users who connect at any time to the Internet via various devices such as mobile phones, PDAs or laptops. Given the large scale as well as the diversity of the Internet, the question arises to which extent it is possible to understand the complex structures behind. Here, this lecture tries to provide an introduction to the world of computer networks by presenting theoretical and practical aspects of computer networks. Therefore, it covers basics of telecommunications engineering, fundamental protocol mechanisms as well as the layers model of current computer networks. Hence, we present all layers starting with the physical medium layer up to the application layer.

Media
Slides.

Literature

- J.F. Kurose, K.W. Ross: Computer Networking - A Top-Down Approach featuring the Internet. Addison-Wesley, 2007.
- W. Stallings: Data and Computer Communications. Prentice Hall, 2006.

Elective literature:

- F. Halsall: Computer Networking and the Internet. Addison-Wesley, 2005.
- P. Lockemann, G. Krüger, H. Krumm: Telekommunikation und Datenhaltung. Hanser Verlag, 1993.
- S. Abeck, P.C. Lockemann, J. Schiller, J. Seitz: Verteilte Informationssysteme. dpunkt-Verlag, 2003

Remarks
This lecture replaces the communication part of the lecture *Kommunikation und Datenhaltung*.

Course: Energy Policy [2581959]

Coordinators: M. Wietschel
Part of the modules: Energy Economics (p.)[IW3BWLIIP2]

ECTS Credits	Hours per week	Term	Instruction language
3,5	2/0	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
See German version.

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

Literature
Will be anounced in the lecture.

Course: Enterprise Architecture Management [2511600]

Coordinators: T. Wolf
Part of the modules: Business Processes and Information Systems (p. 63)[IW3INAIFB8]

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 or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None.

Learning Outcomes
Students understand the connection between enterprise strategy, business processes and business objects and IT architecture; they know methods to depict these connections and how they can be developed based on each other.

Content
The following topics will be covered: components of enterprise architecture, enterprise strategy including methods to develop strategies, business process (re)engineering, methods to implement changes within enterprises (management of change)

Media
Slides, access to internet resources.

Literature

- Nolan, R., Croson, D.: Creative Destruction: A Six-Stage Process for Transforming the Organization. Harvard Business School Press, Boston Mass. 1995

- Doppler, K., Lauterburg, Ch.: Change Management. Campus Verlag 1997

- Jacobson, I.: The Object Advantage, Business Process Reengineering with Object Technology. Addison-Wesley Publishing Company, Wokingham England 1994

- Keller, G., Teufel, Th.: SAP R/3 prozessorientiert anwenden. Addison Wesley 1998

- Österle, H.: Business Engineering Bd. 1 und 2. Springer Verlag, Berlin 1995

Course: Enterprise Risk Management [2530326]

Coordinators: U. Werner
Part of the modules: Risk and Insurance Management (p. 45)[IW3BWLFBV3]

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. term 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.

Course: Decision Theory [2520365]

Coordinators: K. Ehrhart
Part of the modules: Applied Microeconomics (p. 52)[IW3VWL13]

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

Learning Control / Examinations
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

Conditions
None.

Recommendations
See corresponding module information.
Knowledge in mathematics and statistics is required.

Learning Outcomes
The student will be made familiar with the basics in modern decision making particularly under uncertainty so that she will be able to analyze concrete decision problems and to develop simple solution procedures. By being confronted with experimental results in decision making the student should also be able to evaluate the behavioral part of decision making.

Content
This course deals with problems of decision making particularly under uncertainty. We introduce the expected utility theory of Neumann/Morgenstern and the prospect theory of Kahnemann/Tversky and discuss the concepts of stochastic dominance, risk aversion, loss aversion, reference points etc. We also consider the empirical validity of the different approaches. Additionally, the lecture provides an introduction to the theory of findings (epistemology), particularly with respect to decision theory.

Media
Script, overhead slides, additional printed material.

Literature

- Ehrhart, K.-M. und S.K. Berninghaus (2012): Decision Theory, Script, KIT.

- Hirshleifer und Riley (1997): The Analytics of Uncertainty and Information. London: Cambridge University Press, 4. Edtion.

- Berninghaus, S.K., K.-M. Ehrhart und W. Güth (2006): Strategische Spiele. Berlin u.a.: Springer, 3., Edtion

Remarks
The course "Decision Theory" [2520365] will not be offered any more in M.Sc. from winter term 2015/2016 on.

Course: Financial Econometrics [2520022]

Coordinators: M. Schienle
Part of the modules: Statistics and Econometrics (p. 54)[IW3VWL14]

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

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

Conditions
None.

Recommendations
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Learning Outcomes
The student

- shows a broad knowledge of fincancial econometric estimation and testing techniques

- is able to apply his/her technical knowledge using software in order to critically assess empirical problems

Content
ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises

Media
slides

Literature
References will be provided in the lectures

Remarks
The course is offered in summer term 2016, in winter term 2017/18 and afterwards every second term

Course: Financial Management [2530216]

Coordinators: M. Ruckes
Part of the modules: Essentials of Finance (p. 43)[IW3BWLFBV1]

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: Finance and Accounting [25026/25027] is recommended.

Learning Outcomes
Students

- are able to characterize the central questions of financial management,
- are in a position to explain the role of liquidity, compute important liquidity ratios and explain their meaning,
- are able to describe and discuss the basic principles of working capital management,
- know different types of corporate financing as well as their pros and cons,
- are in a position to analyze firms' capital strucures and to identify possible improvements,
- are familiar with basic questions of corporate distribution policy.

Content
Analytical methods and theories in the field of corporate finance with the main focus on:

- Liquidity and Working Capital Management
- Sources of short term/ long term finance
- Capital Structure
- Dividend policy

Literature
Elective literature:

- Ross, Westerfield, Jaffe, Jordan (2009): Modern Financial Management, McGraw-Hill International Edition
- Berk, De Marzo (2014): Corporate Finance, Pearson Addison Wesley

Course: Financial Intermediation [2530232]

Coordinators: M. Ruckes
Part of the modules: Topics in Finance I (p. 44)[IW3BWLFBV5]

ECTS Credits	Hours per week	Term	Instruction language
4,5	3	Winter term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes
Students

- are in a position to describe the arguments for the existence of financial intermediaries,
- are able of discuss and analyze both static and dynamic aspects of contractual relationships between banks and borrowers,
- are able to discuss the macroeconomic role of the banking system,
- are in a position to explain the fundamental principles of the prudential regulation of banks and are able to recognize and evaluate the implications of specific regulations.

Content

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Stability of the financial system
- The macroeconomic role of financial intermediation
- Principles of the prudential regulation of banks

Literature
Elective literature:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6th edition, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2nd edition, MIT Press.

Course: Advanced object orientation [24665]

Coordinators: G. Snelting
Part of the modules: Advanced Object Orientation (p. 76)[IW4INFON]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
This is not a lecture on object-oriented software development! Rather, knowledge of object-oriented software engineering (e.g. Java, UML, Design Patterns) is required.

Recommendations
Good knowledge of Java

Learning Outcomes
Participants in this course know the basics of different object oriented programming languages (e.g. Java, C#, Smalltalk, Scala). They know how inheritance and dynamic dispatch work, behave and are implemented, and how these are used in software engineering. They know innovative language constructs in objects oriented languages like generics, aspects and traits. The participants know the theoretic foundations of (e.g. type systems), software engineering tools for (e.g. refactoring) and techniques (e.g. points-to analysis) for analysing object oriented programs. They know current trends in research on object oriented programming

Content

- Behaviour and semantics of dynamic dispatch
- Implementation of single and multiple inheritance
- Genericity, refactoring
- Traits and mixins, virtual classes
- Cardelli's type system
- Analyses on the call graph, points-to analyses
- operational semantics, type safety
- bytecode, JVM, bytecode verifier, dynamic compilation

Course: Foundations of Digital Services [2595466]

Coordinators: C. Weinhardt, H. Fromm
Part of the modules: eBusiness and Service Management (p. 32)[IW3BWLISM1], Specialization in Customer Relation-
                         ship Management (p. 38)[IW3BWLISM5]

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

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation). By successful
completion of the exercises (according to §4(2), 3 of the examination regulation) a bonus can be obtained. If the grade of the
written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The bonus only
applies to the first and second exam of the semester in which it was obtained.

Conditions
None.

Recommendations
None.

Learning Outcomes
The student:
• understands the different perspectives on services and the concept of value generation in service networks,
• is able to understand and apply concepts, methods and tools for the design, development and management of digital services,
• gains experience in group work such as in solving case studies and in the professional presentation of those results,
• practices the use of English language as a preparation for work in an international environment

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 con-
cepts 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
lecture slides

Literature
Announced in the first session.

Remarks
This course was formerly named "eServices".
The credits have been changed from 5 to 4,5.

Course: Business Strategies of Banks [2530299]

Coordinators: W. Müller
Part of the modules: Topics in Finance I (p. 44)[IW3BWLFBV5]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
Students are are in a position to discuss the principles of commercial banking. They are familiar with fundamental concepts of bank management and are able to apply them.

Content
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.
The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

Literature
Elective literature:

- A script is disseminated chapter by chapter during the course of the lecture.

- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer

Course: Industrial Property and Copyright Law [24070]

Coordinators: T. Dreier
Part of the modules: Intellectual Property and Data Protection (p. 31)[IW3JURA]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The students have an overview of the national, european and international law of intellectual property, expecially of patent law, trademark law, copyright law and also presents other laws of industrial property, including the additional legal protection by unfair competition law. Students understand the differences between registration and non-registration rights. They comprehend key concepts such as territoriality, conditions for protection, exclusive rights, limitations and exceptions, infringement and sanctions. In addition, the focus will be on licensing of IP rights.

Content
The course gives an introduction in to the legal protection of intellectual property. The different rationals for granting legal protection to immaterial goods will be explained, as well as the difference between registration and non-registration rights, and the system of international IP protection on the basis of the principle of territoriality will be explained. Following, the different IP rights will be discussed with regard to their respective conditions and scope of protection. An overview of licensing and of the sanctions in case of infringement of IP rights will be given.

Media
Slides.

Literature
Ilzhöfer, Volker Patent-, Marken- und Urheberrecht Verlag Vahlen, 7current edition
Elective literature:
Additional literature tba

Course: Global Optimization I [2550134]

Coordinators: O. Stein
Part of the modules: Applications of Operations Research (p. 55)[IW3OR5], Methodical Foundations of OR (p. 57)[IW3OR6]

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.

Conditions
None.

Learning Outcomes
The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,

- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case 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.

Media
Lecture notes.

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: O. Stein
Part of the modules: Methodical Foundations of OR (p. 57)[IW3OR6]

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.

Conditions
None.

Learning Outcomes
The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case 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.

Media
Lecture notes.

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: Basic Notions of Computer Science [24001]

Coordinators: T. Worsch
Part of the modules: Foundations in Informatics (p. 14)[IW1INF1]

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

Learning Control / Examinations
The assessment of the module consists of a grade certificate for the exercise according to sec. 4 subsec. 2 no. 3 study and examination regulations and of a written exam (2 hours) according to sec. 4 subsec. 2 no. 1 study and examination regulations. The grade of the module corresponds to the grade of the written exam.

Conditions
None.

Learning Outcomes

- Students know the most important techniques for definitions and are able to read and understand such definitions.
- Students know the difference between syntax and semantics.
- Students know the most important notions from discrete mathematics and computer science and are able to use them for the description of problems and in proofs.

Content

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

Media
lecture notes, slides (pdf).

Literature
Elective literature:

- Goos: Vorlesungen über Informatik, Band 1, Springer, 2005
- Abeck: Kursbuch Informatik I, Universitätsverlag Karlsruhe, 2005

Course: Fundamentals of Production Management [2581950]

Coordinators: F. Schultmann
Part of the modules: Industrial Production I (p. 41)[IW3BWLIIP1]

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 (90 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

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: Commercial and Corporate Law [24011]

Coordinators: Z. (ZAR), O. Knöfel
Part of the modules: Commercial Law (p. 27)[IW1JURA2]

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

Learning Control / Examinations
The assesment ist explained in the module description

Conditions
None.

Recommendations
It is recommended to attend the lecture *BGB for Advanced* [24504] in advance.

Learning Outcomes
the student is able to overview the specifics of commercial transactions, commercial agency and the law of merchants. Moreover, he knows the forms of organization available in German company law.

Content
The lecture begins with an introduction into the different terms of merchants of the German Commercial Code. Subsequently, the rules governing trade names, commercial registries and commercial agency are dealt with. This is followed by a presentation of the general rules of commercial transactions and of the specific commercial transactions. In company law, first of all, the basics of partnerships are explained. Thereafter, the focus will be on corporate law which is most important in practice.

Media
Slides.

Literature
Klunzinger, Eugen

- Grundzüge des Handelsrechts, Verlag Vahlen, latest edition
- Grundzüge des Gesellschaftsrechts, Verlag Vahlen, latest edition

Elective literature:
tba at the beginning of the course.

Course: Industrial Organization [2560238]

Coordinators: P. Reiss
Part of the modules: Economic Theory (p. 51)[IW3VWL12], Applied Microeconomics (p. 52)[IW3VWL13]

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 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

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

Learning Outcomes
The student

- understands the basic problems relating to imperfect competition and its policy implications,

- has basic skills of the game-theoretic and microeconomic modeling used in the field of Industrial Organization,

- applies these skills in the analysis of typical problems of Industrial Organization,

- understands the scope and implications of strategic behavior of firms in various market settings.

Content
This course introduces the theory of industrial organization using game theoretical models. The course is divided into two parts: The first part reviews standard market forms (monopoly, oligopoly, perfect competition). The second part discusses more advanced topics including price discrimination, strategic product differentiation, cartel formation, market entry, and research and development.

Media
Slides, problem sets.

Literature
Compulsory Textbook:
H. Bester (2012): Theorie der Industrieökonomik, Springer-Verlag.
Additional Literature:
J. Tirole (1988): Theory of Industrial Organization, MIT Press.
D. Carlton / J. Perloff (2005): Modern Industrial Organization, Pearson.
P. Belleflamme / M. Peitz (2010): Industrial Organization

Course: Informatics Seminar [SemInfo]

Coordinators: M. Zitterbart
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The student

- deals with a well-defined problem in the Informatics domain in detail,

- analyses and discusses the given problems as part of the courses and in the final seminar papers,

- discusses, presents, and defends technical arguments within the given task specifications,

- organises the drafting of the final seminar paper mostly independently.

The competences gained as part of this seminar module serve as a preparation for the Bachelor thesis. Guided by the respective examiner, the student exercises independent scientific work in drafting and presenting the final seminar paper.

Content
The module consists of a seminar, that is related to the research field of informatics. A complete list of available seminars is published in the internet.

Remarks
The mentioned seminars in this module handbook are place holders. For each semester, a complete list of seminars are published in the Vorlesungsverzeichnis or at the web pages of the participating institutes. Often, the seminar topics for a given semester are published at the end of the preceding semester. Some seminars require an early sign-in deadline at the end of the of the preceding semester.

Course: Integrated Network and Systems Management [2400004]

Coordinators: B. Neumair
Part of the modules: Information Services in Networks (p. 61)[IW3INAIFB4]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: International Marketing [2572155]

Coordinators: M. Klarmann
Part of the modules: Foundations of Marketing (p. 48)[IW3BWLMAR]

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

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None.

Learning Outcomes
Students
- know the characteristics of international marketing
- are familiar with the Hofstede's cultural dimensions theory
- understand basic concepts of cultural learning (the concept of acculturation, the psychic distance paradox)
- know different concepts that explain international buying behavior (e.g. country-of-origin effects)
- comprehend different concepts for market entries in an international context ("waterfall"-strategy, "sprinkler"-strategy, method of analogy, chain ratio method)
- understand what needs to be considered regarding international market research (dealing with ethical dilemmas, challenges regarding primary and secondary data sources, testing measurement equivalence, linguistic equivalence, differences in the response styles of questionnaires)
- know the particularities of international product policy (standardization vs. differentiation, challenge of branding, fight against product plagiarism, brand counterfeiting and product piracy, protection of intellectual property)
- are familiar with the particularities in the international price policy (BigMac Index, how to deal with price demand functions to achieve profit maximization, arbitrage, price corridor, standardization vs. differentiation of prices, how to deal with currency risks, inflation, exchange rates and different willingness to pay)
- know the characteristics of the international communication policy (different laws, problems regarding international standardized campaigns)
- know particularities of the international sales policy (international channels, differences of contract negotiations)
- are able to organize international marketing departments and subsidiaries
- know the problems of marketing in emerging markets

Content
Doing marketing abroad creates a number of significant new challenges for firms. This class is intended to prepare you for meeting these challenges. In the first session, we will discuss the peculiarities of international marketing. The next five sessions will then be dedicated to methods that can be used to address them. For instance, we will look at the following issues:

- Internationalization strategies
- Market entry strategies
- Standardization vs. individualization (e.g. regarding products, prices, and communication)
- Measurement equivalence in international market research

In the final session, we will apply this knowledge to the case of Wal Mart. In particular, Wal Mart, despite being the largest retailing company worldwide, failed to successfully enter the German Market. We will discuss Wal Mart's failure using the methods taught in the weeks before.

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

Course: International Finance [2530570]

Coordinators: M. Uhrig-Homburg, Dr. Walter
Part of the modules: eFinance (p. 35)[IW3BWLISM3], Topics in Finance I (p. 44)[IW3BWLFBV5]

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:

- Eiteman, D. et al., Multinational Business Finance, 13. edition, 2012.
- Solnik, B. and D. McLeavey, Global Investments, 6. edition, 2008.

Course: Cost and Management Accounting [2530210]

Coordinators: T. Lüdecke
Part of the modules: Topics in Finance I (p. 44)[IW3BWLFBV5]

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.

Remarks
The examination will be offered latest until summer term 2015 (repeaters only).

Course: Investments [2530575]

Coordinators: M. Uhrig-Homburg
Part of the modules: Essentials of Finance (p. 43)[IW3BWLFBV1]

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: Finance and Accounting [2610026] 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: IT-Security Management for Networked Systems [24149]

Coordinators: H. Hartenstein
Part of the modules: Telematics II (p. 70)[IW3INTM2]

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

Learning Control / Examinations

Conditions
Basics in computer networks, according to the lectures *Database Systems* [24516] and *Introduction in Computer Networks* [24519] and *Networked IT-Infrastructures* [24074] respectively are required.

Learning Outcomes

Content
The course of this module teaches how to manage modern highly distributed IT systems and services. As a foundation, key concepts and models commonly used in the areas of IT Security Management, Network Management, Identity Management, and IT Service Management are introduced and discussed.

Based on these concepts, selected technical architectures, protocols, and tools found within the mentioned areas of interest are evaluated. Among others, IT security workflows are illustrated by means of the "BSI Grundschutz". It is explained how highly distributed computer networks can be monitored and controlled, and the management of public IP networks is evaluated. The course also focuses on Identity and Access Management as well as Firewalls, Intrusion Detection, and Prevention. Furthermore, concrete examples taken from the daily operation of the Steinbuch Centre for Computing (SCC), for instance in the context of the glass fiber backbone KITnet, are discussed to underline presented conclusions. By presenting current research activities in the areas of Peer-to-Peer networks (e.g. BitTorrent) and social networks (e.g. Facebook) management approaches are put into a global context

Media
Slides

Literature
Jochen Dinger, Hannes Hartenstein, Netzwerk- und IT-Sicherheitsmanagement : Eine Einführung, Universitätsverlag Karlsruhe, 2008, ISBN: 978-3866442092

Claudia Eckert, IT-Sicherheit. Konzepte - Verfahren - Protokolle, 8. Auflage, Oldenbourg Wissenschaftsverlag, 2013, ISBN: 978-3486721386

Andrew S. Tanenbaum, Computernetzwerke, 5. Auflage, Pearson Studium, 2012, ISBN: 978-3868941371

Messaoud Benantar, Access Control Systems: Security, Identity Management and Trust Models, Springer, 2006, ISBN: 978-0387004457

Course: Mechanisms and Applications of Workflow Systems [24111]

Coordinators: J. Mülle, Silvia von Stackelberg

Part of the modules: Information and Database Systems (p. 67)[IW3INIDS], Introduction to Data and Information Management (p. 64)[IW3INGDI], Foundations of Information Systems (p. 65)[IW3INGIS]

ECTS Credits	Hours per week	Term	Instruction language
5	3	Winter term	de

Learning Control / Examinations

It will be announced in advance if the assessment consists of a written exam (approx. 60 minutes) according to section 4 subsection 2 no. 1 study and examination regulations or of an oral exam (approx. 20 minutes) following according to section 4 subsection 2 no. 2 study and examination regulations.

Conditions

None.

Recommendations

Knowledge about database systems, e.g. from the lecture *Database Systems* [24516].

Learning Outcomes

A goal of the course is that the participants are able to model workflows, to explain modelling aspects and their relationships, to compare modelling methods, and to evaluate the usability of these methods in different application areas. They should understand the technical construction of workflow-management systems with the most important components and different architectures and implementation alternatives. Finally, the participants should have obtained an overview on actual relevant standardization proposals and how to use these approaches, and they should be aware of actual research topics.

Content

Workflow Management Systems (WFMS) support the management of business processes according to pre-defined process descriptions. Managing processes flexibly, i.e., handle deviations, e.g., in order to catch exceptions, adapt processes to modified process environments or to support ad-hoc workflows, becomes more and more important.

The course starts with discussing WFMS in the context of business-information systems and their relationship with the more common business-process modelling. Petri nets and pi-calculus are introduced as basic formalisms. Then, methods to model workflows and the design process for workflow-management applications are presented in detail and supplemented with exercises.

An advanced aspect is new research in WFMS technology. In particular, the use of internet techniques like web services and standardization approaches for process modeling, orchestration, and choreography in service-oriented architectures will be presented.

In the realization part of the course, various implementation techniques and architectural issues to realize workflow-management systems as well as diverse system types and concrete workflow-management systems are presented.

Further, the course presents application-driven procedures for changing and adapting workflows to new reqirements, especially business process reengineering and continous process improvement.

The course concludes with recent research areas and results, e.g., methods and techniques to support flexible, adaptive workflows, security of workflows and process mining.

Media

Slides.

Literature

- Matthias Weske: Business Process Management. Springer, 2007

- Frank Leymann, Dieter Roller: Production Workflows - Concepts and Techniques. Prentice-Hall, 2000

- W.M.P. van der Aalst: Workflow Management: Models, Methods, and Systems. MIT Press, 368 pp., 2002

- W.M.P. van der Aalst: Workflow Management: Models, Methods, and Systems. MIT Press, 368 pp., $40.00, ISBN 0-262-01189-1, 2002

- Michael Havey: Essential Business Process Modeling. O´Reilly Media, Inc., 2005

- S. Jablonski, M. Böhm, W. Schulze (Hrsg.): Workflow-Management - Entwicklung von Anwendungen und Systemen. dpunkt-Verlag, Heidelberg, 1997

Elective literature

Will be announced in the lecture.

Course: Logistics and Supply Chain Management [2581996]

Coordinators: M. Wiens
Part of the modules: Industrial Production I (p. 41)[IW3BWLIIP1]

ECTS Credits	Hours per week	Term	Instruction language
3,5	2/0	Summer term	en

Learning Control / Examinations
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Recommendations
None.

Learning Outcomes

- The students know the central tasks and challenges of modern logistics management.
- The students apply key concepts in the area of logistics.
- The students apply methods of risk evaluation and risk management in supply chains.
- The students know key incentive-schemes and planning-tools relevant to supply chain management.
- The students apply exemplary methods to solve practical problems.

Content

- Introduction: Basic Terms and Concepts
- Logistics Systems and Supply Chain Management
- Supply Chain Risk Management
- Extensions and Applications

Media
Medie will be provided on learning platform.

Literature
will be announced in the course

Course: Logistics - organisation, design and control of logistic systems [2118078]

Coordinators: K. Furmans
Part of the modules: Supply Chain Management (p. 34)[IW3BWLISM2]

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
Students are able to:

- Describe logistical tasks,

- Design logistical systems suitable to the respective task,

- Dimension stocastical stock models,

- Determine essential influencing parameters on the bullwhip effect and

- Use optimizing solution methods.

Content
multistage logistic process chains
transport chain in logistic networks
distribution processes
distribution centers
logistics of production systems
dependencies between production and road traffic
information flow
cooperative strategies (like kanban, just-in-time, supply chain management)

Media
presentations, black board

Literature
None.

Remarks

Course: Management of Business Networks [2590452]

Coordinators: C. Weinhardt
Part of the modules: eBusiness and Service Management (p. 32)[IW3BWLISM1], Supply Chain Management (p. 34)[IW3BWLISM2]

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

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation) and by submitting written essays as part of the exercise (according to §4(2), 3 of the examination regulation). 65% of the final grade is based on the written exam and 35% is based on assignments from the exercises. Successful completion of the exercises is a prerequisite for admission to the written exam. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Conditions
None.

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
- E-learning platform ILIAS
- Recorded lecture available on the internet, 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: C. Weinhardt
Part of the modules: Supply Chain Management (p. 34)[IW3BWLISM2]

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

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

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
- E-learning platform ILIAS
- Recorded lecture available on the internet, 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.

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: Brand Management [2572177]

Coordinators: B. Neibecker
Part of the modules: Foundations of Marketing (p. 48)[IW3BWLMAR]

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 minutes) (following §4(2), 1 of the examination regulation).
The examination is offered every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
Students have learned the following outcomes and competences:

- To specify the key terms in brand management
- To identify and define theoretical constructs in marketing management to build brand value
- To indentify the main research trends
- To analyze and interpret high level academic articles
- To learn interactive skills to work in teams and to follow a goal-oriented approach
- To gain understanding of methodological research to develop concrete plans for marketing decision-making

Content
The students should learn the essential scientific and practical principles of Marketing, especially branding. Branding consists of any name, design, style, words or symbols, singly or in any combination that distinguish one product from another in the eyes of the consumer. Brand positioning, brand loyalty and brand equity are discussed as important elements of a management concept. The focus of the course is not limited to short-term ROI, but also long-term benefits of communication strategies facing company's responsibilities to all of its stakeholders, e.g. consumers, investors and public. The strategies and techniques in branding are broaden by several case studies. English as an international technical language in marketing is practiced with course readings and scientific papers. Content:
The course brand management starts with the development of the corporate objectives as the heart of the brand planning process followed by definitions of brand. Setting up on the psychological and social bases of consumer behavior, aspects of an integrated marketing communication are discussed. The students should acquire the particular value of branding strategies. The concept of brand personality is considered in two perspectives, from a practical point of view and the challenging position of the theoretical construct. Methods for the measurement of a consumer-based brand equity are compared with the financial valuation of the brand. The information provided by this equity measurements are related to the equity drivers in brand management. The marketers perspective will be accomplish with the analysis of several case studies. Within the limits of a knowledge based system for advertising evaluation many of the issues accomplished in the course are summarized. At the same time it is discussed as a tool to use marketing knowledge systematically.

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 2010.
- Himmel, H. und A. Krostewitz: Bewertung immaterieller Ressourcen als Teil der Unternehmenssteuerung: Herausforderungen für das Controlling. In: ZfCM: Controlling & Management, 2012, 30-39.
- 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.
- Management-Tools: 10 Grundsätze der monetären Markenbewertung. http://www.management-tools.ch (12.09.2012) (basierend auf Franzen: 2006)
- 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: Managing the Marketing Mix [2571152]

Coordinators: M. Klarmann
Part of the modules: Foundations of Marketing (p. 48)[IW3BWLMAR]

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

Learning Control / Examinations

Conditions
This course is compulsory within or the module "Foundations of Marketing" and must be examined.

Learning Outcomes
See German version.

Content
The content of this course concentrates on the four elements of the marketing mix. Therefore the four main chapters are:

- Product management
- Pricing
- Promotion
- Sales management

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

Course: Mathematics I for Information Engineering and Management [01360]

Coordinators: A. Rieder, C. Wieners
Part of the modules: Mathematics I (p. 29)[IW1MATH1]

ECTS Credits	Hours per week	Term	Instruction language
8	4/2/2	Winter term	de

Learning Control / Examinations

The assessment consists of

1. a graded certificate of exercise following §4(2), 3 of the examination regulation from the exercises to mathematics I and

2. a written examination of 60 minutes on the lectures mathematics I following §4(2), 1 of the examination regulations.

The grade of the module is computed as a weighted sum, where the grade of the written examiniation has a weight of 80% and the certificates a weight of 20%.

Conditions

None.

Learning Outcomes

The aim of of the course "Mathematics I" is to impart a comprehension of basic methods in linear algebra.

Content

The two lectures „Mathematics I and II for the subject area Information Systems" ,edoate basic mathematical knowlegde which is requiered to understand modern computer science and economical sciences. Part I is concerned with linear algebra including the basic algebraic structures, vector spaces and linear mappings. These structures are important for example in computer science.

Media

blackboard, data projector and transparencies if necessary

Literature
Elective literature:

• Offer for interested and top students

   Ammann / Escher: Analysis I–III, Birkhäuer

• Tutorials / simpler literature alternatives

   Henze / Last: Mathematik für Wirtschaftsingenieure I–II, Teubner

   Ansorge / Oberle: Mathematik für Ingenieure I–III, Wiley

Course: Mathematics II for Information Engineering and Management [01877]

Coordinators: A. Rieder, C. Wieners
Part of the modules: Mathematics II (p. 30)[IW1MATH2]

ECTS Credits	Hours per week	Term	Instruction language
8	4/2/2	Summer term	de

Learning Control / Examinations
The assessment in this module consists of

1. a graded certificate of exercise following §4(2), 3 of the examination regulation from the exercises to mathematics II and

2. a written examination of 60 minutes on the lectures mathematics II following §4(2), 1 of the examination regulations.

The grade of the module is computed as a weighted sum, where the grade of the written examiniation has a weight of 80% and the certificate a weight of 20%.

Conditions
Mathematics I
None.

Learning Outcomes
The aim of the course "Mathematics I" is to impart a comprehension of basic methods in analysis.

Content
The letures in mathematics give an overview in basic mathematical knowlegde which is requiered to understand modern computer science and economical sciences. Part II constists of analysis including an introduction into the calculus of functions of one or several variables.

Media
blackboard, data projector and transparencies if necessary

Literature
Elective literature:

• Offer for interested and top students

  Ammann / Escher: Analysis I–III, Birkhäuer

• Tutorials / simpler literature alternatives

  Henze / Last: Mathematik für Wirtschaftsingenieure I–II, Teubner

  Ansorge / Oberle: Mathematik für Ingenieure I–III, Wiley

Course: Mobile Computing and Internet of Things [240051]

Coordinators: M. Beigl
Part of the modules: Mobile Computing and Internet of Things (p. 78)[IW3INMC]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Course: Mobile Communication [24643]

Coordinators: O. Waldhorst, M. Zitterbart
Part of the modules: Telematics II (p. 70)[IW3INTM2]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Recommendations
Knowledge of the lectures *Introduction in Computer Networks* [24519] (or similar lectures) and *Telematics* [24128].

Learning Outcomes
The students are introduced to the fundamental terms used in mobile communications. They are equipped with a portfolio of basic methods for implementing mobile communication systems. Furthermore, they learn how prominent mobile communication systems with practical relevance are structured and operated. In this context, the students will develop an understanding of typical problems in mobile communication systems and learn how to chose and apply methods from the portfolio to solve them.

Content
The course starts with a discussion of typical problems related to wireless transmissions, e.g., signal propagation and fading, reflections and interference. Subsequently, it develops a portfolio of methods for modulation of digital data, multiplexing, coordination of concurrent medium access, and mobility management. To illustrate where and how these methods are applied in practice, typical mobile communication systems are introduced. These include wireless local area networks using IEEE 802.11, wireless personal area networks using Bluetooth, as well as wireless telecommunication systems using GSM, UTMS with HSPA and LTE. Discussions of network-layer mechanisms (e.g., mobile ad-hoc networks and MobileIP) and transport layer protocols close the course.

Media
Slides.

Literature
J. Schiller; Mobilkommunikation; Addison-Wesley, 2003.
Elective literature:
C. Eklund, R. Marks, K. Stanwood, S. Wang; IEEE Stadard 802.16: A Technical Overview of the WirelessMANTM Air Interface for the Broadband Wireless Access; IEEE Communications Magazine, June 2002.
H. Kaaranen, A. Ahtiainen, et. al., UMTS Networks – Architecture, Mobility and Services, Wiley Verlag, 2001.
B. O'Hara, A. Petrick, The IEEE 802.11 Handbook – A Designers Companion IEEE, 1999.
B. A. Miller, C. Bisdikian, Bluetooth Revealed, Prentice Hall, 2002
J. Rech, Wireless LAN – 802.11-WLAN-Technologien und praktische Umsetzung im Detail, Verlag Heinz Heise, 2004.
B. Walke, Mobilfunknetze und ihre Protokolle, 3. Auflage, Teubner Verlag, 2001.
R. Read, Nachrichten- und Informationstechnik; Pearson Studium 2004.
What You Should Know About the ZigBee Alliance http://www.zigbee.org.
C. Perkins, Ad-hoc Networking, Addison Wesley, 2000.
H. Holma, WCDMA For UMTS, HSPA Evolution and LTE, 2007

Course: Business Process Modelling [2511210]

Coordinators: A. Oberweis
Part of the modules: Semantic Knowledge Management (p. 59)[IW3INAIFB2], Business Processes and Information Systems (p. 63)[IW3INAIFB8]

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 (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Conditions
None.

Learning Outcomes
Students

- describe goals of business process modeling and aplly different modeling languages,

- choose the appropriate modeling language according to a given context,

- use suitable tools for modeling business processes,

- apply methods for analysing and assessing process modells to evaluate specific quality characteristics of the process model.

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

Media
Slides, access to internet resources.

Literature
M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer 2012.
F. Schönthaler, G.Vossen, A. Oberweis, T. Karl: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.
Further Literature will be given in the lecture.

Course: Multimedia Communications [24132]

Coordinators: R. Bless, M. Zitterbart
Part of the modules: Telematics II (p. 70)[IW3INTM2]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Recommendations
Knowledge of the lectures *Introduction in Computer Networks* [24519] (or similar lectures) and *Telematics* [24128].

Learning Outcomes
Objective of the lecture is to present techniques, procotols, and latest developments in Internet-based multimedia communications. Especially in the context of increasing amount of voice communications over the Internet (Voice over IP), key technologies and protocols such as RTP and SIP are intensively discussed so that their function and principles are understood in detail.

Content
This lecture describes techniques and protocols to transmit audio and video data over the Internet. Topics are audio/video conferences, audio/video transport protocols, Voice over IP SIP for signaling, establishment and control of multimedia sessions, RTP for transport of multimedia data over the Internet, RTSP for control of A/V streams, ENUM, A/V Streaming, Middleboxes and Caches, DVB, Advanced TVand Video on Demand.

Media
Slides. Protocol traces.

Literature
James F. Kurose, Keith W. Ross: Computer Networking, 6th Edition,
Pearson, 2013, ISBN-10: 0-273-76896-4, ISBN-13 978-0-273-76896-8,
Chapter Multimedia Networking
Weiterführend:
Stephen Weinstein: The Multimedia Internet, Springer, 2005, ISBN 0-387-23681-3
Alan B. Johnston: SIP – understanding the Session Initiation Protocol, 2nd ed., Artech House, 2004
R. Steinmetz, K. Nahrstedt: Multimedia Systems, Springer 2004, ISBN 3-540-40867-3
Ulrick Trick, Frank Weber: SIP, TPC/IP und Telekommunkationsnetze, Oldenbourg, 4. Auflage, 2009

Course: Nature-inspired Optimisation Methods [2511106]

Coordinators: P. Shukla
Part of the modules: Algorithms and Applications (p. 62)[IW3INAIFB5]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Summer 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", 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exersices . The bonus exam may be split into several shorter written tests.
The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None.

Learning Outcomes
To learn:

1. Different nature-inspired methods: local search, simulated annealing, tabu search, evolutionary algorithms, ant colony optimization, particle swarm optimization

2. Different aspects and limitation of the methods

3. Applications of such methods

4. Multi-objective optimization methods

5. Constraint handling methods

6. Different aspects in parallelization and computing platforms

Content
Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

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

Literature
F. Glover and M. Laguna. „Tabu Search" In: Handbook of Applied Optimization, P. M. Pardalos and M. G. C. Resende (Eds.), Oxford University Press, pp. 194-208, 2002. G. Raidl and J. Gottlieb: Empirical Analysis of Locality, Heritability and Heuristic Bias in Evolutionary Algorithms: A Case Study for the Multidimensional Knapsack Problem. Evolutionary Computation, MIT Press, 13(4), pp. 441-475, 2005.
Weiterführende Literatur:
E. L. Aarts and J. K. Lenstra: „Local Search in Combinatorial Optimization". Wiley, 1997. D. Corne and M. Dorigo and F. Glover: „New Ideas in Optimization". McGraw-Hill, 1999. C. Reeves: „Modern Heuristic Techniques for Combinatorial Optimization". McGraw-Hill, 1995. Z. Michalewicz, D. B. Fogel: „How to solve it: Modern Heuristics". Springer, 1999. E. Bonabeau, M. Dorigo, G. Theraulaz: „Swarm Intelligence". Oxford University Press, 1999. A. E. Eiben and J. E. Smith: „Introduction to Evolutionary Computing". Springer, 2003. K. Weicker: „Evolutionäre Algorithmen". Teubner, 2002. M. Dorigo, T. Stützle: „Ant Colony Optimization". MIT Press, 2004. K. Deb: „Multi-objective Optimization using Evolutionary Algorithms", Wiley, 2003.

Course: Network Security: Architectures and Protocols [24601]

Coordinators: M. Zitterbart
Part of the modules: Telematics II (p. 70)[IW3INTM2]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Recommendations
Knowledge of the lectures *Introduction in Computer Networks* [24519] (or similar lectures) and *Telematics* [24128].

Learning Outcomes
The course aims at teaching fundamental concepts of the design of secure communication protocols. More advanced topics include existing security protocols of the internet and local networks.

Content
The lecture Network Security: Architectures and Protocols considers challenges and technologies in the design of secure communication protocols, as well as topics of data security and privacy. Complex systems like Kerberos will be discussed explicitly and their design decision considering security aspects will be outlined. A special focus is set on PKI-basics, infrastructures, as well as on specific PKI-formats. Furthermore, an emphasis is set on the commonly used security protocols IPSec, TLS/SSL, and protocols of infrastructure security.

Media
Slides.

Literature
Roland Bless et al. Sichere Netzwerkkommunikation. Springer-Verlag, Heidelberg, Juni 2005.
Elective literature:

- Charlie Kaufman, Radia Perlman, and Mike Speciner. Network Security: Private Communication in a Public World. 2nd Edition. Prentice Hall, New Jersey, 2002.

- Carlisle Adams and Steve Lloyd. Understanding PKI. Addison Wesley, 2003

- Rolf Oppliger. Secure Messaging with PGP and S/MIME. Artech House, Norwood, 2001.

- Sheila Frankel. Demystifiying the IPsec Puzzle. Artech House, Norwood, 2001.

- Thomas Hardjono and Lakshminath R. Dondeti. Security in Wireless LANs and MANs. Artech House, Norwood, 2005.

- Eric Rescorla. SSL and TLS: Designing and Building Secure Systems. Addison Wesley, Indianapolis, 2000.

Course: Nonlinear Optimization I [2550111]

Coordinators: O. Stein
Part of the modules: Methodical Foundations of OR (p. 57)[IW3OR6], Stochastic Methods and Simulation (p. 58)[IW3OR7]

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 (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of *Nonlinear Optimization II* [2550113]. In this case, the duration of the written examination takes 120 minutes.

Conditions
The successful completion of a compulsory prerequisite is mandatory for admission to the exam.

Learning Outcomes
The student

- knows and understands fundamentals of unconstrained nonlinear optimization,

- is able to choose, design and apply modern techniques of unconstrained 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.

Media
Lecture notes.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002

- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993

- O. Güler, Foundations of Optimization, Springer, 2010

- 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: O. Stein
Part of the modules: Methodical Foundations of OR (p. 57)[IW3OR6]

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 (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.
The exam can also be combined with the examination of *Nonlinear Optimization I* [2550111]. In this case, the duration of the written exam takes 120 minutes.

Conditions
The successful completion of a compulsory prerequisite is mandatory for admission to the exam.

Learning Outcomes
The student

- knows and understands fundamentals of constrained nonlinear optimization,

- is able to choose, design and apply modern techniques of constrained 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.

Media
Lecture notes.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002

- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993

- O. Güler, Foundations of Optimization, Springer, 2010

- 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: B. Wigger, Assistenten
Part of the modules: Applied Microeconomics (p. 52)[IW3VWL13]

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
See German version.

Content
The *Public Revenues* lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-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: G. Sydow
Part of the modules: Constitutional and Administrative Law (p. 28)[IW1JURA3]

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

Course: Public Law II - Public Economic Law [24520]

Coordinators: G. Sydow
Part of the modules: Constitutional and Administrative Law (p. 28)[IW1JURA3]

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

Learning Control / Examinations
The assessment consists of a written exam (60min) 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

Course: Operative CRM [2540520]

Coordinators: A. Geyer-Schulz
Part of the modules: Specialization in Customer Relationship Management (p. 38)[IW3BWLISM5], CRM and Service Management (p. 36)[IW3BWLISM4]

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 10) from excersise work will be added. The grades of this lecture are assigned following the table below:

Grade	Minimum points
1.0	95
1.3	90
1.7	85
2.0	80
2.3	75
2.7	70
3.0	65
3.3	60
3.7	55
4.0	50
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.

Remarks

As of winter term 2014/15 this lecture is hold in alternation with "2540522 - Analytical CRM". The current schedule can be seen on the chair's website (http://www.em.uni-karlsruhe.de/studies/).

Course: Organic Computing [2511104]

Coordinators: H. Schmeck
Part of the modules: Algorithms and Applications (p. 62)[IW3INAIFB5]

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) and of submitting written exercises that recapitulate the content of the course. The exercises include theoretical questions as well as practical programming. For providing a successful solution to all exercises, a bonus will be granted, improving the grade of a passed exam by one grade-step (0.3 or 0.4, respectively, following §4(2), 3 SPO). The course will be offered every second semester (summer term) and exams may be repeated at every ordinary exam date.

Conditions
None.

Learning Outcomes
The student acquires the ability to master methods and concepts of Organic Computing and to demonstrate innovation skills regarding the used methods.
Therefore the course aims at the teaching of fundamentals and methods of Organic Computing within the context of its applicability in practice. On the basis of a fundamental understanding of the taught concepts and methods the students should be able to choose the adequate methods and concepts, if necessary further develop them according to the situation and use them properly when facing related problems in their later job. The students should be capable of finding arguments for the chosen solutions and express them to others.

Content
The mission of Organic Computing is to tame complexity in technical systems by providing appropriate degrees of freedom for self-organized behaviour adapting to changing requirements of the execution environment, in particular with respect to human needs. According to this vision an organic computer system should be aware of its own capabilities, the requirements of the environment, and it should be equipped with a number of "self-x" properties allowing for the anticipated adaptiveness and for a reduction in the complexity of system management. These self-x properties include self-organisation, self-configuration, self-optimization, self-healing, self-protection and self-explanation. In spite of these self-x properties, an organic system should be open to external control actions which might be necessary to prevent undesired behaviour. The course addresses major concepts and methods of Organic Computing and highlights the impact and potential of Organic Computing with respect to real-world applications, specifically in traffic and energy scenarios.

Media
powerpoint slides with annotations, access to applets and Internet ressources, lecture recording (camtasia).

Literature

- Autonomic Computing: Concepts, Infrastructure and Applications. M. Parashar and S. Hariri (Ed.), CRC Press. December 2006.
- Self-Organization in Biological Systems. S. Camazine, J. Deneubourg, N. R. Franks, J. Sneyd, G. Theraulaz and E. Bonabeau. Princeton University Press, 2003.
- Complex Adaptive Systems: An Introduction. H. G. Schuster, Scator Verlag, 2001.
- Introduction to Evolutionary Computing. A. E. Eiben and J. E. Smith. Natural Computing Series, Springer Verlag, 2003. Swarm Intelligence: From Natural to Artificial Systems.Eric Bonabeau, Marco Dorigo and Guy Theraulaz. Oxford University Press, 1999.
- Control of Complex Systems. K. Astrom, P. Albertos, M. Blanke, A. Isidori and W. Schaufelberger. Springer Verlag, 2001.
- Organic Computing - A Paradigm Shift for Complex Systems. C. Müller-Schloer, H. Schmeck, T. Ungerer (eds): Springer, Autonomic Systems, Basel, 627 p., 2011

Elective literature:

- **Adaptive and Self-organising Systems,** Christian Müller-Schloer, Moez Mnif, Emre Cakar, Hartmut Schmeck, Urban Richter,
  June 2007. Preprint.Submitted to ACM Transactions on Autonomous and Adaptive Systems (TAAS)
- **Organic Computing - Addressing Complexity by Controlled Self-organization,** Jürgen Branke, Moez Mnif, Christian Müller-Schloer, Holger Prothmann, Urban Richter, Fabian Rochner, Hartmut Schmeck, In Tiziana Margaria, Anna Philippou, and Bernhard Steffen, *Proceedings of ISoLA 2006*, pp. 200-206. Paphos, Cyprus, November 2006.
- Evolutionary Optimization in Dynamic Environments. J. Branke. Kluwer Academic Publishers, 2002.

- Self-star Properties in Complex Information Systems: Conceptual and Practical Foundations (Lecture Notes in Computer Science. O. Babaoglu, M. Jelasity, A. Montresor, C. Fetzer, S. Leonardi, A. van Moorsel and M. van Steen. Springer Verlag, 2005.
- Design and Control of Self-organizing Systems. C. Gershenson. PhD thesis, Vrije Universiteit Brussel, Brussels, Belgium, 2007.
- VDE / ITG / GI - Positionspapier: Organic Computing - Computer- und Systemarchitektur im Jahr 2010. Juli 2003. it - Information Technology, Themenheft Organic Computing, Oldenbourg Verlag. Volume: 47, Issue: 4/2005.

further references will be announced in class

Course: Managing Organizations [2577902]

Coordinators: H. Lindstädt
Part of the modules: Strategy and Organization (p. 40)[IW3BWLUO1]

ECTS Credits	Hours per week	Term	Instruction language
3.5	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
After passing this course students are able to

- evaluate strengths and weaknesses of existing organisational structures and rules.
- compare alternatives of organisational structure in practice and assess and interpret them regarding their effectiveness and efficiency.
- assess the management of organisational changes.

Content
The course should enable the participants to assess the strengths and weaknesses of existing organisational structures and rules using systematic criteria. Here concepts and models for designing organisation structures, regulating organizational processes and managing organisational changes are presented and discussed using case studies. The course is structured to relate to actions and aims to give students a realistic view of the opportunities and limits of rational design approaches.

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.

Remarks
The credits for the course "Managing Organizations" have been changed from 4 to 3,5 from summer term 2015 on.

Course: Human Resource Management [253003]

Coordinators: P. Nieken
Part of the modules: Human Resources and Organizations (p. 50)[IW3BWLIAP2]

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

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Conditions
None.

Recommendations
Completion of module Business Administration is recommended.
Basic knowledge of microeconomics, game theory, and statistics is recommended.

Learning Outcomes
The student

- understands the processes and instruments of human resource management.
- analyzes different methods of human resource planning and selection and evaluates their usefulness.
- analyzes different processes of talent management and evaluates the strengths and weaknesses.
- understands the challenges of human resource management and its link to corporate strategy.

Content
The students acquire basic knowledge in the fields of human resource planning, selection and talent management. Different processes and instruments and their link to corporate strategy are evaluated based on microeconomic and behavioral approaches. The results are tested and discussed based on empirical data.

Media
Slides

Literature

- Personnel Economics in Practice, Lazear & Gibbs, John Wiley & Sons, 2014
- Strategic Human Resources. Frameworks for General Managers, Baron & Kreps, John Wiley & Sons, 1999

Remarks
This course has been added summer 2015.

Course: Personnel Policies and Labor Market Institutions [2573001]

Coordinators: P. Nieken
Part of the modules: Human Resources and Organizations (p. 50)[IW3BWLIAP2]

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

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Conditions
None.

Recommendations
Completion of module Business Administration is recommended.
Basic knowledge of microeconomics, game theory, and statistics is recommended.

Learning Outcomes
The student

- understands the process and role of agents in collective wage bargaining.

- analyzes strategic decisions in the context of corporate governance.

- understands the concept of co-determination in Germany.

- challenges statements that evaluate certain personnel politics.

Content
The students acquire knowledge about the process and the strategic aspects of collective bargaining about wages. They analyze selected aspects of corporate governance and co-determination in Germany. The lecture also addresses questions of personnel politics and issue of labor market discrimination. Microeconomic and behavioral approaches as well as empirical data is used and evaluated critically.

Media
Slides

Literature
Arbeitsmarktökonomik, W. Franz, Springer, 2013

Remarks
This course has been added summer 2015.

Course: Advanced Lab Applied Informatics [25070p]

Coordinators: A. Oberweis, H. Schmeck, R. Studer
Part of the modules: Semantic Knowledge Management (p. 59)[IW3INAIFB2]

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

Learning Control / Examinations
The assessment of this course are practical work, presentations and a written seminar thesis according to §4(2), 3 of the examination regulation. Practical work, presentations and a written thesis are weighted according to the course.

Conditions
None.

Learning Outcomes
Students are able to

- implement a prototype at the computer based on the given topic.
- write the thesis 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 course.
- present results of the research in written form as generally found in scientific publications.

Content
The lab intensifies and extends specific topics which are discussed within corresponding lectures. Knowledge of these lecture topics is an advantage but not a precondition.

Media
Slides, access to internet resources

Literature
Literature will be given individually.

Remarks
The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at http://www.aifb.uni-karlsruhe.de/Lehre

Course: Computing Lab Information Systems [PraBI]

Coordinators: A. Oberweis, R. Studer
Part of the modules: Business Processes and Information Systems (p. 63)[IW3INAIFB8]

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

Learning Control / Examinations
The assessment of this course are practical work, presentations and a written thesis according to §4(2), 3 of the examination regulation. Practical work, presentations and a written thesis are weighted according to the course.

Conditions
None.

Learning Outcomes
Students are able to

- implement a prototype at the computer based on the given topic,

- write the thesis to present the results and the development process,

- give presentations in a scientific context in front of an auditorium to present the results.

Content
The lab intensifies and extends specific topis which are discussed within corresponding lectures. Knowledge of these lecture topics is an advantage but not a precondition.

Media
Slides, Access to internet resources

Literature
Literature will be given individually.

Remarks
The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at http://www.aifb.uni-karlsruhe.de/Lehre

Course: Advanced Lab in Efficient Algorithms [25700p]

Coordinators: H. Schmeck
Part of the modules: Algorithms and Applications (p. 62)[IW3INAIFB5]

ECTS Credits	Hours per week	Term	Instruction language
4	3	Winter / Summer Term	de

Learning Control / Examinations
The assessment consists of (according Section 4(2), 3 of the examination regulation):

- practical work

- oral presentation of the results

- written report

- discussion and collaboration

Conditions
None.

Learning Outcomes
See German version.

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 methods presented in the lectures are practiced during this laboratory in teamwork including implementation tasks. The results should be presented by an oral presentation and a written report.
The topics of the laboratory 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
Elective literature:
Will be announced at the beginning of the computer lab.

Remarks
There is a limited number of participants. Therefore students have to register for the lab.

Course: Practical Course Internet Services [xIDLp]

Coordinators: H. Schmeck, W. Tichy, R. Studer, H. Hartenstein
Part of the modules: Information Services in Networks (p. 61)[IW3INAIFB4]

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

Learning Control / Examinations
The success control is realized by demanding practical work, presentations and a document describing the work according to
$ 4(2),3 SPO Informationswirtschaft. The written document, the presentations and the practical work will be weighted in equal
parts towards the total grade.

Conditions
the advanced lab may offered by any of the lecturers participatingin this module

Learning Outcomes
Students will

- carry out a literature study based on a given topic, and then identify, find, evaluate and analyze the relevant literature.

- produce their seminar work (and later the bachelor- / masters thesis) without much initial delay for familiarizing with the
  topic, while obeying format requirements, like the ones provided by publishers in the publication of documents.

- devise presentations as part of a scientific context. For that techniques will be presented which allow the preparation and
  presentation of the content to be presented in a manner that is adequate for the audience.

- present the results of the research in written form in a manner that is generally used in scientific publications.

Content
The seminar deals with specific topics that were partly mentioned in the respective lecture, and deepens them. A previous visit
to the respective lecture is helpful, but not a prerequisite for attendance.

Course: Consulting in Practice [PUB]

Coordinators: K. Böhm, Stefan M. Lang
Part of the modules: Information and Database Systems (p. 67)[IW3INIDS], Introduction to Data and Information Management (p. 64)[IW3INGDI], Foundations of Information Systems (p. 65)[IW3INGIS]

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

Learning Control / Examinations
The assessment will be an assessment according to sec. 4 subsec. 2 no 3. study and examination regulations and consists of several parts. These include talks, market studies, projects, case studies and reports.
The course will be assessed with "passed" or "failed". For passing the practical course, all partial exercises must have been passed successfully.

Conditions
None.

Learning Outcomes
At the end of the course, the participants

- have gained knowledge and understanding for the activities of the consulting process in general,
- have gained function-specific knowledge and understanding of IT consulting,
- have an overview about consulting companies,
- know concrete consulting examples,
- have experienced how effective teams work and
- have got an insight into the professional field "consulting".

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

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

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

Emphasised topics in the course are:

- Elementary problem solving: Problem definition, structuring of problems and focussing through the usage of tools (e.g., logic and hypothesis trees), creative techniques, solution systems etc.
- Obtaining information effectively: Access of information sources, interview techniques etc.
- Effective communication of findings/recommendations: Analysis/planning of communication (media, audience, formats), communication styles (e.g., top-down vs. bottom-up), special topics (e.g., arrangement of complex information) etc.
- Efficient teamwork: Tools for optimising efficient work, collaboration with clients, intellectual and process leadership in the team etc.

Media
Slides, case studies.

Remarks
Seats are limited, so please register with Prof. Böhm's office.
This course is offered every three semesters.

Course: Selling IT-Solutions Professionally [PLV]

Coordinators: K. Böhm, Hellriegel
Part of the modules: Information and Database Systems (p. 67)[IW3INIDS], Introduction to Data and Information Management (p. 64)[IW3INGDI], Foundations of Information Systems (p. 65)[IW3INGIS]

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

Learning Control / Examinations
The assessment will be an assessment according to sec. 4 subsec. 2 no 3. study and examination regulations and consists of several parts. These include group work and role playing, written summaries and the presentation thereof and occasionally playing roles such as account manager, sales manager and project manager.
The course will be assessed with "passed" or "failed". For passing the practical course, all partial exercises must have been passed successfully.

Conditions
None.

Learning Outcomes
At the end of the course, the participants:

1. Have gained knowledge and understanding for the sales process.

2. Have obtained knowledge and understanding for typical roles and tasks.

3. Have gained an insight into practical and application-oriented aspects through an extensive case study and role plays.

Content
One of the key qualifications in IT sales (activities related to the customer) is the understanding of sales mechanisms as well as having the corresponding basic skills. This applies not only to the marketing staff, but also to consultants of customers, project managers and developers. After a short overview of the different types of businesses and the resulting requirements regarding marketing and sales in general, the course focuses in particular on the process of selling IT-solutions professionally.

The topics are structured as follows:

1. Understanding the market: which information regarding the markets of clients and suppliers needs to be obtained and where can such information be found.

2. Knowing the customer: what should a provider know about the customer and its staff? This goes up to the question with which characters one has to deal with.

3. Planning the sales process: sales builds on phases, milestones and formally describable intermediate results.

4. Building a sales team: solutions are developed and sold with a team consisting of "players" having different expertise. How does one play this game?

5. Positioning the solution: obviously, it is necessary to develop a solution which is competitive, both technically and commercially.

6. To contract: what is important at the very last steps: how to convince the customers.

Based on a real-world case study, the students have the opportunity to reflect and practice the learned theory by means of teamwork and role plays. This aims at establishing a first connection to reality. The topics of the course are enriched with many examples from practice.

Media
Presentation, case studies and group work material.

Literature
Elective literature:
Reiner Czichos: Creaktives Account-Management.

Remarks
Seats are limited, so please register with Prof. Böhm's office.

Course: Principles of Insurance Management [2550055]

Coordinators: U. Werner
Part of the modules: Risk and Insurance Management (p. 45)[IW3BWLFBV3]

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.* Karlsruhe 2011.

- P. Koch. *Versicherungswirtschaft - ein einführender Überblick.* 2005.

- M. Rosenbaum, F. Wagner. Versicherungsbetriebslehre. Grundlegende Qualifikationen. Karlsruhe 2002.

- U. Werner. Einführung in die Versicherungsbetriebslehre. Skript zur Vorlesung.

Elective literature:
Will be announced during the lecture.

Course: Exercises in Civil Law [24506]

Coordinators: T. Dreier
Part of the modules: Commercial Law (p. 27)[IW1JURA2]

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

Learning Control / Examinations
The assessment is explained in the module description.
Bedingungen

Conditions
None.

Learning Outcomes
The students are able to solve legal cases by way of the appropriate legal technique (so-called Subsumtion). and to solve practical legal problems in a methodologically correct way.

Content
In 5 sessions the substantive law twhich students have been taught in the courses "Civil Law for Beginners", "Advanced Civil Law" and "Commercial and Corporation Law" will be repeated and the method for solving legal cases deepend. Moreover, 5 sessions ae reserved to written exam problems which cover the totality of what students have learned so far. Aditional sessions are reserved for the subsequent in-class discussion of the exam problems.

Media
Slides

Literature
tba in the course.

Course: Problem solving, communication and leadership [2577910]

Coordinators: H. Lindstädt
Part of the modules: Strategy and Organization (p. 40)[IW3BWLUO1]

ECTS Credits	Hours per week	Term	Instruction language
2	1/0	Summer term	de

Learning Control / Examinations
The assessment consists of a written exam (30 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Recommendations
None.

Learning Outcomes
After passing this course students are able to

- structure problem solving processes.

- apply the principles of focused communication based on charts and presentations.

- understand leadership in the context of situation and personality.

Content
The course deals with various aspects of problem solving and communication processes and is divided into two parts. The first part of the course addresses the fundamental steps in the problem-solving process; namely, problem identification, problem structuring, problem analysis and communication of solution. Ideas for structuring problem solving processes will be discussed and the perquisites for and principles of structured communication based on charts and presentations will be explained. The second part of the course addresses important concepts in leadership, including the context-specificity of influence, the choice of leader and the characteristics of employees. The course content reflects current issues in management and communication practice and is oriented toward the practical application of theoretical insights to these issues. In this respect, the course aims to develop interdisciplinary skills.

Media
Slides.

Literature
The relevant excerpts and additional sources are made known during the course.

Course: Production Economics and Sustainability [2581960]

Coordinators: M. Fröhling
Part of the modules: Industrial Production I (p. 41)[IW3BWLIIP1]

ECTS Credits	Hours per week	Term	Instruction language
3,5	2/0	Winter term	de

Learning Control / Examinations
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None.

Learning Outcomes
Students shall be aware of issues concerning industrial production and sustainability and shall apply strategies to resolve these issues.

Content
The analysis and management of material flows on the company level and above will be the focus of this lecture. Herein, the discussion will be about cost-effective and environmentally acceptable steps to avoid, abate and recycle emissions and waste as well as ways of efficient resources handling. As methods material flow analysis (MFA), life cycle assessment (LCA) and OR methods, e.g. for decision support, are introduced.
Topics:
- regulations related to materials and substances
- raw materials, reserves and their availabilities/lifetimes
- material and substance flow analysis (MFA/SFA)
- material related ecoprofiles, e.g. Carbon Footprint
- LCA
- resource efficiency
- emission abatement
- waste management and closed-loop recycling
- raw material oriented production systems
- environmental management (EMAS, ISO 14001, Ecoprofit), eco-controlling

Media
Media will be provided on e-learning platform.

Literature
will be announced in the course

Course: Programming [24004]

Coordinators: R. Reussner, G. Snelting
Part of the modules: Foundations in Informatics (p. 14)[IW1INF1]

ECTS Credits	Hours per week	Term	Instruction language
5	2/0/2	Winter term	de

Learning Control / Examinations
Two assessments are required for the successful completion of this module.

- A certificate for the exercise (not graded, assessment according to sec. 4 subsec. 2 no. 3 study and examination regulations) has to be obtained. If this assessment is failed, it can be repeated once. **This certificate is a compulsory prerequisite for the second part**, namely the

- successful completion of the two final exercises (assessment according to sec. 4 subsec. 2 no. 3 study and examination regulations), to be submitted separately. If this assessment is failed, it can be repeated once in which case **both** final exercises have to be handed in again.

The grade of the module consists of the grade of the two final exercises.

Conditions
None.

Recommendations
Previous knowledge in java programming is recommended but not mandatory.

Learning Outcomes
Students should learn

- basic structures of the programming language Java and how to apply them; in particular control and simple data structures, object orientation and implementation of basic algorithms

- basics of programming methodology and the ability to autonomously write executable small to medium sized Java programs

Content

- objects and classes
- types, values and variables
- methods
- control structures
- recursion
- references, lists
- inheritance
- input and output
- exceptions
- programming methodology
- implementation of basic algorithms in Java (such as sorting algorithms)

Media
beamer, slides, blackboard, practice sheets

Literature
P. Pepper, Programmieren Lernen, Springer, 3. Auflage 2007
Elective literature:
B. Eckels: Thinking in Java. Prentice Hall 2006
J. Bloch: Effective Java, Addison-Wesley 2008

Course: Project Management in Practice [2400005]

Coordinators: K. Böhm, W. Schnober
Part of the modules: Information and Database Systems (p. 67)[IW3INIDS], Introduction to Data and Information Management (p. 64)[IW3INGDI], Foundations of Information Systems (p. 65)[IW3INGIS]

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

Learning Control / Examinations
The assessment is an assessment according to sec. 4 subsec. 2 no 3. study and examination regulations and consists of several parts. These include presentations, project work, papers and seminar theses.
The course will be assessed with "passed" or "failed" (according to sec. 7 subsec. 3 study and examination regulations). For passing the practical course, all partial exercises must have been passed successfully.

Conditions
None.

Learning Outcomes
At the end of the course, the participants:

- Know the principles of project management and are able to make use of them in real-world case studies.
- Have profound knowledge about project phases, principles of project planning, fundamental elements such as project charter & scope definitions, descriptions of project goals, activity planning, milestones, project-structure plans, agenda and cost planning and risk management. Further, they know principle elements of project implementation, crisis management, escalation and, last but not least, project-termination activities.
- Understand and are able to adopt the fundamentals of planning as well as the subjective factors which are relevant in a project. This includes topics such as communication, group processes, teambuilding, leadership, creative solution methods and risk-assessment methods.

The following key skills are taught:

- Project planning
- Project control
- Communication
- Leadership behavior
- Crisis management
- Identification of and solutions of difficult situations
- Team building
- Motivation (of oneself and of others)

Content

- General project conditions
- Project goals / creative methods for identifying project goals and priorities
- Project planning
- Activity planning
- Cost/time/resource planning
- Phase models
- Risk management
- Project control / success control / monitoring
- Crisis management
- Project termination / lessons learned

Media
Slides, SW-screenshots, misc. presentation techniques

Remarks
The course materials are partly in English.
Places are limited, so please register with Prof. Böhm's office.

Course: Undergraduate Seminar Information Systems [prosemis]

Coordinators: K. Böhm
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations
The assessment consists of a written seminar thesis and a presentation thereof according to sec. 4 subsec. 2 no. 3 study and examination regulations. The final grade of the seminar will be the grade for the seminar thesis which can be increased or decreased by up to two grade points ("Notenstufen") according to the performance in the oral presentation.
For further details please see the German version.

Conditions
None.

Recommendations
Lectures held at the Information Systems Group related to the current topic of the seminar are strongly recommended.

Learning Outcomes
Independent preparation and presentation of a seminar topic from the field of information systems adhering to scientific standards.

Content
The Information Systems Group offers every summer semester one undergraduate seminar covering selected topics from the area of information systems (every undergraduate seminar at the "Lehrstuhl für Systeme der Informationsverwaltung" counts as "Undergraduate Seminar Information Systems"). For example, the topics can be in the following areas peer-to-peer networks, database systems, data mining, sensor networks and workflow-management systems. Details will be announced each semester (announcements at the notice boards of the institute and at the homepage of the Information Systems Group).

Media
Slides.

Literature
Will be announced for every seminar.
Elective literature:
Literature from lectures concerning the seminar topic.

Course: [2400010]

Coordinators: M. Beigl, P. Jakimovski
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content
In this seminar, different topics are in focus every semester, which are given to the participants with the task of creating an according article. The objective is to present the state of the art with respect to technologies and their applications in the field of ubiquitous computing. Topics will be announced at the kickoff-event and on the institute's web page.

Course: Seminar: Cellular automata and discrete complex systems [24530]

Coordinators: R. Vollmar, T. Worsch
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations
The assessment consists of a written seminar thesis and a presentation thereof according to sec. 4 subsec. 2 no. 3 study and examination regulations. The grade is the average of the weighted single grades (generally 50% seminar thesis, 50% presentation).

Conditions
None.

Learning Outcomes

- Students get an introduction to doing scientific work in a specific area.
- The work for the proseminar also is a preparation for the bachelor thesis.
- Besides the scientific work key qualifications are acquired in an integrative way.

Content
Selected topics concerning cellular automata and discrete complex systems include CA as a parallel model, reversible CA, simulation of real phenomena by CA, infinite tilings, asynchronous logic, etc.

Literature
scientific papers

Course: Real Estate Management I [2586400]

Coordinators: T. Lützkendorf
Part of the modules: Real Estate Management (p. 47)[IW3BWLOOW2]

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

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Conditions
None.

Recommendations
A combination with the module *Design Construction and Assessment of Green Buildings I* [IW3BWLOOW1] 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
The student

- has a basic understanding of the specific characteristics of real estate and real estate markets

- is able to transfer and apply in-depth knowledge in the field of business administration to construction and real estate

- is able to analyze, evaluate or to meet decisions in the life cycle of real estate

Content
The course Real Estate Management I deals with questions concerning the economy of a single building 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]

Coordinators: T. Lützkendorf
Part of the modules: Real Estate Management (p. 47)[IW3BWLOOW2]

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 (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Reexaminations are offered at every ordinary examination date.

Conditions
None.

Recommendations
A combination with the module *Design Construction and Assessment of Green Buildings I* [IW3BWLOOW1] 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
The student

- has an in-depth knowledge on the economic classification and significance of the real estate industry

- has a critical understanding of essential theories, methods and instruments of the real estate industry

- is able to analyze and evaluate activity areas and functions in real estate companies as well as to prepare or to take decisions

Content
The course Real Estate Management II gives special attention to topics in connection to the management of large real estate portfolios. This especially includes property valuation, market and object rating, maintenance and modernization, as well as real estate portfolio and risk management. The tutorial provides examples in order to practice the application of theoretical knowledge to practical problems.

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 Organization [24502]

Coordinators: T. Asfour, J. Henkel, W. Karl, Ömer Terlemez
Part of the modules: Computer Engineering (p. 17)[IW2INF4]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1/2	Summer term	de

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Learning Outcomes
The students are to be enabled to

- gain fundamental knowledge of computer organization, i.e. the architecture and the operation principle of computer systems,
- understand the relationship between hardware concepts and their effects on the software, in order to build efficient programs,
- comprehend the fundamental principles of the design process and being able to apply them, based on the understanding of the interdependencies of technology, computer concepts and applications,
- build up a computer from basic components.

Content
This course deals with the fundamentals of computer organisation; the instruction set architecture in conjunction with the discussion RISC – CISC; pipelining, pipeline constraints and methods for the resolution of pipeline conflicts; memory organization, cache memory; I/O system and interface modules; interrupt handling; bus systems; support of operating system functions: virtual memory management and protection mechanisms.

Media
slides, practice sheets

Literature
Elective literature:

- D. Patterson, J. Hennessy: Rechnerorganisation und -entwurf; Deutsche Auflage. Herausgegeben von Arndt Bode, Wolfgang Karl und Theo Ungerer, Spektrum Verlag, 2006
- Th. Flick, H. Liebig: Mikroprozessortechnik; Springer-Lehrbuch, 5. Auflage 1998
- Y.N. Patt & S.J. Patel: Introduction to Computing Systems: From bits & gates to C & beyond; McGrawHill, August 2003

Course: Computer Architecture [24570]

Coordinators: J. Henkel, W. Karl
Part of the modules: Computer Architecture (p. 77)[IW3INRS]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Media
slides, work sheets

Literature
Elective literature:

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- Hennessy, J.L., Patterson, D.A.: Computer Architecture: A Quantitative Approach. Morgan Kaufmann, 3.Auflage 2002
- U. Bringschulte, T. Ungerer: Microcontroller und Microprozessoren, Springer, Heidelberg, 2. Auflage 2007
- Theo Ungerer: Parallelrechner und parallele Programmierung, Spektrum-Verlag 1997

Course: Financial Accounting and Cost Accounting [2600002]

Coordinators: J. Strych
Part of the modules: Business Administration (p. 21)[IW1BWL4], Foundations in Business Administration (p. 20)[IW1BWL1]

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

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

Conditions
None.

Recommendations
It is recommended to have some skills about financial accounting on an introductory level.

Learning Outcomes
Students

- are able to understand IFRS annual reports,
- know differences between HGB and IFRS,
- are able to understand and implement selected IFRS rules,
- can analyse how liquid the firm is,
- can analyse and assess financial reports,
- are able to measure the value added in firms,
- have skills about budgeting and benchmarking, and
- can understand and implement reporting systems.

Content
1. Introduction to accounting standards (IFRS, HGB)
2. Annual report and financial statements
3. Selected topics in financial accounting
4. Operational efficiency analysis
5. Financial Statement Analysis
6. Value-based management
7. Taxes
8. Creative accounting and compliance
9. Budgeting and benchmarking
10. Reporting

Media
slides

Course: Renewable Energy – Resources, Technology and Economics [2581012]

Coordinators: R. McKenna
Part of the modules: Energy Economics (p.)[IW3BWLIIP2]

ECTS Credits	Hours per week	Term	Instruction language
3,5	2/0	Winter term	en

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

Conditions
None.

Learning Outcomes
The student:

- understands the motivation and the global context of renewable energy resources.

- gains detailed knowledge about the different renewable resources and technologies as well as their potentials.

- understands the systemic context and interactions resulting from the increased share of renewable power generation.

- understands the important economic aspects of renewable energies, including electricity generation costs, political pro-motion and marketing of renewable electricity.

- is able to characterize and where required calculate these technologies.

Content
1. General introduction: Motivation, Global situation
2. Basics of renewable energies: Energy balance of the earth, potential definition
3. Hydro
4. Wind
5. Solar
6. Biomass
7. Geothermal
8. Other renewable energies
9. Promotion of renewable energies
10. Interactions in systemic context
11. Excursion to the "Energieberg" in Mühlburg

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

Literature
Elective literature:

- Kaltschmitt, M., 2006, Erneuerbare Energien : Systemtechnik, Wirtschaftlichkeit, Umweltaspekte, aktualisierte, korrigierte und ergänzte Auflage Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg.

- Kaltschmitt, M., Streicher, W., Wiese, A. (eds.), 2007, Renewable Energy: Technology, Economics and Environment, Springer, Heidelberg.

- Quaschning, V., 2010, Erneuerbare Energien und Klimaschutz : Hintergründe - Techniken - Anlagenplanung – Wirtschaftlichkeit München : Hanser, Ill.2., aktualis. Aufl.

- Harvey, D., 2010, Energy and the New Reality 2: Carbon-Free Energy Supply, Eathscan, London/Washington.

- Boyle, G. (ed.), 2004, Renewable Energy: Power for a Sustainable Future, 2nd Edition, Open University Press, Oxford.

Course: Semantic Web Technologies [2511310]

Coordinators: R. Studer, A. Harth
Part of the modules: Semantic Knowledge Management (p. 59)[IW3INAIFB2], Semantic Web and Applications
(p. 60)[IW3INAIFB3], Information Services in Networks (p. 61)[IW3INAIFB4]

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 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 are required.

Recommendations
None.

Learning Outcomes
The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems

- demonstrates basic competency in the areas of data and system integration on the web

- masters advanced knowledge representation scenarios involving ontologies

Content
"Semantic Web" denotes an extension of the World Wide Web with meta data and applications to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals.
Central concepts are the representation and processing of knowledge in form of ontologies and the access via Linked Data. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.
The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)

- Web Architecture and Linked Data

- Web Ontology Language (OWL)

- Rule languages

- Applications

Media
Lecture notes.

Literature
See German version.

Remarks
The lecture supersedes the existing SWT-1 and SWT-2 lectures beginning from SS 2014. The exams SWT-1 and SWT-2 will be offered latest until winter term 2014/15.

Course: Seminar in Applied Informatics [25070s]

Coordinators: A. Oberweis, H. Schmeck, R. Studer
Part of the modules: Semantic Knowledge Management (p. 59)[IW3INAIFB2], Semantic Web and Applications (p. 60)[IW3INAIFB3]

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

Learning Control / Examinations
The assessment is done according to §4(2), 3 of the examination regulation in form of an evaluation of the seminar presentation and a written seminar report. The weighting of the individual marks (presentation and report) is announced at the beginning of the seminar.

Conditions
None.

Learning Outcomes
Students

- do literature search based on a given topic, identify relevant literature and evaluate this literature,

- give presentations in a scientific context in front of an auditorium to present the results of the research,

- present results of the research in a seminar thesis as a scientific publication using format requirements such as those recommended by well-known publishers.

Content
The seminar intensifies and extends specific topics which are discussed within corresponding lectures. The actual topics are changing each semester. Knowledge of these lecture topics is an advantage but not a precondition.

Media
Slides, Access to internet resources

Literature
Literature will be given individually.

Remarks
The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at http://www.aifb.uni-karlsruhe.de/Lehre

Course: Applied Econometrics [semSTAT1]

Coordinators: M. Schienle
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
The assessment is done according to §4(2), 3 of the examination regulation.
Students write a seminar paper on an assigned topic (10 to 12 pages), present it in class and discuss results during seminar sessions. These three elements are graded individually. The seminar grade is the weighted average of these individual grades. The weighting depends on the respective seminar.

Conditions
None.

Learning Outcomes

Content

Course: Seminar in Cryptography [SemiKryp3]

Coordinators: J. Müller-Quade
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The student

- deals with a restricted problem in the field of cryptography,

- analyzes and discusses the problems associated to cryptography in the final seminar paper,

- discusses, presents and defends subject-specific arguments within a given task,

- organizes the preparation of the final paper largely independent.

Content
The seminar deals with current topics in the research field of cryptography. These are e.g.

- provable security

- side channel attacks;

- new Public-Key systems;

- quantum cryptography

Course: Seminar in Telematics [24074s]

Coordinators: M. Zitterbart, H. Hartenstein
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Learning Outcomes
Students learn how

- to do a literature study starting from a given subject to identify relevant literature and to review and to evaluate it.
- to identify independently issues that arise from sub-domains of Telematics and to classify approaches to a solution found in the literature.
- to prepare scientific presentations. Techniques are introduced that help to present a subject before an audience in a proper way. Part of this is also to present the topic in a given time frame and to answer questions that may arise from the topic.
- to identify open questions of other presentations and to contribute them to a discussion that follows each presentation.
- to present the results of the literature study in a written document in a way that is common practice for scientific publications.

Content
In this seminar, the focus is on specific subjects that were introduced in the respective lectures, and on an in-depth discussion of those topics. Hereby, topics from different domains such as Future Internet research, sensor networks, network security, or highly distributed IT systems in the Internet are covered.

Course: Seminar in Law [rechtsem]

Coordinators: T. Dreier
Part of the modules: Seminar Module Law (p. 82)[IW3SEMJURA]

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

Learning Control / Examinations

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 student is able to independent scientific research regarding legal issues in the area of information management and engineering. The seminar covers legal issues of information law and commercial law, from internet law, the law of intellectual property, competition law and data protection law to contract law. The subjects to be discussed comprise issues of national, European and international law. Written papers shall also discuss the information technology issues and economic questions related to the legal problem at issue.

Content
The seminar covers legal issues of information law, from internet law, the law of intellectual property, competition law and data protection law to contract law. The subjects to be discussed comprise issues of national, European and international law. Each seminar focuses on a different set of issues. Written papers shall also discuss the information technology issues and economic questions related to the legal problem at issue. The current topics will be announced before start of term.
Students can participate in all seminars offered by the ZAR/IIR (however, students can participate in seminars of the master study cours, seminars in cooperation with the University of Freiburg and other specially marked seminars if special permission has been granted).

Media
extensive script with cases; content structure, further information in the lectures

Literature
Tba in the lecture.

Course: Seminar in Security [SemSich]

Coordinators: J. Müller-Quade
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The student

- deals with a restricted problem in the field of computer security,
- analyzes and discusses the problems associated to a distinct discipline in the final seminar paper,
- discusses, presents and defends subject-specific arguments within a given task,
- organizes the preparation of the final paper largely independent.

Content
The seminar deals with current topics in the research field of computer security. These are e.g.

- Side channel attacks;
- Network security;
- Communication protocols;

Course: Seminar in Enterprise Information Systems [SemAIFB1]

Coordinators: R. Studer, A. Oberweis, T. Wolf, R. Kneuper
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

- do literature search based on a given topic, identify relevant literature and evaluate this literature,

- give presentations in a scientific context in front of an auditorium to present the results of the research,

- present results of the research in a seminar thesis as a scientific publication using format requirements such as those recommended by well-known publishers.

Content
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 Data Mining I [2521388]

Coordinators: G. Nakhaeizadeh
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
The assessment is done according to §4(2), 3 of the examination regulation.
Students write a seminar paper on an assigned topic (10 to 12 pages), present it in class and discuss results during seminar sessions. These three elements are graded individually. The seminar grade is the weighted average of these individual grades. The weighting depends on the respective seminar.

Conditions
None.

Learning Outcomes

Content

Course: Seminar Energy Economics [SemEW]

Coordinators: W. Fichtner, P. Jochem, D. Keles, R. McKenna, V. Bertsch
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
Non exam assessment (following §4(2), 3 of the examination regulation).

Conditions
None.

Learning Outcomes
Students shall gain insights into selected research in energy economics.
• 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 energy economics.

Content

Course: Entrepreneurship Seminar [SemTuE1]

Coordinators: O. Terzidis
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

ECTS Credits	Hours per week	Term	Instruction language
3			

Learning Control / Examinations
See German version.

Conditions
None.

Learning Outcomes
The scope is depending on the seminars summarised hereunder.

Content

Course: Seminar in Behavioral and Experimental Economics [n.n.]

Coordinators: P. Reiss
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
Students write (according to Section 4 (2), 3 SPO) a seminar paper on an assigned topic (15-20 pages), present it in class and discuss results during seminar sessions. These three elements are graded individually. The seminar grade is the weighted average of these individual grades where the weighting is announced on the course syllabus.

Conditions
None.

Recommendations
Basic knowledge of mathematics, statistics, microeconomics, and game theory is assumed.

Learning Outcomes
The student

- works independently on a topic in Experimental Economics and/or Behavioral Economics,

- writes a seminar paper according to scientific standards,

- gives a presentation on the results of the paper,

- cultivates the discussion of research approaches.

Content
Seminar topics are announced online at http://io.econ.kit.edu (-> Studium und Forschung).

Media
Slides.

Literature
A selection of published papers is compulsory reading for the course.

Remarks
Language: german or english.

Course: Seminar in Finance [2530280]

Coordinators: M. Uhrig-Homburg, M. Ruckes
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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* [IW3BWLFBV1] 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 Financial Economics and Risk Management [2530353]

Coordinators: M. Ulrich
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
See German version.

Conditions
None.

Learning Outcomes
The students

- look critically into current research topics .
- train their presentation skills.
- learn to get their ideas across in a focused and concise way, both in oral and written form.
- cultivate the economic discussion of research approaches.

Content

Course: Seminar in Industrial Production [SemIIP2]

Coordinators: F. Schultmann, M. Fröhling
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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" [IW3BWLIIP1], „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: C. Weinhardt
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Conditions
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
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
- E-learning 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: www.iism.kit.edu/im/lehre .

Course: Seminar Internet Services [xIDLs]

Coordinators: H. Schmeck, R. Studer, H. Hartenstein, W. Tichy
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations
The success monitoring is based on a presentation about a research topic from the current topic of the seminar followed by a discussion, and a written summary as well as active participation in discussions (in accordance with §4(2),3 of SPO Informationswirtschaft).

Conditions
A seminar can be chosen with one of the Professors participating in this module.

Learning Outcomes
Students will

- conduct a literature search based on a given topic and identify, find, evaluate and analyze the relevant literature
- Prepare their seminar paper (and later their Bachelor/Master thesis) with minimal familiarization effort while obeying format requirements like the ones provided by publishers when publishing documents
- Prepare presentations in a scientific context. Therefore techniques are introduced facilitating the preparation of content in a manner that is appropriate for the audience
- Present the results of their research in written form in a manner that is generally used in scientific publications

Content
The seminar deals with specific topics that were partly mentioned in the respective lecture and deepens students' knowledge. Previously attending the lecture is recommended but not a prerequisite.

Course: Seminar Management Accounting [2579904]

Coordinators: M. Wouters
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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 "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2610026) must have been completed before starting this seminar.

Learning Outcomes
Students
• are largely independently able to identify a distinct topic in Management Accounting,
• are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
• can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Literature
Will be announced in the course.

Remarks
Maximum of 24 students.

Course: Seminar on Morals and Social Behavior [SemPÖ1]

Coordinators: N. Szech
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
Students write a seminar paper on an assigned topic (10 pages), present it in class and discuss results during seminar sessions. These three elements are graded individually. The seminar grade is the weighted average of these individual grades where the weighting is announced on the course syllabus.

Conditions
None.

Recommendations
None.

Learning Outcomes
The students

- look critically into current research topics in the field of morals and social behavior in relevant economic contexts.
- train their presentation skills.
- learn to get their ideas across in a focused and concise way, both in oral and written form.
- cultivate the economic discussion of research approaches.

Content
Seminar topics are announced online at http://polit.econ.kit.edu.

Literature
A selection of published papers and books.

Remarks
The seminar will be held in English.

Course: Seminar on Topics in Experimental Economics [n.n.]

Coordinators: P. Reiss
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
Students write (according to Section 4 (2), 3 SPO) a seminar paper on an assigned topic (15-20 pages), present it in class and discuss results during seminar sessions. These three elements are graded individually. The seminar grade is the weighted average of these individual grades where the weighting is announced on the course syllabus.

Conditions
None.

Recommendations
Basic knowledge of mathematics, statistics, microeconomics, and game theory is assumed.

Learning Outcomes
The student works independently on a topic in Experimental Economics, writes a seminar paper according to scientific standards, gives a presentation on the results of the paper, cultivates the discussion of research approaches.

Content
Seminar topics are announced online at http://io.econ.kit.edu (-> Studium und Forschung).

Media
Presentation Slides.

Literature
A selection of published papers is compulsory reading for the course.

Remarks
Language: German or English.

Course: Seminar on Topics in Political Economics [SemPÖ2]

Coordinators: N. Szech
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
Students write a seminar paper (about 10 pages), present it in class and discuss results during seminar sessions. These three elements are graded individually. The seminar grade is the weighted average of these individual grades where the weighting is announced on the course syllabus.

Conditions
None.

Recommendations
None.

Learning Outcomes
The students

- look critically into current research topics in Political Economics.

- train their presentation skills.

- learn to get their ideas across in a focused and concise way, both in oral and written form.

- cultivate the economic discussion of research approaches.

Content
Seminar topics are announced online athttp://polit.econ.kit.edu

Literature
A selection of published papers and books.

Remarks
The seminar will be held in English.

Course: Seminar Risk and Insurance Management [SemFBV1]

Coordinators: U. Werner
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
Oral presentation and written report of about 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 tasks delivered.

Conditions
See corresponding module information.
The seminar is held within the courses of *Risk and Insurance Management and Insurance Management* ([IW3BWLFBV3], [WW3BWLFBV4] 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* [IW3BWLFBV3] 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
- Risk Communication
- Insurance Risk Management
- Enterprise Risk Management
- Modeling, Measuring and Management of Extreme Risks
- Current Issues in the Insurance Industry

For their contents refer to the information given for these courses.

Literature
Will be announced at the beginning of the lecture period.

Remarks
Some of the courses mentioned above are offered on demand. For further information, see:http://insurance.fbv.kit.edu.
To attend the course please register with the secretary of the chair: thomas.mueller3@kit.edu

Course: Seminar Software Systems [SWSSem]

Coordinators: R. Reussner
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations

Conditions
None.

Learning Outcomes
The students can

- conduct literature search for a given topic and can identify, locate, assess and evaluate the relevant literature.

- present the research results in a written form similar to scientific publications.

- write their papers with minimal effort, taking formatting and length requirements, as they are set by all publishers of scientific publications, into consideration.

- learn to cite related work in a scientific way and learn to create auditorium-appropriate presentations in the context of a scientific topic.

- achieve knowledge about techniques and tools for systematic software engineering, such as software design, software architectures, predictions of functional and extra-functional properties of software, documentation, testing, etc.

Content
This course treats cutting-edge research topics from the area of software systems, i.e. software engineering and performance engineering.

Course: Seminar Software Engineering [SWTSem]

Coordinators: W. Tichy, R. Reussner, G. Snelting
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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

Learning Control / Examinations

Conditions
Basic knowledge of software engineering from lectures or practical experience is required.
Ability to create programs with low complexity and knowledge of an object-oriented programming language (e.g. Java, C#, or C++) are required.
Knowledge of the English terminology is required.

Learning Outcomes
The students will

- independently research literature for a given topic. This includes searching and identifying relevant literature as well as evaluating and interpreting its content.

- learn to optimize the time needed to cope with the relevant parts of the concrete topic.

- write a term paper that complies with formatting rules (as they will be enforced by all publishers for common publications).

- prepare a presentation for a scientific topic. We will discuss techniques that help to prepare and present the contents with respect to the targeted audience.

write down the results of their research similar to the form of a scientific publication.

Content
The seminar covers topics of recent research in the field of software engineering.

Course: Seminar Statistics [SemSTAT]

Coordinators: N.N.
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

ECTS Credits	Hours per week	Term	Instruction language
3	2		

Learning Control / Examinations
Non exam assessment (following §4(2), 3 of the examination regulation).

Conditions
None.

Learning Outcomes

Content

Course: Seminar Stochastic Models [SemWIOR1]

Coordinators: K. Waldmann
Part of the modules: Seminar Module Economic Sciences (p.)[IW3SEMWIWI]

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
The participants will posses profound knowledge of modelling, evaluation and optimization of stochastic systems .They are familiar with basic principles of scientific argumentation and can cope with modern presentation techniques.

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: R. Studer
Part of the modules: Seminar Module Informatics (p. 81)[IW3SEMINFO]

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 strategic and behavioral marketing [2572197]

Coordinators: B. Neibecker
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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
Students

- do literature search based on a given topic, identify relevant literature and evaluate this literature,

- give presentations in a scientific context in front of an auditorium to present the results oft he research,

- present results of the research in a seminar thesis as a scientific publication using format requirements such as those recommended by well-known publishers.

Content
In the seminar the student should learn to apply the research methods to a predefined topic area. The topics are based on research questions in marketing. This problem analysis requires a interdisciplinary examination. As a special option, the implementation of methodological solutions for market research can be accomplished and discussed with respect to its application.

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 Discrete Optimization [2550491]

Coordinators: S. Nickel
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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 35-40 minutes (according to §4(2), 3 of the examination regulation).
The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.
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* [IW1OR].

Learning Outcomes
The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Content
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: N. N.
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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: O. Stein
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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: Management and Organization [2577915]

Coordinators: H. Lindstädt
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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

Learning Control / Examinations
Learning control is based on a written paper and a presentation of the results in a seminar session (according to §4(2), 3 SPO). Final grade is composed of both elements.

Conditions
See corresponding module information.
Preferably, at least one of the institute's offered modules should be passed before participation in the seminar.

Learning Outcomes
After passing this course students are able to

- describe corporate and organizational management approaches and to clarify them using practical examples.

- apply the basics of scientific work.

- present selected topics to a group.

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: Security [24941]

Coordinators: J. Müller-Quade
Part of the modules: Security (p. 73)[IW3INSICH]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Learning Outcomes
The student

- knows the theoretic background and the basic mechanisms of computer security and cryptography
- understands the mechanisms of computer security and can explain them,
- can read and understand the current scientific papers,
- can evaluate the safety procedures and can recognize hazards,
- can adapt mechanisms of computer security to new environment.

Content

- Theoretical and practical aspects of computer security
- Development of safety goals and classification of threats
- Presentation and comparison of different formal access control models
- Formal description of authentication systems, presentation and comparison of different authentication methods (passwords, biometrics, challenge-response protocols)
- Analysis of typical vulnerabilities in programs and web applications and development of appropriate protective protection methods / avoidance strategies
- Introduction to key management and Public Key Infrastructure
- Presentation and comparison of current safety certifications
- Block ciphers, hash functions, digital signature, public key encryption and digital signatures (RSA, ElGamal), and various methods of key exchange (e.g., Diffie-Hellman)
- Furthermore, an introduction to provable security is provided, which presents some of the key security concepts (e.g. IND-CCA).
- Presentation of combinations of cryptographic modules using currently used protocols such as Secure Shell (SSH) and Transport Layer Security (TLS).

Media
Presentation slides (available online)
Blackboard presentation

Literature
Lecture notes (available online)

Course: Simulation I [2550662]

Coordinators: K. Waldmann
Part of the modules: Stochastic Methods and Simulation (p. 58)[IW3OR7], Applications of Operations Research (p. 55)[IW3OR5]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1/2	Winter / Summer 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 0.6 (according to Section 4(2), 3 of the examination regulation).

Conditions
None.

Learning Outcomes
The participants will be enabled to model discrete event systems that underlie stochastic influences and to analyze them using simulation. The discussion of practice-oriented case studies pursues two goals. On the one hand, the participants will be sensitized for different criteria to evaluate the performance of a stochastic discrete-event system. On the other hand, an overview of application areas of stochastic simulation is provided. In the context of the course, the basic elements of discrete-event simulation are introduced and a procedure model for the execution of simulation studies is developed. Properties of existing mathematical methods for the generation of random variables are discussed and are assigned to concrete application cases. Statistical methods for the description of simulation input data and for the interpretation of simulation results will be exemplified. The facultative computer exercise course using a simulation software comprises a practice-oriented case study that illustrates the opportunities and limitations of stochastic simulation.

Content
Generation of random numbers, Monte Carlo Integration, discrete event simulation, discrete random variables, continuous random variables, statistical analysis of simulated data.

Media
Blackboard, slides, flash-animations, java tools, simulation software.

Literature

- Lecture Notes
- K.-H. Waldmann/U. M. Stocker: Stochastische Modelle - Eine anwendungsorientierte Einführung, Springer (2012), 2. Auflage
- Elective literature: A. M. Law/W.D. Kelton: Simulation Modeling and Analysis (3rd ed), McGraw Hill (2000)

Remarks
The course will be offered in the summer term 2015 and the summer term 2016.

Course: Simulation II [2550665]

Coordinators: K. Waldmann
Part of the modules: Stochastic Methods and Simulation (p. 58)[IW3OR7]

ECTS Credits	Hours per week	Term	Instruction language
4,5	2/1/2	Winter / Summer 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 a 2/3 step of a full grade (according to Section 4(2), 3 of the examination regulation).

Conditions
Foundations in the field of *Simulation I* [2550662] are desired.

Learning Outcomes
The participants will be enabled to model and analyze discrete event systems that underlie stochastic influences with efficient simulation techniques. The discussion of practice-oriented case studies illustrates the limits of standard simulation techniques for stochastic discrete event systems regarding the simulation effort to obtain statistical significant results. Variance reducing techniques will be introduced in theory as modern and efficient techniques and will be exemplified by examples from quality management, financial engineering and insurance. The main scope of the applications discussed in the course is the efficient simulation of stochastic processes. The facultative computer exercise course under utilization of the programming language Java comprises a practice-oriented case study, in which the participants implement certain variance reducing techniques in order to analyze the reduction in computer effort in comparison to standard techniques.

Content
Variance reducing techniques, simulation of sochastic processes, case studies.

Media
Blackboard, slides, flash-animations, java tools, simulation software.

Literature

- Lecture Notes
- K.-H. Waldmann/U. M. Stocker: Stochastische Modelle - Eine anwendungsorientierte Einführung, Springer (2012), 2. Auflage
- Elective literature: A. M. Law/W.D. Kelton: Simulation Modeling and Analysis (3rd ed), McGraw Hill (2000)

Remarks
The course will be offered in the winter term 2015/2016.

Course: Software Laboratory: OR Models I [2550490]

Coordinators: S. Nickel
Part of the modules: Applications of Operations Research (p. 55)[IW3OR5]

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 student

- evaluates the possibilities of computer usage in practical applications of Operations Research,
- is capable of classifying and utilizing the general possibilities and fields of usage of modeling and implementation software for solving OR models in practice,
- models and solves problems arising in industry applications with the aid of computer-supported optimization methods.

Content
After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, . . .), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis.
Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

Remarks
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course. The lecture is offered in every winter term. The planned lectures and courses for the next three years are announced online.

Course: Software Engineering I [24518]

Coordinators: W. Tichy, Korbinian Molitorisz
Part of the modules: Software Engineering I (p. 74)[IW2INSWT1]

ECTS Credits	Hours per week	Term	Instruction language
6	3/1/2	Summer term	de

Learning Control / Examinations
The assessment consists of a 60 minute written exam according to sec. 4 subsec. 2 no. 1 study and examination regulations.
In addition the student needs to obtain a certificate for the exercise (not graded) as an assessment according to section 4
subsection 2 no. 3 study and examination regulations.

Conditions
Successful completion of the module *Foundations in Informatics* [IW1INF1] is mandatory.

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

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

Media
slides (pdf), practice sheets

Literature
Elective literature:

- Objektorientierte Softwaretechnik : mit UML, Entwurfsmustern und Java / Bernd Brügge ; Allen H. Dutoit
  München [u.a.] : Pearson Studium, 2004. - 747 S., ISBN 978-3-8273-7261-1

- Lehrbuch der Software-Technik - Software Entwicklung / Helmut Balzert
  Spektrum-Akademischer Vlg; Auflage: 2., überarb. und erw. A. (Dezember 2000), ISBN-13: 978-3827404800

- Software engineering / Ian Sommerville. - 7. ed.
  Boston ; Munich [u.a.] : Pearson, Addison-Wesley, 2004. - XXII, 759 S.
  (International computer science series), ISBN 0-321-21026-3

- Design Patterns: Elements of Reusable Object-Oriented Software / Gamma, Erich and Helm, Richard and Johnson,
  Ralph and Vlissides, John, Addison-Wesley 2002
  ISBN 0-201-63361-2

- C# 3.0 design patterns : [Up-to-date for C#3.0] / Judith Bishop
  Bejing ; Köln [u.a.] : O'Reilly, 2008. - XXI, 290 S.
  ISBN 0-596-52773-X, ISBN 978-0-596-52773-0

Course: Software Engineering II [24076]

Coordinators: R. Reussner, W. Tichy, A. Koziolek
Part of the modules: Software Engineering II (p. 75)[IW3INSWT2]

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

Learning Control / Examinations
The assessment consists of a written exam (approx. 60 minutes) according to section 4 subsection 2 no. 1 study and examination regulations.

Conditions
None.

Recommendations
The lecture *Software engineering I* should have been attended before.

Learning Outcomes
Software Processes: Students understand the evolutionary and incremental development and they can describe the advantage over a sequential process. They can describe the phases and disciplines of the Unified Process.
Requirements Engineering: Students can describe the terms and activities of Requirements Engineering. They can classify and assess requirements according to the facets "kind" and "representation". They can apply fundamental guidelines on specifying natural language requirements and they can describe requirements prioritization approaches. The can describe the purpose and the elements of Use Case Models. They can classify use cases according to their level and goal. They can create use case diagrams and use cases. They can derive system sequence diagrams and operation contracts and they can describe their role in the software development process.
Software architecture: Students can reproduce and describe the definitions of software architecture and software components. They can explain the difference between software architecture and software architecture documentation. They can describe the advantages of explicit architecture and the influences on architecture decisions. They can assign design decisions and elements to architectural layers. They can describe what component models define. They can describe the elements of the Palladio component model and explain some of the made design decisions.
Enterprise Software Patterns: Students can characterize enterprise systems and decide which characteristics a given application has. They know patters of structuring the domain logic, data source architectural patterns, and object-relational structural patterns. They can select an appropriate pattern for a given design problem and justify their selection with respect to advantages and disadvantages of the patterns.
Software design: Students can assign responsibilities that result from system operations to classes and objects in an object oriented design using the GRASP patterns and thus design object-oriented software.
Software quality: Students know the principles for well-readable program code and they can identify violations and make suggestions for improvement.
Model-driven software development (MDSD): Students can describe the goals and envisioned labour division of MDSD. They can reproduce and explain the definitions of "model" and "metamodel". They can discuss the goals of modelling. They can describe the Model-driven Architecture and they can express constraints in the Object Constraint Language. They can express simple transformation fragments of model-to-text transformations in a template language. They can discuss the advantages and disadvantages of MDSD.
Embedded systems: Students can explain the principles of real time systems and why these are usually implemented as parallel processes. They can describe a rough development process for real time systems. They can describe the role of a real time operating system. They can distinguish between different types of real time systems.
Dependability: Students can describe the different dimensions of dependability and assign a given requirement to the related dimension. They can explain why Unit tests are not sufficient to assess software reliability and they can describe what influence the usage profile and realistic failure data have. They can assess the reliability of a system based on statistical tests.
Security: Students can describe the fundamental ideas and challenges of software security. They can detect common security problems and make solution proposals.

Content
The students learn approaches and techniques for systematic software engineering. The lecture covers advanced topics. Topics are requirements engineering, software development processes, software quality, software architectures, MDD, Enterprise Software Patterns software maintainability, software security, dependability, embedded software, middleware, statistic testing

Media
Slides, secondary literature

Literature
Will be announced in the lecture.

Course: Special Topics in Management Accounting [2579905]

Coordinators: M. Wouters, F. Stadtherr
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

ECTS Credits	Hours per week	Term	Instruction language
3	2		en

Learning Control / Examinations
The final grade of the course is the grade awarded to the paper.

Conditions
The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2610026) must have been completed before starting this seminar.

Learning Outcomes
Students
• are largely independently able to identify a distinct topic in Management Accounting,
• are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
• can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Literature
Will be announced in the course.

Remarks
Maximum of 24 students.

Course: Special Topics in Information Engineering & Management [2540498]

Coordinators: C. Weinhardt
Part of the modules: eBusiness and Service Management (p. 32)[IW3BWLISM1]

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
Students are able to

- do literature search based on a given topic: identify relevant literature, find, assess and evaluate this literature.
- do additional practical components in order to apply scientific methods (e.g., case studies, software implementations, surveys, or experiments).
- 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
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 an 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

- PowerPoint
- E-learning platform 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 "Industrial Engineering and Management" and "Economics Engineering" also have the chance of getting practical experience and enhance their scientific capabilities.
The Special Topics Information Engineering and 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: A. Oberweis, H. Schmeck, R. Studer
Part of the modules: Business Processes and Information Systems (p. 63)[IW3INAIFB8]

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

- explain basic knowledge and concepts in a subarea of "Applied computer science",

- apply methods and instruments in a subarea of "Applied computer science",

- choose the appropriate methods to solve given problems and apply them,

- find and discuss arguments for solution approaches.

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 is not equivalent to another course of this topic.

Course: Special Topics of Efficient Algorithms [25700sp]

Coordinators: H. Schmeck
Part of the modules: Algorithms and Applications (p. 62)[IW3INAIFB5]

ECTS Credits	Hours per week	Term	Instruction language
5	2/1	Winter / 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). The exam will be offered in every semester and can be repeated on regular examination dates.
If the mark obtained in the written exam is in between 1.3 and 4.0, a successful completion of the assignments or the bonus exam will improve the mark by one level (i.e. by 0.3 or 0.4).

Conditions
None.

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 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
This course emphasizes the new topics in the area of algorithms, data structures, and computer infrastructures. The exact topics can vary according to the audiences and the time it is held.

Literature
Elective literature:
Will be announced in the lecture.

Remarks
This course can be particularly used for recognising the external courses with the topics in the area of algorithms, data-structures and computer infrastructures but are not associated in other courses in this subject area.

Course: Special Topics of Knowledge Management [25860sem]

Coordinators: R. Studer
Part of the modules: Semantic Knowledge Management (p. 59)[IW3INAIFB2]

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

Learning Control / Examinations
Assesment is provided by a written exam of 60 minutes or an oral exam during the first few weeks after the lecturing period (acc. to §4(2), 1 or 2 SPO). The exam is offered each semester and may be repeated at the regular examination day.

Conditions
None.

Learning Outcomes
The lecture serves as placeholder for course achievements abroad.
The students acquire the skills, methods and tools in one specialized topic of "knowledge management" to demonstrate their mastery and innovativeness.
The lecture aims at providing principles and methods in the context of the practical application of KM. On the basis of a fundamental understanding of concepts, methods, and tools, students will be able to work on advanced problems. The students will be able to find and argue for solutions of KM problems.

Content
The lecture serves as placeholder for course achievements abroad.
The lecture deals with special topics in the area of knowledge management (incl. Knowledge Discovery and Semantic Web). The lecture deepens one of the following topics:

- Dynamic and Interoperable Systems in Knowledge Management
- Personal and Process-oriented Knowledge Management
- Formal Concept Analysis
- Semantic Search and Text Mining
- Combination of Social Software and Semantic Web

Literature
Elective literature:
Depends on the actual content.

Course: Specific Aspects in Taxation [2560129]

Coordinators: B. Wigger, Armin Bader
Part of the modules: Topics in Finance I (p. 44)[IW3BWLFBV5]

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
See German version.

Content
The lecture „Special Aspects of Taxation" focuses on the effects of different taxes. The main emphasis is on German tax legislation. In addition to that, international aspects of taxation, in particular with respect to the European integration, will be discussed.
The lecture consists of four parts: First specific tax problems of corporate, income and consumption taxes are treated. Part two introduces the advantages and disadvantages of each of these taxes, in particular their incidence ("Who actually carries the tax burden?") and their effects within the value chain. The third part then deals with the question how the different taxes contribute to public revenues. Finally, the last part compares tax systems within and outside Europe.
As a special feature, guest lecturers will provide insight into practical aspects of taxation.

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: Facility Location and Strategic Supply Chain Management [2550486]

Coordinators: S. Nickel
Part of the modules: Methical Foundations of OR (p. 57)[IW3OR6], Supply Chain Management (p. 34)[IW3BWLISM2], Applications of Operations Research (p. 55)[IW3OR5]

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 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 student

- knows and describes basic quantitative methods in location planning in the context of strategic Supply Chain Planning,

- applies several criteria for the evaluation of the locations of facilities in the context of 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),

- implements the considered models in 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 lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

Course: Statistics and Econometrics in Business and Economics [2521325/2521326]

Coordinators: W. Heller
Part of the modules: Statistical Applications of Financial Risk Management (p. 53)[IW3VWL]

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

Learning Control / Examinations
See German version.

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: W. Heller
Part of the modules: Statistics (p. 25)[IW1STAT]

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 understands and applies

- the basic concepts of statistical data exploration,

- the basic definitions and theorems of probability theory.

Content
A. Descriptive Statistics: univariate und bivariate analysis
B. Probability Theory: probability space, conditional and product probabilities

Media
lecture notes

Literature
Skriptum: Kurzfassung Statistik I
Elective literature:
Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009,
ISBN 978-3486590883.
Bol, G.: Deskriptive Statistik, 6. überarb. Auflage, Oldenbourg, München 2004, ISBN 978-3486576122.
Bol, G.: Wahrscheinlichkeitstheorie, 6. überarb. Auflage, Oldenbourg, München 2007,
ISBN 978-3486584356.
Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage,
Springer, Berlin 2009, ISBN 978-3642015564.
Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl.,
Springer, Berlin 2010, ISBN 978-3642150098.
Rinne, H.: Taschenbuch der Statistik, 4. überarb. u. erw. Auflage., Harri Deutsch, Frankfurt
a. M. 2008, ISBN 978-3817118274.
Schwarze, J.: Grundlagen der Statistik, Beschreibende Verfahren, 11. vollst. überarbeitete
Auflage, NWB, Herne 2009, ISBN 978-3482594816.
Schwarze, J.: Grundlagen der Statistik 2: Wahrscheinlichkeitsrechnung und induktive Statistik,
9. vollst. überarb. Aufl., NWB, Herne 2009, ISBN 978-3482568695.
Taleb: The Black Swan: The Impact of the Highly Improbable, Penguin 2008.

Course: Statistics II [2610020]

Coordinators: W. Heller
Part of the modules: Statistics (p. 25)[IW1STAT]

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
None.

Recommendations
It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2610020].

Learning Outcomes
The student

- understands and applies the basic definitions and theorems of probability theory,
- transfers these theoretical foundations to problems in parametrical mathematical statistics.

Content
B. Probability Theory:

- transformation of probabilities,
- parameters of location and dispersion,
- most 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:
Bamberg, G., Baur, F. und Krapp, M.: Statistik, 16. überarb. Auflage. Oldenbourg, München 2011, ISBN 978-3486702583.
Bol, G.: Induktive Statistik, 3. überarb. Auflage, Oldenbourg, München 2003, ISBN 978-3486-272765.
Bol, G.: Wahrscheinlichkeitstheorie, 6. überarb. Auflage, Oldenbourg, München 2007, ISBN 978-3486584356.
Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2010, ISBN 978-3642150098.
Rinne, H.: Taschenbuch der Statistik, 4. überarb. u. erw. Auflage, Harri Deutsch, Frankfurt a. M. 2008, ISBN 978-3817118274.
Schwarze, J.: Grundlagen der Statistik 2: Wahrscheinlichkeitsrechnung und induktive Statistik, 9. vollst. überarb. Aufl., NWB, Herne 2009, ISBN 978-3482568695.

Course: Statistical Modeling of generalized regression models [2521350]

Coordinators: W. Heller
Part of the modules: Statistics and Econometrics (p. 54)[IW3VWL14]

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

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Conditions
None.

Recommendations
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Learning Outcomes
The student

- shows comprehensive knowledge of regression techniques

Content

Media
Slides

Literature
Provided in the lecture

Course: Markov Decision Models I [2550679]

Coordinators: K. Waldmann
Part of the modules: Stochastic Methods and Simulation (p. 58)[IW3OR7], Methodical Foundations of OR (p. 57)[IW3OR6]

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 a 2/3 step of a full grade (according to Section 4(2), 3 of the examination regulation).

Conditions
None.

Learning Outcomes
The participants will be enabled to model and analyze stochastic systems with modern techniques. The discussion of practice-oriented case studies pursues two goals. On the one hand, typical problem settings are illustrated and on the other hand, criteria for the evaluation of the performance of stochastic systems are motivated. Properties and characteristics for the evaluation of the performance of Markov Chains, Poisson Processes and queuing systems are developed.

Content
Markov Chains, Poisson Processes, Markov Chains in Continuous Time, Queuing Systems

Media
Blackboard, Slides, Flash Animations, Simulation Software

Literature

- Waldmann, K.H., Stocker, U.M. (2012): Stochastische Modelle - eine anwendungsorientierte Einführung, Springer, 2. Auflage
- 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: Markov Decision Models II [2550682]

Coordinators: K. Waldmann
Part of the modules: Stochastic Methods and Simulation (p. 58)[IW3OR7]

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 0.6.

Conditions
Foundations in the field of the Markov Decision Models I [2550679] are desired.

Learning Outcomes
The participants will be enabled to utilize Markov Decision Processes as a method for analyzing, controlling and optimizing dynamic stochastic systems. The discussion of practice-oriented case studies in the area of the management of energy systems, revenue management and logistics illustrates the application fields of Markov Decision Processes. Necessary mathematical concepts like theoretical foundations, optimality criteria and the solution of the optimality equation are presented.
Particularly the development of simple structured decision rules, that are desired by practitioners on the one hand, and that permit the efficient solutions of the optimality equation on the other hand, are discussed. The facultative computer exercise course using the programming language Java comprises a practice-oriented case study that illustrates the opportunities of the optimization of stochastic systems.

Content
Queuing Systems, Stochastic Decision Processes

Media
Blackboard, Slides, Flash Animations, Simulation Software

Literature

- Waldmann, K.H., Stocker, U.M. (2012): Stochastische Modelle - eine anwendungsorientierte Einführung, Springer, 2. Auflage
- Elective literature: Puterman, M.L. (1994): Markov Decision Processes: Discrete Stochastic Dynamic Programming; John Wiley

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Tactical and Operational Supply Chain Management [2550488]

Coordinators: S. Nickel
Part of the modules: Stochastic Methods and Simulation (p. 58)[IW3OR7], Supply Chain Management (p. 34)[IW3BWLISM2], Applications of Operations Research (p. 55)[IW3OR5]

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 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* [IW1OR].

Learning Outcomes
The student

- gathers expertise in fundamental techniques from procurement and distribution logistics, methods from inventory management and lot sizing,

- acquires the ability to efficiently utilize quantitative models from transportation planning (long-distance and distribution planning), inventory management and lot sizing in production,

- applies the introduced methods in more detail and in industry-relevant case-studies.

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 lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

Course: Telematics [24128]

Coordinators: M. Zitterbart
Part of the modules: Telematics (p. 69)[IW3INTM]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Recommendations
Knowledge of the lecture *Introduction in Computer Networks* [24519] or similar lectures is required.

Learning Outcomes
This course details selected protocols, architectures, techniques, and algorithms, which were already presented in the course *Introduction in Computer Networks*. Thus, overall knowledge and knowledge about problems that occur within a world-wide and dynamic network as well as solutions that are applied in order to avoid these problems is imparted in this course.

Content
This course addresses protocols, architectures, techniques, and algorithms that are used, e.g., for Internet routing and establishing of reliable end-to-end communication associations. In addition to different media access control mechanisms in local area networks further communication systems, e.g. line-switched ISDN, are detailed. It is intended that students additionally understand which possibilities for network management and administration currently exist.

Media
Slides.

Literature
S. Keshav. *An Engineering Approach to Computer Networking*. Addison-Wesley, 1997

J.F. Kurose, K.W. Ross. *Computer Networking: A Top-Down Approach Featuring the Internet*. 4rd Edition, Addison-Wesley, 2007

W. Stallings. *Data and Computer Communications*. 8th Edition, Prentice Hall, 2006
Elective literature:

- D. Bertsekas, R. Gallager. *Data Networks*. 2nd Edition, Prentice-Hall, 1991
- F. Halsall. *Data Communications, Computer Networks and Open Systems*. 4th Edition, Addison-Wesley Publishing Company, 1996
- W. Haaß. *Handbuch der Kommunikationsnetze*. Springer, 1997
- A.S. Tanenbaum. *Computer-Networks*. 4th Edition, Prentice-Hall, 2004
- Internet standards
- Selected journal arcticles

Course: Theoretical Foundations of Computer Science [24005]

Coordinators: J. Müller-Quade, D. Wagner
Part of the modules: Theoretical Informatics (p. 16)[IW2INF3]

ECTS Credits	Hours per week	Term	Instruction language
7	3/1/2	Winter term	de

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Learning Outcomes
The student

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

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

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

Media
Slides (pdf), lecture notes, practice sheets.

Literature
Elective literature:

- Uwe Schöning: Theoretische Informatik - kurz gefasst. Sprektrum (2001).
- Ingo Wegener: Theoretische Informatik. Teubner (1999)
- Ingo Wegener: Kompedium theoretische Informatik. Teubner (1996).

Course: Corporate Governance in Energy Economics [2581005]

Coordinators: H. Villis
Part of the modules: Energy Economics (p.)[IW3BWLIIP2]

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
See German version.

Content

Course: Management and Strategy [2577900]

Coordinators: H. Lindstädt
Part of the modules: Strategy and Organization (p. 40)[IW3BWLUO1]

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) 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
After passing this course students are able to

- prepare strategic decisions along the ideal-typical strategy process in practice ("strategic analysis").
- assess strategic options.
- explain the portfolio management (Parental advantage and best owner of business entities).
- discuss price and capacity decisions in oligopolies and explain them in examples.

Content
The participants learn about central concepts of strategic management along the ideal-typical strategy process: internal and external strategic analysis, concept and sources of competitive advantages, their importance when establishing competitive and corporate strategies as well as strategy assessment and implementation. This aims in particular to provide a summary of the basic concepts and models of strategic management, i.e. to provide in particular an action-oriented integration. Thereby a focus is on imparting knowledge about how price developments in oligopolistic markets can be understood, modeled and forecasted based on game theory.

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.

Remarks
The credits for the course "Management and Strategy" have been changed from 4 to 3,5 from summer term 2015 on.

Course: Capability maturity models for software and systems engineering [2511216]

Coordinators: R. Kneuper
Part of the modules: Business Processes and Information Systems (p. 63)[IW3INAIFB8]

ECTS Credits	Hours per week	Term	Instruction language
4	2	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 master the basics of capability maturity models, oversee the whole process in project management and development processes according to CMMI and SPICE. They know how to use capability maturity models for quality assurance.

Content
Capability maturity models like CMMI and SPICE are an important tool for assessing and improving software development. A significantly increasing number of companies use these models in their own approach to improve their development and to demonstrate a certain minimum quality and effective external presentation. This is the case in Germany, especially in the automotive industry, but also many other industries.

Preliminary Structure of the lecture:

1. Introduction and Overview, motivation
2. Project management according to CMMI
3. Development processes according to CMMI
4. Process management and supporting processes according toCMMI
5. Differences between SPICE and CMMI
6. Introduction of capability maturity models
7. Assessments and Appraisals
8. Costs and benefits of capability maturity models

Media
Slides, access to internet resources.

Literature
Literature is given in each lecture individually.

Course: Economics I: Microeconomics [2610012]

Coordinators: C. Puppe, P. Reiss
Part of the modules: Economics (p. 23)[IW1VWL]

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. In particular, the student should be able to analyze market processes and the determinants of market results. Furthermore, she should be able to evaluate the effects of economic policy measures on market behavior and propose alternative, more effective policy measures.
In particular, the student should learn

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

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

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

Content
The students learn the basic concepts in Microeconomics and some basics in game theory. The student will understand the working of markets in modern economies and the role of decision making. Furthermore, she should be able to understand simple game theoretic argumentation in different fields of Economics.
In the two main parts of the course, problems of microeconomic decision making (household behavior, firm behavior) and problems of commodity allocation on markets (market equilibria and efficiency of markets) are discussed. In the final part of the course, basics of imperfect competition (oligopolistic markets) and of game theory as well as welfare economics are presented.

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 III: Introduction in Econometrics [2520016]

Coordinators: M. Schienle
Part of the modules: Statistical Applications of Financial Risk Management (p. 53)[IW3VWL], Statistics and Econometrics
(p. 54)[IW3VWL14]

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

Course: Web Engineering [24124]

Coordinators: H. Hartenstein, M. Nußbaumer
Part of the modules: Information Services in Networks (p. 61)[IW3INAIFB4]

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

Learning Control / Examinations
The assessment is explained in the module description.

Conditions
None.

Recommendations
Knowledge of the lecture *Software Engineering II*.

Learning Outcomes

- Students know fundamentals as well as current methodologies and techniques in the field of Web Engineering

- Students have gained insight into existing Web-oriented application platforms and development frameworks, and have the basic knowledge for system design close to current practices.

- Students can apply methods for analyzing current standards and technologies of the Web. Students are able to understand and interpret scientific papers and standard specifications and are confident in using the domain-specific terminology.

- Students are able to analyze, structure and describe problems in the field of Web Engineering as well as to design Web-based system architectures.

Content
This lecture will discuss the systematic construction of Web-based applications and systems by focusing on the different phases and aspects of the Web application lifecycle. It helps students to look at the Web phenomenon from different perspectives - e.g. as a Web designer, analyst, architect, component engineer, program manager, product manager or CIO. Students learn how to engineer Web applications and agile systems from requirements engineering, planning, design, development, testing, deployment and up to operation, maintenance and evolution. Many examples are shown and discussed, demonstrating the need for expecting change and staying agile. As this is not a programming course, students will be introduced to the core technology aspects and are encouraged to consolidate the details.

Media
Slides

Literature
Will be announced in the lecture.

Course: [24522]

Coordinators: K. Böhm
Part of the modules: Foundations of Information Systems (p. 65)[IW3INGIS]

ECTS Credits	Hours per week	Term	Instruction language
1	0/1	Summer term	de

Learning Control / Examinations

Conditions
None.

Learning Outcomes

Content

Remarks
The course is currently not lectured.

Course: Competition in Networks [2561204]

Coordinators: K. Mitusch
Part of the modules: Specialization in Customer Relationship Management (p. 38)[IW3BWLISM5], Applied Microeconomics (p. 52)[IW3VWL13]

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

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

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 Students

- will get a vivid idea of the special characteristics of network industries like telecom, utilities, IT and transport sectors.
- will acquire the basic economic understanding of network industries concerning competition, competitive distortion, state intervention, pricing and financing
- will be able to apply abstract concepts and formal methods to use in these fields

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

Literature
Will be announced in the lecture.

Course: Seminar Economic Theory [SemWIOR2]

Coordinators: C. Puppe
Part of the modules: Seminar Module Economic Sciences (p. 79)[IW3SEMWIWI]

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
See German version.

Content

Literature
Will be announced at the end of the recess period.

Remarks
see German version.

Course: Knowledge Management [2511300]

Coordinators: R. Studer
Part of the modules: Semantic Knowledge Management (p. 59)[IW3INAIFB2]

ECTS Credits	Hours per week	Term	Instruction language
4	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
Students

- know different application domains of knowledge management
- know different (specifically semantic and social) technologies of knowledge management
- are able to judge the applicability of business software with regard to aspects of knowledge management
- are able to judge the long term value of knowledge management in organisations and compare it to possible costs

Content
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 [252517]

Coordinators: C. Puppe
Part of the modules: Economic Theory (p. 51)[IW3VWL12]

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).

Conditions
The course *Economics I: Microeconomics* [2610012] has to be completed beforehand.

Recommendations
It is recommended to visit the course *Economics II: Macroeconomics* [2600014] beforehand.

Learning Outcomes
See German version.

Content
The lecture "Welfare economics" deals with the question of efficiency and distributional properties of economic allocations, in particular allocations of market equilibria. The lecture is based on the two welfare theorems: The first welfare theorem (under weak preconditions) says that every competitive equilibrium is efficient.
According to the second welfare theorem (under stronger preconditions), every efficient allocation can be preserved as a competetive equilibrium through adequate choices of initial endowments. Afterwards, the terms and definitions of envy-freeness and the related concept of egalitarian equivalence in the context of the general theory of equilibrium will be discussed.
The second part of the lecture deals with the principle of "social justice" (i.e. distributational justice).The fundamental principles of utilitarism, Rawl's theory of justice as well as John Roemer's theory of equality of opportunity are explained and critically analyzed.

Literature
Elective literature:

   • J. Rawls: *A Theory of Justice*. Harvard University Press (1971)

   • J. Roemer: *Theories of Distributive Justice*. Harvard University Press (1996)

Remarks
The next course will be held in the summer 2015 and afterwards every two years in the summer.

Course: Workflow-Management [2511204]

Coordinators: A. Oberweis
Part of the modules: Business Processes and Information Systems (p. 63)[IW3INAIFB8]

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

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

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

Learning Outcomes
Students

- explain the concepts and principles of workflow management concepts and systems and their applications,
- create and evaluatel business process models,
- analyze static and dynamic properties of workflows.

Content
A workflow is that part of a business process which is automatically executed by a computerized system. Workflow management includes the design, modelling, analysis, execution and management of workflows. Workflow management systems are standard software systems for the efficient control of processes in enterprises and organizations. Knowledge in the field of workflow management systems is especially important during the design of systems for process support.
The course covers the most important concepts of workflow management. Modelling and design techniques are presented and an overview about current workflow management systems is given. Standards, which have been proposed by the workflow management coalition (WfMC), are discussed. Petri nets are proposed as a formal modelling and analysis tool for business processes. Architecture and functionality of workflow management systems are discussed. The course is a combination of theoretical foundations of workflow management concepts and of practical application knowledge.

Media
Slides, Access to internet resources.

Literature

- W. van der Aalst, H. van Kees: Workflow Management: Models, Methods and Systems, Cambridge 2002: The MIT Press
- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer 2012.
- A. Oberweis: Modellierung und Ausführung von Workflows mit Petri-Netzen. Teubner-Reihe Wirtschaftsinformatik, B.G. Teubner Verlag, 1996.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karl: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.
  Further literature is given in the lecture.

7   Appendix: Qualification objectives of the Bachelors degree in Information Engineering and Management

Graduates with a Bachelors degree in Information Engineering and Management are equipped with strategically oriented basic knowledge in the fields of informatics (theoretical computer science, algorithms, programming technology and software engineering), economic sciences (business-related topics from the financial industry, information industry, production management, marketing and accounting as well as economic correlations of microeconomics) and law (basics of private law, private business law and of the constitutional and administrative law) as well as mathematics, statistics and operation research. Through the comprehensive methodological basis, the graduates are in a position to acknowledge and apply specialized basic concepts, methods, models and approaches. The graduates have an in-depth knowledge in computer science and law.

They can acknowledge, describe and communicate economic, IT and legal problems. This hereby entails planning, analyzing, comparing, reviewing and optimizing products, systems and processes. They make decisions, develop specialized solutions and implement their innovative ideas using methods and models from different disciplines within the framework of the available resources. They know how to illustrate, validate, review and guarantee the quality of the results achieved. The practical use of their know-how also takes into account the social, scientific and ethical aspects. Through the interdisciplinary nature of the course, the graduates can effectively respond at the interface of the different topics as well as set up targeted communication between the respective disciplines.

The graduates are in a position to work in a team and cope with challenges, e.g., those encountered in information and communication technology fields. They have the ability to exercise career-related activities in the industry, service sector or in trade, start their own firms or take up a Masters degree program in Information Engineering and Management or any other related course.

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Studien- und Prüfungsordnung der Universität Karlsruhe (TH) für den Bachelorstudiengang Informationswirtschaft

vom 15. April 2009

Aufgrund von § 34 Abs. 1 Satz 1 des Landeshochschulgesetzes (LHG) vom 1. Januar 2005 hat die beschließende Senatskommission für Prüfungsordnungen der Universität Karlsruhe (TH) am 13. Februar 2009 die folgende Studien- und Prüfungsordnung für den Bachelorstudiengang Informationswirtschaft beschlossen.

Der Rektor hat seine Zustimmung am 15. April 2009 erteilt.

Inhaltsverzeichnis

Die Universität Karlsruhe (TH) hat sich im Rahmen der Umsetzung des Bolognaprozesses zum Aufbau eines Europäischen Hochschulraumes zum Ziel gesetzt, dass am Abschluss der Studierendenausbildung an der Universität Karlsruhe (TH) der Mastergrad stehen soll. Die Universität Karlsruhe (TH) sieht daher die an der Universität Karlsruhe (TH) angebotenen konsekutiven Bachelor- und Masterstudiengänge als Gesamtkonzept mit konsekutivem Curriculum.

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.

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich, Zweck der Prüfung

(1) Diese Bachelorprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Bachelorstudiengang Informationswirtschaft an der Universität Karlsruhe (TH).

(2) Die Bachelorprüfung (§ 17 – 20) bildet den berufsbefähigenden Abschluss dieses Studiengangs, der gemeinsam von der Fakultät für Informatik und der Fakultät für Wirtschaftswissenschaften an der Universität Karlsruhe (TH) angeboten wird. Durch die Bachelorprüfung soll festgestellt werden, ob der Studierende die für den Übergang in die Berufspraxis grundlegenden wissenschaftlichen Fachkenntnisse besitzt und die Zusammenhänge des Faches Informationswirtschaft überblickt.

§ 2 Akademischer Grad

Aufgrund der bestandenen Bachelorprüfung wird der akademische Grad „Bachelor of Science" (abgekürzt: „B.Sc.") für den Studiengang Informationswirtschaft (englischsprachig: Information Engineering and Management) verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) Die Regelstudienzeit beträgt sechs Semester. Sie umfasst neben den Lehrveranstaltungen ein Berufspraktikum, Prüfungen und die Bachelorarbeit.

(2) Die im Studium zu absolvierenden Lehrinhalte sind in Module gegliedert, die jeweils aus einer Lehrveranstaltung oder mehreren, thematisch und zeitlich aufeinander bezogenen Lehrveranstaltungen bestehen. Der Studienplan beschreibt 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 Verteilung der Leistungspunkte im Studienplan auf die Semester hat in der Regel gleichmäßig zu erfolgen.

(6) Lehrveranstaltungen können in englischer Sprache angeboten werden.

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(7) Profilmodule dienen der Profilbildung im Studiengang und der transparenten Darstellung der Lehrziele des Studiengangs durch eine Lehrzielhierarchie. Profilmodule werden durch die Module nach § 17 Abs. 3 und Abs. 4 gebildet. Jeweils beim Abschluss eines Moduls des Profilmoduls werden die Leistungspunkte dem Profilmodul angerechnet. Die Zuordnung der Module und Seminare zu Profilmodulen beschreibt der Studienplan.

§ 4 Aufbau der Prüfungen

(1) Die Bachelorprüfung besteht aus einer Bachelorarbeit und Fachprüfungen, jede Fachprüfung aus einer oder mehreren Modulprüfungen, jede Modulprüfung aus einer oder mehreren Modulteilprüfungen. Eine Modulteilprüfung besteht aus mindestens einer Erfolgskontrolle.

(2) Erfolgskontrollen sind:

   1. schriftliche Prüfungen,

   2. mündliche Prüfungen oder

   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 Studienplan ausgewiesen sind.

(3) Mindestens 50 % einer Modulprüfung sind in Form von schriftlichen oder mündlichen Prüfungen (§ 4 Abs. 2, Nr. 1 und 2) abzulegen, die restlichen Prüfungen erfolgen durch Erfolgskontrollen anderer Art (§ 4 Abs. 2, Nr. 3). Ausgenommen hiervon sind die Prüfungen nach § 17 Abs. 4.

§ 5 Anmeldung und Zulassung zu den Prüfungen

(1) Um an schriftlichen und/oder mündlichen Prüfungen (§ 4 Abs. 2, Nr. 1 und 2) teilnehmen zu können, muss sich der Studierende schriftlich oder per Online-Anmeldung beim Studienbüro anmelden. Hierbei sind die gemäß dem Studienplan für die jeweilige Modulprüfung notwendigen Studienleistungen nachzuweisen. Dies gilt auch für die Anmeldung zur Bachelorarbeit.

(2) Um zu schriftlichen und/oder mündlichen Prüfungen (§ 4 Abs. 2, Nr. 1 und 2) in einem bestimmten Modul zugelassen zu werden, muss der Studierende vor der ersten schriftlichen oder mündlichen Prüfung in diesem Modul beim Studienbüro eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach, wenn diese Wahlmöglichkeit besteht, abgeben.

(3) Die Zulassung darf nur abgelehnt werden, wenn

   1. der Studierende in einem mit der Informationswirtschaft 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 Erfolgskontrolle (§ 4 Abs. 2, Nr. 1 - 3) der einzelnen Lehrveranstaltungen wird vom Prüfer der betreffenden Lehrveranstaltung in Bezug auf die Lehrinhalte der Lehrveranstaltung und die Lehrziele des Moduls festgelegt. Die Art der Erfolgskontrollen, ihre Häufigkeit, Reihenfolge und Gewichtung, die Bildung der Lehrveranstaltungsnote und der Modulnote sowie

Prüfer müssen mindestens sechs Wochen vor Semesterbeginn bekannt gegeben werden. Im Einvernehmen von Prüfer und Studierendem kann in begründeten Ausnahmefällen die Art der Erfolgskontrolle auch nachträglich geändert werden. Dabei ist jedoch § 4 Abs. 3 zu berücksichtigen. Hierüber entscheidet der Prüfungsausschuss auf Antrag.

(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.

(4) Weist ein Studierender nach, dass er wegen länger andauernder oder ständiger körperlicher Behinderung nicht in der Lage ist, die Erfolgskontrollen ganz oder teilweise in der vorgeschriebenen Form abzulegen, kann der zuständige Prüfungsausschuss – in dringenden Angelegenheiten, deren Erledigung nicht bis zu einer Sitzung des Ausschusses aufgeschoben werden kann, dessen Vorsitzender – gestatten, Erfolgskontrollen in einer anderen Form zu erbringen.

(5) Bei Lehrveranstaltungen in englischer Sprache können mit Zustimmung des Studierenden die entsprechenden Erfolgskontrollen in englischer Sprache abgenommen werden.

(6) Schriftliche Prüfungen (§ 4 Abs. 2, Nr. 1) sind in der Regel von zwei Prüfern nach § 15 Abs. 2 oder 3 zu bewerten. Die Note ergibt sich aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in § 7 Abs. 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 mindestens 60 und höchstens 240 Minuten.

(7) Mündliche Prüfungen (§ 4 Abs. 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 Studierenden. Dies gilt auch für die mündliche Nachprüfung gemäß § 8 Abs. 3.

(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 zu prüfenden 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. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

(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. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

(12) Bei mündlich durchgeführten Erfolgskontrollen anderer Art muss neben dem Prüfer ein Beisitzer anwesend sein, der zusätzlich zum Prüfer die Protokolle zeichnet.

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§ 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, Modulprüfungen, Modulteilprüfungen und Profilmodule sind zur differenzierten Bewertung nur folgende Noten zugelassen:

1.0, 1.3	:	sehr gut
1.7, 2.0, 2.3	:	gut
2.7, 3.0, 3.3	:	befriedigend
3.7, 4.0	:	ausreichend
4.7, 5.0	:	nicht ausreichend

Diese Noten müssen in den Protokollen und in den Anlagen (Transcript of Records und Diploma Supplement) verwendet werden.

(3) Für Erfolgskontrollen anderer Art kann im Studienplan die Benotung mit „bestanden" (passed) oder „nicht bestanden" (failed) vorgesehen 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 in demselben Studiengang bzw. einem darauf aufbauenden konsekutiven Masterstudiengang 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 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 geregelt. Die differenzierten Lehrveranstaltungsnoten (Absatz 2) sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden. Enthält der Studienplan keine Regelung darüber, wann eine Modulprüfung bestanden ist, so ist diese Modulprüfung dann endgültig nicht bestanden, wenn eine dem Modul zugeordnete Modulteilprüfung endgültig nicht bestanden wurde.

(9) Die Ergebnisse der Bachelorarbeit, der Modulprüfungen bzw. der Modulteilprüfungen, der Erfolgskontrollen anderer Art sowie die erworbenen Leistungspunkte werden durch das Studienbüro der Universität erfasst.

(10) Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein. Eine Fachprüfung ist bestanden, wenn die für das Fach erforderliche Anzahl von Leistungspunkten über die im Studienplan definierten Modulprüfungen nachgewiesen wird.

(11) Die Gesamtnote der Bachelorprüfung, die Fachnoten und die Modulnoten lauten:

		bis	1.5	:	sehr gut (very good)
von	1.6	bis	2.5	:	gut (good)
von	2.6	bis	3.5	:	befriedigend (satisfactory)
von	3.6	bis	4.0	:	ausreichend (sufficient)

(12) 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.

(13) Bis zum Aufbau einer entsprechenden Datenbasis wird als Übergangsregel die Verteilung der Vordiplomsnoten des Diplomstudiengangs Informationswirtschaft per 31. Juli 2005 zur Bildung dieser Skala für alle Module des Bachelorstudiengangs herangezogen. Diese Verteilung wird jährlich gleitend über mindestens fünf Jahre mit mindestens 30 Studierenden jeweils zu Beginn des Studienjahres für jedes Modul, die Fachnoten und die Gesamtnote angepasst und in diesem Studienjahr für die Festsetzung der ECTS-Note verwendet.

§ 8 Orientierungsprüfungen, Wiederholung von Prüfungen und Erfolgskontrollen, Erlöschen des Prüfungsanspruchs

(1) Die Modulprüfungen im Modul Grundlagen der Informatik und im Modul Volkswirtschaftslehre 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 erfolgreich abgelegt hat, verliert den Prüfungsanspruch im Studiengang, es sei denn, dass er die Fristüberschreitung nicht zu vertreten hat;

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hierüber entscheidet der Prüfungsausschuss auf Antrag des Studierenden. Eine zweite Wieder-holung von Prüfungen der Orientierungsprüfungen ist ausgeschlossen.

(2) Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Abs. 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 be-standenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als „ausrei-chend" sein.

(3) Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Abs. 2, Nr. 2) einmal wie-derholen.

(4) Wiederholungsprüfungen nach Absatz 2 und 3 müssen in Inhalt, Umfang und Form (münd-lich oder schriftlich) der ersten Prüfung entsprechen. Ausnahmen kann der zuständige Prüfungs-ausschuss auf Antrag zulassen. Fehlversuche an anderen Hochschulen sind anzurechnen.

(5) Die Wiederholung einer Erfolgskontrolle anderer Art (§ 4 Abs. 2, Nr. 3) wird im Studienplan geregelt.

(6) Eine zweite Wiederholung derselben schriftlichen oder mündlichen Prüfung ist nur in Aus-nahmefällen zulässig. Einen Antrag auf Zweitwiederholung hat der Studierende schriftlich beim Prüfungsausschuss zu stellen. Über den ersten Antrag eines Studierenden auf Zweitwiederho-lung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungs-ausschuss diesen Antrag ablehnt, entscheidet der Rektor. Über weitere Anträge auf Zweitwie-derholung entscheidet nach Stellungnahme des Prüfungsausschusses der Rektor. Absatz 2 Satz 2 und 3 gelten entsprechend.

(7) Die Wiederholung einer bestandenen Erfolgskontrolle ist nicht zulässig.

(8) Eine Fachprüfung ist endgültig nicht bestanden, wenn mindestens ein Modul des Faches endgültig nicht bestanden ist.

(9) Die Bachelorarbeit kann bei einer Bewertung mit „nicht ausreichend" einmal wiederholt wer-den. Eine zweite Wiederholung der Bachelorarbeit ist ausgeschlossen.

(10) Ist gemäß § 34 Abs. 2 Satz 3 LHG die Bachelorprüfung bis zum Ende des neunten Fach-semesters dieses Studiengangs einschließlich etwaiger Wiederholungen nicht vollständig abge-legt, so erlischt der Prüfungsanspruch im Studiengang, es sei denn, dass der Studierende die Fristüberschreitung nicht zu vertreten hat. Die Entscheidung darüber trifft der Prüfungsaus-schuss. Die Entscheidung über eine Fristverlängerung und über Ausnahmen von der Fristrege-lung trifft der Prüfungsausschuss.

§ 9 Versäumnis, Rücktritt, Täuschung, Ordnungsverstoß

(1) Der Studierende kann bei schriftlichen Prüfungen ohne Angabe von Gründen bis einen Tag (24 Uhr) vor dem Prüfungstermin zurücktreten (Abmeldung). Bei mündlichen Prüfungen muss der Rücktritt spätestens drei Werktage vor dem betreffenden Prüfungstermin erklärt werden (Abmeldung). Ein Rücktritt von einer mündlichen Prüfung weniger als drei Werktage vor dem betreffenden Prüfungstermin ist nur unter Voraussetzungen des Absatzes 3 möglich. Die Ab-meldung kann schriftlich beim Prüfer oder per Online-Abmeldung beim Studienbüro erfolgen. Eine durch Widerruf abgemeldete Prüfung gilt als nicht angemeldet. Der Rücktritt von mündli-chen Nachprüfungen im Sinne von § 8 Absatz 2 ist grundsätzlich nur unter den Voraussetzun-gen von Absatz 3 möglich.

(2) Eine Prüfung gilt als mit „nicht ausreichend" (5.0) bewertet, wenn der Studierende einen Prü-fungstermin 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 Fristüber-schreitung 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 die Vorlage eines ärztlichen Attests und in Zweifelsfällen 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. Werden die Gründe 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 mündlichen oder schriftlichen Prüfung (§ 4 Abs. 2 Nr. 1 und 2) durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Prüfung als mit „nicht ausreichend" (5.0) bewertet. Für Erfolgskontrollen anderer Art (§ 4 Abs. 2, Nr. 3) gilt dies entsprechend.

(5) Ein Studierender, der den ordnungsgemäßen Ablauf der Prüfung stört, kann von dem jeweiligen Prüfer oder der Aufsicht führenden Person von der Fortsetzung der Prüfung ausgeschlossen werden; in diesem Fall gilt die betreffende Prüfung als mit „nicht ausreichend" (5.0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss den Studierenden von der Erbringung weiterer Prüfungen ausschließen. Für Erfolgskontrollen anderer Art (§ 4 Abs. 2, Nr. 3) gilt dies entsprechend.

(6) Der Studierende kann innerhalb von einem Monat verlangen, dass die Entscheidung gemäß Absatz 4 und 5 vom Prüfungsausschuss überprüft wird. Belastende Entscheidungen des Prüfungsausschusses sind dem Studierenden unverzüglich schriftlich mitzuteilen, zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Vor einer Entscheidung ist dem Studierenden Gelegenheit zur Äußerung zu geben.

(7) Näheres regelt die Allgemeine Satzung der Universität Karlsruhe (TH) zur Redlichkeit bei Prüfungen und Praktika.

§ 10 Mutterschutz, Elternzeit, Wahrnehmung von Familienpflichten

(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 Studien- und 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 an 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.

(3) Der Prüfungsausschuss entscheidet auf Antrag über die flexible Handhabung von Prüfungsfristen entsprechend den Bestimmungen des Landeshochschulgesetzes, wenn Studierende Familienpflichten wahrzunehmen haben. Die Bearbeitungszeit der Bachelorarbeit kann nicht durch die Wahrnehmung von Familienpflichten unterbrochen oder verlängert werden. Die gestellte Arbeit gilt als nicht vergeben. Der Studierende erhält ein neues Thema, das innerhalb der in § 11 festgelegten Bearbeitungszeit zu bearbeiten ist.

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§ 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 laut § 17 Absatz 2 noch nicht bestanden wurde.

Vor Zulassung sind Betreuer, Thema und Anmeldedatum dem Prüfungsausschuss bekannt zu geben. Auf Antrag des Studierenden sorgt ausnahmsweise 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) 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. Der Bachelorarbeit werden 12 Leistungspunkte zugeordnet, der Arbeitsaufwand soll daher 360 Stunden nicht übersteigen. Die empfohlene Bearbeitungsdauer beträgt sechs Monate. Die maximale Bearbeitungsdauer beträgt einschließlich einer Verlängerung neun Monate. Die Bachelorarbeit kann auch auf Englisch geschrieben werden.

(4) Die Bachelorarbeit kann von jedem Prüfer nach § 15 Abs. 2 vergeben und betreut werden. Soll die Bachelorarbeit außerhalb der beiden nach § 1 Abs. 2 Satz 1 beteiligten Fakultäten angefertigt werden, so bedarf dies der Genehmigung des Prüfungsausschusses.

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 1 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. Der Studierende kann das Thema der Bachelorarbeit nur einmal und nur innerhalb der ersten zwei Monate der Bearbeitungszeit zurückgeben. Auf begründeten Antrag des Studierenden kann der Prüfungsausschuss die in Absatz 3 festgelegte Bearbeitungszeit um höchstens drei Monate 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.

(8) Die Vorbereitung auf die Bachelorarbeit wird im Rahmen eines der verpflichtenden Seminare (nach § 17 Abs. 4) gewährleistet.

§ 12 Berufspraktikum

(1) Während des Bachelorstudiums ist ein mindestens sechswöchiges Berufspraktikum abzuleisten, welches geeignet ist, den Studierenden eine Anschauung von berufspraktischer Tätigkeit in Informationswirtschaft zu vermitteln. Dem Berufspraktikum sind 8 Leistungspunkte zugeordnet.

(2) Der Studierende setzt sich in eigener Verantwortung mit geeigneten privaten bzw. öffentlichen Einrichtungen in Verbindung, an denen das Praktikum abgeleistet werden kann. Der Studierende wird von einem Prüfer nach § 15 Abs. 2 und einem Firmenbetreuer betreut.

(3) Am Ende des Berufspraktikums ist dem Prüfer ein kurzer Bericht abzugeben und eine Kurzpräsentation der Erfahrungen im Berufspraktikum zu halten.

(4) Das Berufspraktikum ist abgeschlossen, wenn eine mindestens sechswöchige Tätigkeit nachgewiesen wird, der Bericht abgegeben und die Kurzpräsentation gehalten wurde. Die Durchführung des Berufspraktikums ist im Studienplan zu regeln. Das Berufspraktikum geht nicht in die Gesamtnote ein.

§ 13 Zusatzleistungen und Zusatzmodule

(1) Innerhalb der Regelstudienzeit, einschließlich der Urlaubssemester für das Studium an einer ausländischen Hochschule (Regelprüfungszeit), können in einem Modul bzw. Fach auch weitere Leistungspunkte (Zusatzleistungen) im Umfang von höchstens 20 Leistungspunkten erworben werden. § 3, § 4 und § 8 Abs. 10 der Studien- und Prüfungsordnung bleiben davon unberührt. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein. Soweit Zusatzleistungen erbracht wurden, werden auf Antrag des Studierenden bei der Festlegung der Modul- bzw. Fachnote nur die Noten berücksichtigt, die unter Abdeckung der erforderlichen Leistungspunkte die beste Modul- bzw. Fachnote ergeben. Die bei der Festlegung der Modul- bzw. Fachnote nicht berücksichtigten Leistungspunkte werden als Zusatzleistungen automatisch im Transcript of Records aufgeführt und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach § 7 vorgesehenen Noten gelistet.

(2) Der Studierende hat bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

(3) Die Ergebnisse maximal zweier Module, die jeweils mindestens 9 Leistungspunkte umfassen müssen, werden auf Antrag des Studierenden in das Bachelorzeugnis als Zusatzmodule aufgenommen und als solche gekennzeichnet. Zusatzmodule werden bei der Festsetzung der Gesamt-, Fach- und Modulnoten nicht mit einbezogen. Nicht in das Zeugnis aufgenommene Zusatzmodule werden im Transcript of Records automatisch aufgenommen und als Zusatzmodule gekennzeichnet. Zusatzmodule werden mit den nach § 7 vorgesehenen Noten gelistet.

(4) Neben den im Studienplan definierten fachwissenschaftlichen Modulen und Leistungen können die Zusatzleistungen nach Absatz 1 - 3 auch aus dem Lehrangebot anderer Fakultäten und Einrichtungen gewählt werden.

§ 14 Prüfungsausschuss

(1) Für den Bachelorstudiengang Informationswirtschaft wird ein Prüfungsausschuss gebildet. Er besteht aus sechs stimmberechtigten Mitgliedern, die jeweils zur Hälfte von der Fakultät für Informatik und der Fakultät für Wirtschaftswissenschaften bestellt werden: vier Professoren, Juniorprofessoren, Hochschul- oder Privatdozenten, zwei Vertretern der Gruppe der akademischen Mitarbeiter nach § 10 Abs. 1 Satz 2 Nr. 2 LHG und einem Vertreter der Studierenden mit beratender Stimme. Im Falle der Einrichtung eines gemeinsamen Prüfungsausschusses für den Bachelor- und den Masterstudiengang Informationswirtschaft erhöht sich die Anzahl der Vertreter der Studierenden auf zwei Mitglieder mit beratender Stimme, wobei je ein Vertreter aus dem Bachelor- und ein Vertreter aus dem Masterstudiengang stammt. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

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(2) Der Vorsitzende, sein Stellvertreter, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter werden von den jeweiligen Fakultätsräten bestellt, die Mitglieder der Gruppe der akademischen Mitarbeiter nach § 10 Abs. 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 aus einer der beteiligten Fakultäten sein. Der Vorsitz wechselt zwischen den Fakultäten alle zwei Jahre. Der Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch die Prüfungssekretariate unterstützt.

(3) Der Prüfungsausschuss regelt die Auslegung und die Umsetzung der Studien- und Prüfungsordnung in die Prüfungspraxis der Fakultäten. Er achtet darauf, dass die Bestimmungen der Studien- und Prüfungsordnung eingehalten werden. Er entscheidet über die Anrechnung von Studienzeiten, Studienleistungen und Modulprüfungen und übernimmt die Gleichwertigkeitsfeststellung. Er berichtet regelmäßig den Fakultätsräten über die Entwicklung der Prüfungen und Studienzeiten sowie über die Verteilung der Fach- und Gesamtnoten und gibt Anregungen zur Reform des Studienplans und der Studien- und 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, der Abnahme von Prüfungen beizuwohnen. 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 hinzuziehen. 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 beim Rektorat der Universität Karlsruhe (TH) einzulegen.

§ 15 Prüfer und Beisitzer

(1) Der Prüfungsausschuss bestellt die Prüfer und die Beisitzenden. Er kann die Bestellung dem Vorsitzenden übertragen.

(2) Prüfer sind Hochschullehrer und habilitierte Mitglieder sowie akademische 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 jeweilige Fakultät ihnen eine diesbezügliche Prüfungsbefugnis erteilt hat.

(4) Zum Beisitzenden darf nur bestellt werden, wer einen akademischen Abschluss in einem Studiengang der Informationswirtschaft, Informatik, Rechtswissenschaften, Wirtschaftswissenschaften oder einen gleichwertigen akademischen Abschluss erworben hat.

§ 16 Anrechnung von Studienzeiten, Anerkennung von Studien- und Prüfungsleistungen

(1) Studienzeiten im gleichen Studiengang werden angerechnet. Studien- und Prüfungsleistungen, die in gleichen oder anderen Studiengängen an der Universität Karlsruhe (TH) oder an anderen Hochschulen erbracht wurden, werden angerechnet, soweit Gleichwertigkeit besteht. 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 Studien- und Prüfungsleistung werden die Grundsätze des ECTS herangezogen; die inhaltliche Gleichwertigkeitsprüfung orientiert sich an den Qualifikationszielen des Moduls.

(2) Werden Leistungen angerechnet, können die Noten – soweit die Notensysteme vergleichbar sind – übernommen werden und in die Berechnung der Modulnoten und der Gesamtnote einbezogen werden. Liegen keine Noten vor, muss die Leistung nicht anerkannt werden. Der Studierende hat die für die Anrechnung erforderlichen Unterlagen vorzulegen.

(3) Bei der Anrechnung von Studienzeiten und der Anerkennung von Studien- und Prüfungsleistungen, 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, Studien- und Prüfungsleistungen, die in staatlich anerkannten Fernstudien- und an anderen Bildungseinrichtungen, insbesondere an staatlichen oder staatlich anerkannten Berufsakademien sowie an Fach- und Ingenieurschulen erworben wurden.

(5) Die Anerkennung von Teilen der Bachelorprüfung kann versagt werden, wenn in einem Studiengang mehr als 80 Leistungspunkte und/oder die Bachelorarbeit anerkannt werden soll/en. Dies gilt insbesondere bei einem Studiengangwechsel sowie bei einem Studienortwechsel.

(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.

(7) Erbringt ein Studierender Studienleistungen an einer ausländischen Universität, soll die Gleichwertigkeit vorab durch einen Studienvertrag nach den ECTS-Richtlinien festgestellt und nach diesem verfahren werden.

II. Bachelorprüfung

§ 17 Umfang und Art der Bachelorprüfung

(1) Die Bachelorprüfung besteht aus den Fachprüfungen nach Absatz 2 - 4 sowie der Bachelorarbeit (§ 11).

(2) In den ersten beiden Studienjahren sind Fachprüfungen aus folgenden Fächern durch den Nachweis von Leistungspunkten in einem oder mehreren Modulen abzulegen:

1. Betriebswirtschaftslehre im Umfang von 16 Leistungspunkten,
2. Volkswirtschaftslehre im Umfang von 5 Leistungspunkten,
3. Informatik im Umfang von 37 Leistungspunkten,
4. Mathematik im Umfang von 16 Leistungspunkten,
5. Operations Research im Umfang von 9 Leistungspunkten,
6. Statistik im Umfang von 10 Leistungspunkten,
7. Recht im Umfang von 19 Leistungspunkten.

Die Module, die ihnen zugeordneten Leistungspunkte und die Zuordnung der Module zu den Fächern sind im Studienplan festgelegt. Zur entsprechenden Modulprüfung kann nur zugelassen werden, wer die Anforderungen nach § 5 erfüllt.

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(3) Im dritten Studienjahr sind Fachprüfungen

1. aus dem Fach Informatik durch Module im Umfang von 18 Leistungspunkten,

2. aus wirtschaftswissenschaftlichen Fächern durch Module im Umfang von 18 Leistungspunkten sowie

3. aus dem Fach Recht durch Module im Umfang von 6 Leistungspunkten

abzulegen. Wirtschaftswissenschaftliche Fächer sind Betriebswirtschaftslehre, Operations Research und Volkswirtschaftslehre. Dabei sind im Fach Betriebswirtschaftslehre mindestens 9 Leistungspunkte abzulegen. Die Module, die ihnen zugeordneten Leistungspunkte und die Zuordnung der Module und Seminare zu den Fächern sind im Studienplan festgelegt.

(4) Ferner ist im dritten Studienjahr in zwei unterschiedlichen Fächern jeweils ein Seminar im Umfang von je 3 Leistungspunkten zu absolvieren. Das Seminar wird dabei in die Fachnote des Faches eingerechnet, dem das Seminar zugeordnet ist. Die Zuordnung der Seminare zu den Fächern ist im Studienplan festgelegt.

(5) Im dritten Studienjahr ist als eine weitere Prüfungsleistung eine Bachelorarbeit gemäß § 11 anzufertigen.

§ 18 Nachweise für die Bachelorprüfung

Voraussetzung für die Anmeldung zur letzten Modulprüfung der Bachelorprüfung 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 Nachweises 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 des dritten Studienjahres (§ 17 Abs. 3 und 4) und der Bachelorarbeit doppelt gewichtet.

(3) Hat der Studierende die Bachelorarbeit mit der Note 1.0 und die Bachelorprüfung mit einer Gesamtnote von 1.2 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 werden 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 erfolgreich nachgewiesenen Prüfungsleistung. Sie werden dem Studierenden gleichzeitig ausgehändigt. In der Bachelorurkunde wird die Verleihung des akademischen Bachelorgrades beurkundet. Die Bachelorurkunde wird vom Rektor und den Dekanen der beteiligten Fakultäten unterzeichnet und mit dem Siegel der Universität versehen.

(2) Das Zeugnis enthält die in den Fachprüfungen, den zugeordneten Modulprüfungen und der Bachelorarbeit erzielten Noten, deren zugeordnete Leistungspunkte und ECTS-Noten und die Gesamtnote und die ihr entsprechende ECTS-Note. Das Zeugnis ist von den Dekanen der beteiligten Fakultäten 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 vom Studierenden 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 sollen 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 enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 22 Ungültigkeit der Bachelorprüfung, Aberkennung des Bachelorgrades

(1) Hat der Studierende bei einer Prüfung getäuscht und wird diese Tatsache erst nach der Aushändigung des Zeugnisses bekannt, so kann der Prüfungsausschuss nachträglich die Noten für diejenigen Prüfungsleistungen, bei deren Erbringung der Studierende getäuscht hat, entsprechend berichtigen und die Prüfung ganz oder teilweise für „nicht bestanden" erklären.

(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) Dem Studierenden ist vor einer Entscheidung nach Absatz 1 und Absatz 2 Satz 2 Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. Dies bezieht sich auch auf alle davon betroffenen Anlagen (Transcript of Records und Diploma Supplement). Mit dem unrichtigen Zeugnis ist auch die Bachelorurkunde und alle Anlagen (Transcript of Records und Diploma Supplement) einzuziehen, wenn die Prüfung aufgrund einer Täuschung für „nicht bestanden" erklärt wurde.

(5) Eine Entscheidung nach Absatz 1 oder Absatz 2 Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Prüfungszeugnisses ausgeschlossen.

(6) Die Aberkennung des akademischen Bachelorgrades richtet sich nach den gesetzlichen Bestimmungen.

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§ 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) Für die Einsichtnahme in die schriftlichen Modulprüfungen, schriftlichen Modulteilprüfungen bzw. Prüfungsprotokolle gilt eine Frist von einem Monat nach Bekanntgabe des Prüfungsergebnisses.

(3) Der Prüfer bestimmt Ort und Zeit der Einsichtnahme.

(4) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 24 In-Kraft-Treten

(1) Diese Satzung tritt am 1. Oktober 2009 in Kraft.

(2) Studierende, die ihr Studium an der Universität Karlsruhe (TH) auf Grundlage der Prüfungsordnung für den Bachelorstudiengang Informationswirtschaft vom 12. August 2005 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 29 vom 14. Oktober 2005) in der Fassung der Neubekanntmachung vom 15. August 2008 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 65 vom 18. August 2008) aufgenommen haben, können einen Antrag auf Zulassung zur Prüfung letztmalig am 30. September 2013 stellen.

(3) Auf Antrag können Studierende, die ihr Studium an der Universität Karlsruhe (TH) auf Grundlage der Prüfungsordnung für den Bachelorstudiengang Informationswirtschaft vom 12. August 2005 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 29 vom 14. Oktober 2005) in der Fassung der Neubekanntmachung vom 15. August 2008 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 65 vom 18. August 2008) begonnen haben, ihr Studium nach der vorliegenden 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 15. April 2009

Professor Dr. sc. tech. Horst Hippler
(Rektor)

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