Karlsruhe Institute of Technology

Module Handbook Information Engineering and Management (B.Sc.) ER 2005

Summer term 2010
Long version
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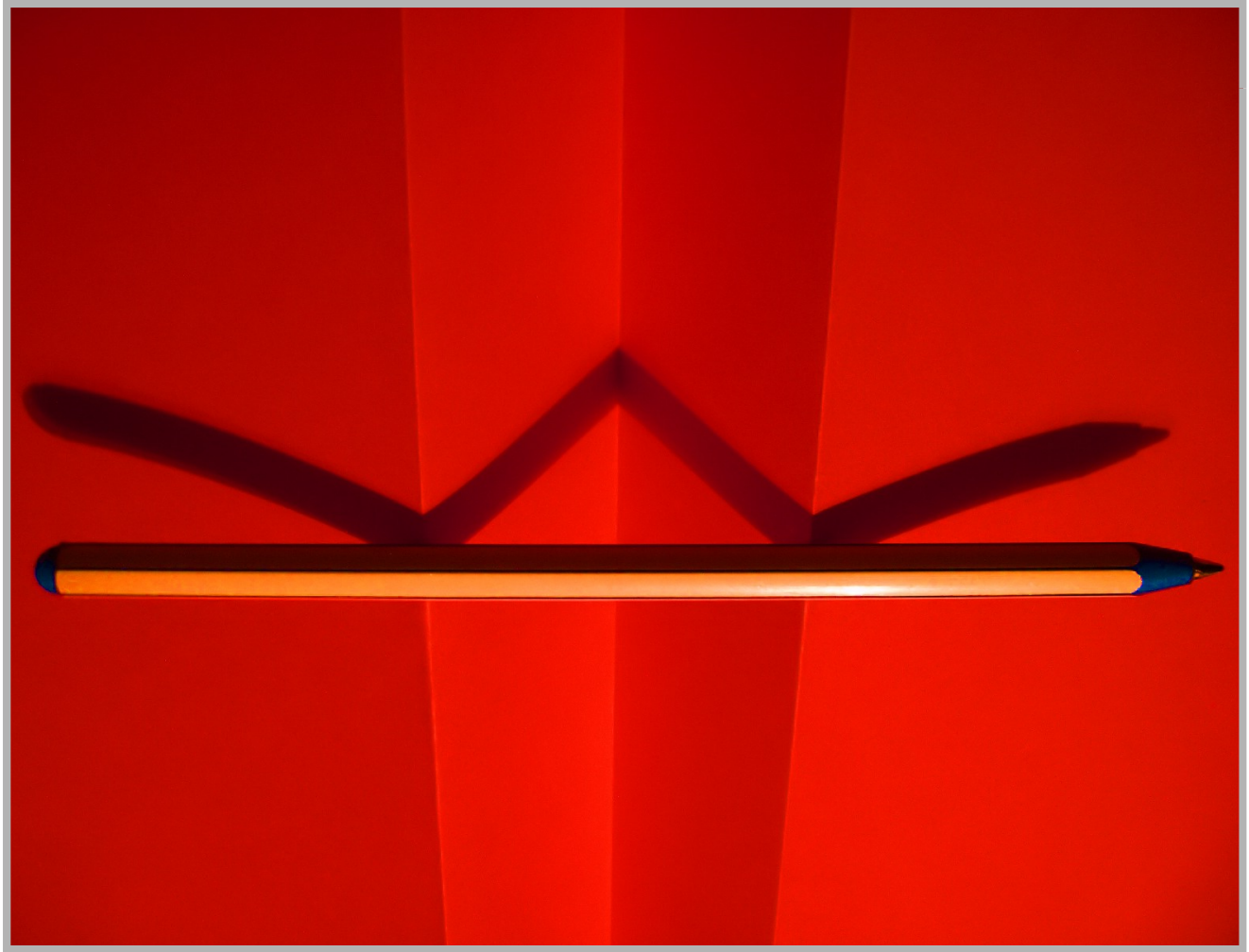
Fakultät für Informatik



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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.

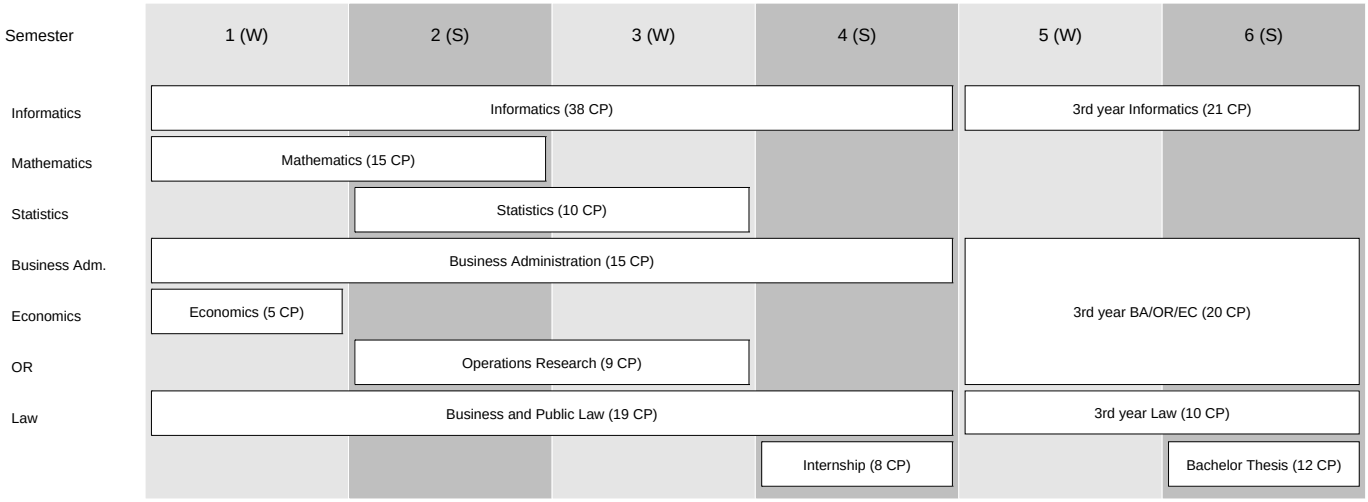

Abbildung 1: Structure of Bachelor Programme in Information Engineering and Management

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 statistics), and law. The internship prepares the student for his profession. Table 1 shows the structure of the subjects of the modules and their weight, table 2 shows the allocation of courses to modules and the curriculum for the first four terms.

ModulID	Module	Coordinator	CP
Subject Informatics			
IW1ININF1	Informatics 1	Abeck, Bellosa	8
IW1ININF2	Informatics 2	Zitterbart	8
IW1ININF3	Informatics 3	Sanders	8
IW1WWAINF	Applied Informatics	Oberweis, Schmeck, Studer	8
IW1INTINF	Computer Engineering	Karl	6
Subjects Business Administration, OR, Economics, and Statistics			
IW1WWBWL	Business Administration	Uhrig-Homburg, Weinhardt	15
IW1WWVWL	Economics	Berninghaus, Puppe	5
IW1WWOR	Operations Research	Waldmann, Stein	9
IW1WWSTAT	Statistics	Rachev, Höchstötter	10
Subject Mathematics			
IW1MAMATH	Mathematics	Wieners	15
Subject Law			
IW1INJURA	Law	Dreier	19
Internship			
IW1EXPRAK	Internship	Geyer-Schulz, Waldmann	8
	Sum		119

Tabelle 1: Modules in the terms 1-4

ModulID	Course	Term	SWS	CP
1st Term				
IW1WWBWL	Financial and Management Accounting	1	2/2	4.0
IW1WWVWL	Economics I	1	3/0/2	5.0
IW1MAMATH	Mathematics I	1	4/2/2	7.5
IW1ININF1	Fundamental terms in Informatics	1	2/1/2	4.0
IW1ININF1	Programming	1	2/0/2	5.0
IW1INJURA	Civil Law for Beginners	1	4/0	4.0
				29.5
2nd Term				
IW1WWBWL	Introduction to Information Engineering and Management	2	2/2	3.0
IW1WWSTAT	Statistics I	2	3/2/2	5.0
IW1WWOR	Introduction to Operations Research I	2	2/0/2	4.5
IW1MAMATH	Mathematics II	2	4/2/2	7.5
IW1ININF2	Informatics II	2	4/2/2	8.0
IW1INJURA	Advanced Civil Law	2	2/0	3.0
				31
3rd Term				
IW1WWBWL	Basics of Business Administration C	3	2/0/2	4.0
IW1WWSTAT	Statistics II	3	3/2/2	5.0
IW1WWOR	Introduction to Operations Research II	3	2/2/2	4.5
IW1ININF3	Informatics III	3	4/2	8.0
IW1WWAINF	Applied Informatics I	3	2/1	4.0
IW1INJURA	Commercial and Corporate Law	3	2/0	3.0
IW1INJURA	Public Law I	3	2/0	3.0
				31.5
4th Term				
IW1WWBWL	Basics of Business Administration B	4	2/1	4.0
IW1WWAINF	Applied Informatics II	4	2/2/2	4.0
IW1INTINF	Computer Engineering II	4	3/1/2	6.0
IW1INJURA	Public Law II	4	2/0	3.0
IW1INJURA	Exercises in Civil Law	4	0/2	3.0
IW1EXPRAK	Internship	4		8.0
				28.0
				119.0

Tabelle 2: Curriculum in the terms 1-4

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

1. a module with 21 credits in informatics
2. a module with 20 credits or two modules with 10 credits each in the subject BA/OR/EC,
3. a module with 10 credits in law,
4. 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. The following functions can be accessed on https://studium.kit.edu/meinsemester/Seiten/pruefungsanmeldung.aspx:

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

For further and more detailed information also see https://zvwgate.zvw.uni-karlsruhe.de/download/leitfaden_studierende.pdf

Repeating exams

Principally, a failed exam can repeated only once. If the **repeat examination** (including an eventually provided verbal repeat examination) will be failed as well, the **examination claim** is lost. Requests for a second repetition of an exam require the approval of the examination committee. A request for a second repetition has to be made without delay after loosing the examination claim. A counseling interview is mandatory. For further information see http://www.wiwi.kit.edu/serviceHinweise.php.

Bonus accomplishments and additional accomplishments

Bonus accomplishments can be achieved on the basis of entire modules or within modules, if there are alternatives at choice. Bonus accomplishments can improve the module grade and overall grade by taking into account only the best possible combination of all courses when calculating the grades. The student has to declare a Bonus accomplishment as such at the time of registration for the exams. Exams, which have been registered as Bonus accomplishments, are subject to examination regulations. Therefore, a failed exam has to be repeated. Failing the repeat examination implies the loss of the examination claim.
Additional accomplishments are voluntarily taken exams, which have no impact on the overall grade of the student

and can take place on the level of single courses or on entire modules. It is also mandatory to declare an additional accomplishment as such at the time of registration for an exam. Up to 2 modules with a minimum of 9 CP may appear additionally in the certificate. After the approval of the examination committee, it is also possible to include modules in the certificate, which are not defined in the module handbook. Single additional courses will be recorded in the transcript of records. Courses and modules, which have been declared as bonus accomplishments, can be changed to additional accomplishments.

Further information

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

Used abbreviations

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

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.

Computer Engineering [IW1INTINF] (S. 20)

Anmerkungen

Starting in the summer term 2009, it is possible to choose the lecture Re*chnerorganisation* [24502] in this module. Students, who have already started the lecture *Technische Informatik* [24512] can not subscribe in *Rechnerorganisation*.
Exeptionally for the summer term 2009, both lecures are the same, with differnet titels. Starting from the summer term 2010, only *Rechnerorganisation* will be continued.

Design and Implementation of Complex Systems [IW3INCS0] (S. 30)

Anmerkungen

The lecture *Communication and Database Systems* is substituted by the lectures *Introduction into Computer Networks* and *Database Systems*. Students who failed the exam can participate in the exam on the new lectures. An online registration to *Communication and Database Systems* is necessary in this case.
Students who have already passed the exam on *Communication and Database Systems* are not allowed to take the new lectures since the content is the same.
The course *Component Based Software Engineering* is offered in summer term 2010 for the last time.
The course *Software Security* is offered from summer term 2011 on.

Information and Knowledge Systems [IW3INISW0] (S. 34)

Anmerkungen

The lecture *Communication and Database Systems* is substituted by the lectures *Introduction into Computer Networks* and *Database Systems*. Students who failed the exam can participate in the exam on the new lectures. An online registration to *Communication and Database Systems* is necessary in this case.
Students who have already passed the exam on *Communication and Database Systems* are not allowed to take the new lectures since the content is the same.

eBusiness Management [IW3WWEBM0] (S. 39)

Anmerkungen

The lecture *Competition in Networks* [26240] is always offerd in the winter term.
The current seminar courses for this semester are listed on following webpage: the http://www.im.uni-karlsruhe.de/lehre
The course *Management of Business Networks (Introduction)* [26496] was added to the module.
The course *Logistics - Organisation, Design, and Control of Logistic Systems* was formerly named *Logistics*.

Supply Chain Management [IW3WWEBM1] (S. 41)

Anmerkungen

The current seminar courses for this semester are listed on following webpage: the http://www.im.uni-karlsruhe.de/lehre
The course *Management of Business Networks (Introduction)* [26496] was added to the module.
The course *Logistics - Organisation, Design, and Control of Logistic Systems* was formerly named *Logistics*.
The course *Tactical and Operational Supply Chain Management* [25488] was added to the module.
The course *Quantitative Methods for Supply Chain Risk Management [*2118090*]* was added to the module.

[FOO] (S. 166)

Anmerkungen

The course is not lectured in the summer term 2010.

Software Security [SWSich] (S. 169)

Anmerkungen

The course is not lectured in the summer term 2010.

4 Modules of term 1-4

4.1 Informatics

Module: Informatics 1 Module key: [IW1ININF1]

Subject: Informatics
Module coordination: Gregor Snelting
Credit points (CP): 8

Learning Control / Examinations
Completion of *Grundbegriffe der Informatik* [24001], *Programming* [24004]:Both courses have to be completed sucessfully. 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 §10(1) of the examination regulation of the Bachelor programme in Information Engineering and Management. 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.

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Courses in module *Informatics 1* [IW1ININF1]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24001	Basic Notions of Computer Science (S. 55)	2/1/2	W	4	T. Worsch
24004	Programming (S. 56)	2/0/2	W	4	G. Snelting

Module: Informatics 2 Module key: [IW1ININF2]

Subject: Informatics
Module coordination: Peter Sanders
Credit points (CP): 8

Learning Control / Examinations
The assessment of the module consists of

1. a 90 minute lecture accompanying written intermediate exam according to SPO § 4 Abs. 2 Nr. 1;
2. a 120 minute written final exam according to SPO § 4 Abs. 2 Nr. 1;
3. a passed, not regularly graded certificate for the exercise according to SPO § 4 Abs. 2 Nr. 3.

The grade of the module is calculated as follows: 90% of the final exam and 10% of the intermediate exam.

Prerequisites
It is recommended to take this module after the module Informatics 1.

Conditions
Knowledge of the module Informatics 1 is required in this module.

Learning Outcomes
Basic principles of computer science are an important part of Information engineering. Therefore, students need fundamental understanding of algorithms and their design and analysis. The goal is to establish an understanding for approaches to problem solutions using computer science methods. In the context of the module Informatics 2, a system-oriented view plays an important role. Therefore, basics on processes, distributed systems and data bases are introduced.

Content
Abstract data types (ADT) form the basis for understanding algorithms. In this module, the Sigma algebra, the abstract data types Bool, Stack, Queue, and List are presented as examples of this concept. For the evaluation of algorithms several calculi are introduced. One example is the O-calculus which is used for the analysis of the asymptotic behavior of algorithms e.g. with respect to run time or memory usage (space).
In this module several classes of algorithms are presented with examples:
Greedy algorithms form a special class of algorithms in informatics. They are characterized by always choosing the state which promises the highest profit at selection time as the next state – they are gradient methods (steepest ascent methods, hillclimbers). And from this behavior they derive their name: greedy algorithms. To decide which neighbouring state to choose as next state, evaluation functions are used. Greedy algorithms usually are very fast, they find for many problems good, but not always the best solution. In this module the following problems which can be solved with greedy algorithms are treated: Construction of a minimal spanning tree in a graph, finding the shortest path in graph, task scheduling, colouring graphs, and last but not least, the travelling salesman problem.
An other class of algorithms is represented by divide-and-conquer algorithms. Divide-and-conquer algorithms recursively split a problem in several subproblems until the subproblems can be handled. Next, partial solutions are recursively assembled to form the solution of the whole problem. In this module problems which can be solved by divide-and-conquer algorithms (e.g. finding a limit, matrix multiplication) are presented.
Problems in informatics may also be solved by algorithms which use dynamic programming. Dynamic programming is an algorithmic method for solving optimization problems. The method of dynamic programming is to directly compute the solution of the smallest subproblems first, and to assemble these solutions in a suitable way to sove the next larger subproblem, and so on. In this setting costly recursions should be omitted by reusing already computed intermediary solutions during the solution process. Already computed partial solutions are stored in a table, so that they can be reused. Dynamic programming is explained in this module with several examples as e.g. the search for optimal binary search trees, the travelling salesmen problem, and catenated matrix multiplication.
Probabilistic algorithms are yet an other class of algorithms. A probabilistic algorithm uses – in contrast to the deterministic algorithms treated previously – random bits to control its execution. It is not required that a probabilistic algorithm always finds a correct solution in an efficient way. Probabilistic algorithms are often easier to understand, simpler to implement, and more efficient than deterministic algorithms for the same problem. Several classes of probabilistic algorithms exist. In this module Macao algorithms, Monte Carlo algorithsm, and Las Vegas algorithms are presented.
The last class of algorithms in this module consists of algorithms which use predetermination or precomputation. Examples for these are the repeated evaluation of polynomials, as well as string search problems.
In this module processes are presented. A process is the carrier of the trajectory of an activity which is executed in its own address space in memory (physical encapsulation). The execution of an application program, for instance, runs as a process. A process usually can only access data in his own address space. This module addresses the problem of process change and presents several solutions for process management. The following deterministic and probabilistic algorithms for process management are presented as examples: first-come-first-serve, shortest-job-first, round-robin, and earliest-deadline-first.
In addition, the problem of communication between processes is treated. In this context semaphores, mutexes, message systems, and signals are introduced in this module. Communication between several processes can lead to deadlocks. A set of processes is in a deadlock, if each process of the set waits for an event which can only be triggered by process of the same set. In this module Banker´s algorithm which prevents deadlocks is treated.

Finally, distributed systems are presented in this module. In this context layered communication architectures are introduced and the concepts of horicontal and vertical communication are explained. Several types of communication are treated, especially connection-less (packet switching) and connection-oriented communication. As example for a communication protocol the alternating bit protocol is investigated.

Courses in module *Informatics 2* [IW1ININF2]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24500	Algorithms I (S. 57)	3/1/2	S	8	P. Sanders

Module: Informatics 3 — Module key: [IW1ININF3]

Subject: Informatics
Module coordination: Jörn Müller-Quade
Credit points (CP): 8

Learning Control / Examinations

- The assessment of the module consists of a grade certificate for the exercise according to § 4 Abs. 2 Nr. 3 SPO.
- Additionally, a written examination according to § 4 Abs. 2 Nr. 1 SPO.

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

Prerequisites
It is recommended to take this module after the modules *Informatics 1* and *Informatics 2* have been passed.

Conditions
None.

Learning Outcomes
Students should learn to understand the potential and limits of computer science: there are important problems, whose solutions can be well defined, however, one will be never able to compute them systematically. Other problems can be solved “presumably” only by systematic trial and error. Other topics of this lecture provide a basis for circuit design, compiler design, pattern matching, etc.. Most of the lecture results will be rigorously proven. The proof techniques, learned thereby, are important for the specification of computer systems and for the systematic design of programs and algorithms.

Content
Fundamental 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, register machines, RAM-model, non-determinism, relation to formal language families. Equivalence of all sufficiently powerful computation models (Church´s thesis). Undecidability of important functions (halting problem, ...). Introduction to the complexity theory: NP-complete problems and polynomial reductions.

Courses in module *Informatics 3* [IW1ININF3]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24005	Theoretical Foundation of Computer Science (S. 59)	3/1	W	8	J. Müller-Quade

Remarks
This module will be offered from the winter term 09/10 on in a different form. The course *Informatics III* will be substituted by an adequate course.

Module: Applied Informatics — Module key: [IW1WWAINF]

Subject: Informatics
Module coordination: Andreas Oberweis, Stefan Tai
Credit points (CP): 8

Learning Control / Examinations
The assessments of the Applied Informatics I [25070] and Applied Informatics II [25033] are written examinations (60 min each) according to §4(2), 1 SPO.
The grade of the module is the average of the grade of the assessment of the course 25070 and of the grade of 25033.

Prerequisites
Knowledge of modules *Informatics 1* [IW1ININF1] and *Informatics 2* [IW1ININF2] is expected.

Conditions
None.

Learning Outcomes
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* [25070] 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 consecutive course *Applied Informatics II* [25033] covers various facets of electronic commerce which have to be supported by adequate and efficient distributed information and communication systems. After a brief introduction into e-commerce the following topics are covered: application architectures (incl. client server architectures), document description and exchange (incl. XML), enterprise middleware (incl. CORBA, Java EE), enterprise SOA (incl. Web services).

Courses in module *Applied Informatics* [IW1WWAINF]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25070	Applied Informatics I - Modelling (S. 62)	2/1	W	4	A. Oberweis, R. Studer, S. Agarwal
25033	Applied Informatics II - IT Systems for e-Commerce (S. 63)	2/1	S	4	S. Tai

Module: Computer Engineering — Module key: [IW1INTINF]

Subject: Informatics
Module coordination: Wolfgang Karl
Credit points (CP): 6

Learning Control / Examinations
The assessment of the course Computer Engineering II is a written examination (60 minutes) according to § 4 Abs. 2 Nr. 1 SPO. The grade of the module is the grade of the written exam.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of this module is to introduce the principles for the design and organization of computers. The emphasis is to show the relationship between hardware and software and to focus on the concepts that are the basics for current computers. The audience should understand how computing systems work and how programs run efficiently on modern computers.

Content
The module begins with a historical perspective of computer architectures and processors. It then shows the hardware/software interface and the requirements of high-level programming languages for the instruction set architecture. The organization and components of computers, their functionality and interoperability are then described. Finally, the impact of the hardware concepts on the software is discussed in order to demonstrate why a system performs as it does.

Courses in module *Computer Engineering* [IW1INTINF]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24512	Computer Engineering II (S. 61)	3/1/2	S	6	W. Karl
24502	Computer Organization (S. 60)	3/1/2	S	6	T. Asfour, R. Dillmann, J. Henkel, W. Karl

Remarks
Starting in the summer term 2009, it is possible to choose the lecture Re*chnerorganisation* [24502] in this module. Students, who have already started the lecture *Technische Informatik* [24512] can not subscribe in *Rechnerorganisation*.
Exeptionally for the summer term 2009, both lecures are the same, with differnet titels. Starting from the summer term 2010, only *Rechnerorganisation* will be continued.

4.2 Business Administration

Module: Business Administration — Module key: [IW1WWBWL]

Subject: Business Administration
Module coordination: Marliese Uhrig-Homburg, Christof Weinhardt
Credit points (CP): 15

Learning Control / Examinations
The assessment of the course *Financial Accounting and Cost Accounting* is a written examination according to §4(2), 3 of the examination regulation of the Bachelor programme in Information Engineering and Management. The grade certificate for this course is a prerequisite for the last written examination of this module according to §4(2), 1 of the examination regulation of the Bachelor programme in Information Engineering and Management.
The assessment of the course *Introduction to Information Engineering and Management* is an assessment according to §4(2), 3 of the examination regulation of the Bachelor programme in Information Engineering and Management.
The assessments of the courses *Business Administration and Management Science B* and *C* are written examinations (90 minutes each) according to §4(2), 1 of the examination regulation of the Bachelor programme in Information Engineering and Management.
The grade of the module is the average of the grades of the assessments of the courses *Introduction to Information Engineering* and *Management Business Administration and Management Science C* and *B*, wheighted by their credit points.

Prerequisites
None.

Conditions
The grade certificate in *Financial Accounting and Cost Accounting* is a prerequisite for the last examination of the module.

Learning Outcomes
In this module students learn the core knowledge of Business Administration and Management Science. Based on financial accounting and management accounting the central activities, functions and decisions of a company in a market economy are presented and analyzed. Furhtermore the basic role of information as a production factor is illustrated by showing the connections of different scientific disciplines in the information society. Examples about the importance of information in the context of companies that offer information based services, the information technology involved, and the implementation of electronic markets and their logistics should provide a better understanding of the role of information in the “Knowledge Economy”.
Students should understand the interdisciplinary links between the design of a company´s business processes, information technology, and the legal framework in which the company operates.

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.
The goal of the Introduction into Information Engineering and Management 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 topics Information for economic DSS, the organization of information flows as well as the valuation of information and interdependencies between business administration, economics, information technology and law, are analysed.

Courses in module *Business Administration* [IW1WWBWL]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25002/25003	Financial Accounting and Cost Accounting (S. 64)	2/2	W	4	T. Burdelski
26490	Introduction to Information Engineering and Management (S. 65)	2/2	S	3	C. Weinhardt, A. Geyer-Schulz
25026/25027	Business Administration and Management Science C (S. 68)	2/0/2	W	4	H. Lindstädt, M. Ruckes, M. Uhrig-Homburg, T. Burdelski
25024/25025	Business Administration and Management Science B (S. 67)	2/0/2	S	4	W. Gaul, T. Lützkendorf, A. Geyer-Schulz, C. Weinhardt, T. Burdelski

4.3 Economics

Module: Economics — Module key: [IW1WWVWL]

Subject: Economics
Module coordination: Siegfried Berninghaus, Clemens Puppe
Credit points (CP): 5

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.

Prerequisites
None.

Conditions
None.

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

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

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

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

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

Courses in module *Economics* [IW1WWVWL]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25512	Economics I: Microeconomics (S. 72)	3/0/2	W	5	S. Berninghaus

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

4.4 Operations Research

Module: Introduction to Operations Research — Module key: [IW1WWOR]

Subject: Operations Research
Module coordination: Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann
Credit points (CP): 9

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.

Prerequisites
Mathematics I und II. Programming knowledge for computing exercises.

Conditions
It is strongly recommended to attend the course *Introduction to Operations Research I* [25040] before attending the course *Introduction to Operations Research II* [25043].

Learning Outcomes
The student

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

Content
This module treats the following topics: linear programming, network models, integer programming, nonlinear programming, dynamic programming, queuing theory, heuristic models.
This module forms the basis of a series of advanced lectures with a focus on both theoretical and practical aspects of Operations Research.

Courses in module *Introduction to Operations Research* [IW1WWOR]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25040	Introduction to Operations Research I (S. 70)	2/2/2	S	4.5	S. Nickel, O. Stein, K. Waldmann
25043	Introduction to Operations Research II (S. 71)	2/2/2	W	4.5	S. Nickel, O. Stein, K. Waldmann

4.5 Statistics

Module: Statistics — Module key: [IW1WWSTAT]

Subject: Statistics
Module coordination: Svetlozar Rachev, Markus Höchstötter
Credit points (CP): 10

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.

Prerequisites
None.

Conditions
It ist recommended to attend the course *Statistics I* [25008/25009] before the course *Statistics II* [25020/25021].
Each course is complemented by an exercise, a tutorium and a computing laboratory. It highly recommended to attend these too.

Learning Outcomes

Content
The module contains the fundamental methods and scopes of Statistics.
A. Descriptive Statistics: univariate und bivariate analysis
B. Probability Theory: probability space, conditional and product probabilities, transformation of probabilities, parameters of location and dispersion, most importand discrete and continuous distributions, covariance and correlation, convolution and limit distributions
C. Theory of estimation and testing: suffiency of statistics, point estimation (optimality, ML-method), internal estimations, theory of tests (optimality, most important examples of tests)

Courses in module *Statistics* [IW1WWSTAT]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25008/25009	Statistics I (S. 73)	4/0/2	S	5	M. Höchstötter
25020/25021	Statistics II (S. 74)	4/0/2	W	5	M. Höchstötter

4.6 Law

Module: Business and Public Law — Module key: [IW1INJURA]

Subject: Law
Module coordination: Thomas Dreier
Credit points (CP): 19

Learning Control / Examinations
The assessment of this module consists of:

1. a written examination (90 min) according to § 4(2), 1 of the SPO for the course Civil Law for Beginners (4 ECTS),
2. a graded certificate according to § 4(2), 3 of the SPO for the courses Civil Law for Beginners, Advanced Civil Law, and Commercial and Corporation Law (9 ECTS), and
3. a written examination (90 min) according to § 4(2), 1 of the SPO for the courses Public Law I and II (6 ECTS).

The grade of the module is a credits weighted average of the grades, namely the grade for Civil Law for Beginners with a weight of 4 credits, the grade for Solving Private Law Cases with a weight of 9 credits, and the grade for Public Law I and II with a weight of 6 credits.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The modul Law of the first two years of Bachelor studies shall provide the students with an introduction into law and teach them fundamental knowledge about civil law, commercial and corporation law as well as public law. Students shall be enabled to recognise legal issues, formulate legal questions, and solve simple legal problems. Also, they shall be able to recognise when outside legal counsel is called for in a given situation. They shall be able to communicate with lawyers. Besides solid knowledge of material law, students also shall be able to solve practical cases with the method of so-called subsumtion.

Content
The modul Law of the first two years of Bachelor studies provides the students with an introduction and an overview of both the role and the working of the law as an instrument of preventing and solving conflicts within society as well as allocation risks. To this end, the modul comprises courses in the areas of civil law, commercial and corporation law as well as of public law (with the exception of criminal law). The courses in civil law cover the general part of the German Civil Code (Bürgerliches Gesetzbuch, BGB), contract and property law. The commercial and corporation law courses explain the notions of merchant, the different forms of agency and commcercial transactions as well as the main statutory forms of corporations. The public law courses cover fundamental rights, state organisation, administrative law and administrative as well as constitutional legal remedies.

Courses in module *Business and Public Law* [IW1INJURA]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24012	Civil Law for Beginners (S. 75)	4/0	W	4	T. Dreier, P. Sester
24504	Advanced Civil Law (S. 76)	2/0	S	3	T. Dreier, P. Sester
24011	Commercial and Corporate Law (S. 77)	2/0	W	3	P. Sester
24016	Public Law I - Basic Principles (S. 79)	2/0	W	3	I. Spiecker genannt Döhmann
24520	Public Law II - Public Economic Law (S. 80)	2/0	S	3	I. Spiecker genannt Döhmann
24506/24017	Exercises in Civil Law (S. 78)	2/0	W/S	3	P. Sester, T. Dreier

4.7 Mathematics

Module: Mathematics — Module key: [IW1MAMATH]

Subject: Mathematics
Module coordination: Christian Wieners
Credit points (CP): 15

Learning Control / Examinations
The assessment in this module consists of two graded certificates of exercise following §4(2), 3 of the examination regulation for the Bachelor Information Engineering and Management from the exercises to mathematics I or II and a written examination of 120 minutes on the lectures mathematics I and mathematics II following §4(2), 1 of the examination regulations Bachelor Information Engineering and Management. One certificate of exercise with a grade of at least sufficient is required for the admission to the written examination. 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 two certificates a weight of 10% each.

Prerequisites
None.

Conditions
None.

Learning Outcomes
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 should 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.

Courses in module *Mathematics* [IW1MAMATH]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
01360	Mathematics I for Information Engineering and Management (S. 81)	4/2/2	W	7,5	A. Rieder, C. Wieners, N. Neuss
01877	Mathematics II for Information Engineering and Management (S. 82)	4/2/2	S	7,5	A. Rieder, C. Wieners, N. Neuss

Remarks
None.

4.8 General Modules

Module: Internship — Module key: [IW1EXPRAK]

Subject: nicht kategorisiert
Module coordination: Martina Zitterbart, Studiendekan (Fak. f. Wirtschaftswissenschaften)
Credit points (CP): 8

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.

Prerequisites
None.

Conditions
The internship is regulated in §15 of the examination regulation.
Examiners are all lecturers of the degree programme.
It is recommended that the internship is taken between the 4th and the 5th term of the Bachelor programme Information Engineering and Management.

Learning Outcomes
This module serves to impart interdisciplinary key qualifications:

The student

- carries out professional tasks in the context of Information Engineering and Management to learn about the requirements on the engineer,
- describes in a short report the executed activities precisely and coherent, and judges about them critically,
- presents effectively is experiences gained during the internship using appropriate media support and gets involved professionally in the subsequent discussion, and
- trains via concrete and constructive criticism his/her competence for problem solving.

The presentation primarily serves for the communication between student, company, and examiner with the goal of initiating further cooperation in the context of the Bachelor thesis and/or a project

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.

5 Modules of term 5-6

5.1 Informatics

Module: Algorithm Design — Module key: [IW3INALG0]

Subject: Informatics (Specialization)
Module coordination: Dorothea Wagner
Credit points (CP): 21

Learning Control / Examinations
The assessment of each course is outlined in its course description. The grade of this module is the credit-weighted average of the grades of the selected courses.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation, especially the modules *Informatics 1* [IW_05_1ININF1] and *Informatics 2* [IW_05_1_ININF2] have to be passed.

Conditions
The course *Algorithms II* [Algo2] must be selected.

Learning Outcomes
The students should

- be able to identify and adequately specify the algorithmic problems in different application areas,
- be able to assess their computational complexity and recognize adequate algorithmic techniques for solving the problems,
- know the essential methodological approaches to the design and analysis of algorithms,
- be able to design algorithmic methods for specific applications,
- be able to express methodological aspects of algorithms in a qualified and structured form.

Content
This module addresses theoretical and practical aspects of algorithm engineering. It covers general methods for the design and analysis of algorithms related to sequential and parallel models of computation, as well as general algorithmic methods like approximation algorithms, online methods, randomized algorithms and specific methods of algorithm engineering.

Courses in module *Algorithm Design* [IW3INALG0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25700	Efficient Algorithms (S. 122)	2/1	S	5	H. Schmeck
24074	Networked IT-Infrastructures (S. 85)	2/1	W	5	W. Juling
24079s	Seminar in Algorithm Design (S. 88)	2	W/S	3	D. Wagner
24079p	Practical Course in Algorithm Design (S. 87)	4	W/S	5	P. Sanders, D. Wagner, M. Krug
24171	Randomized Algorithms (S. 97)	2	W	4	T. Worsch
xAlgoEng	Algorithm Engineering (S. 179)	2	W/S	4	P. Sanders, D. Wagner
24518	Software Engineering I (S. 100)	3/1/2	S	6	W. Tichy, Höfer, Meder
24941	Security (S. 106)	3/1	S	6	J. Müller-Quade
24519	Introduction in Computer Networks (S. 101)	2/1	S	4	H. Hartenstein
Algo2	Algorithmen II (S. 164)	3/1	W	6	P. Sanders

Module: Design and Implementation of Complex Systems Module key: [IW3INCS0]

Subject: Informatics (Specialization)
Module coordination: Walter F. Tichy
Credit points (CP): 21

Learning Control / Examinations
See the assessment of each course of this module. The overall grade is computed by weighting the grade of each course with its credits and computing the average of the weighted grades, rounded to one decimal place.
The assessment of the course *Database Systems* follows Sec. 4 Subsec. 2 No. 3 of the study and examination regulations.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
- The course *Software Engineering I* [24518] is mandatory.
- Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module has to be chosen and completed.

Learning Outcomes
Students must be capable of
- recognizing and explaining the need for a planned and structured process for the development of complex software systems,
- performing and supervising the major tasks of software development and maintenance,
- integrating databases and communication networks into their solutions,
- critically assessing methods and tools for system development
- recognizing the advantages of software components and applying the techniques of component software.

Content
Participating in the development of complex systems is one of the major tasks of the practicing Information Engineer. This module enables students to perform suitable tasks by themselves or as a member of a team, as well as planning large systems and supervising their development.

Courses in module *Design and Implementation of Complex Systems* [IW3INCS0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24518	Software Engineering I (S. 100)	3/1/2	S	6	W. Tichy, Höfer, Meder
24654	Component Based Software Engineering (S. 104)	2	S	3	R. Reussner, M. Kuperberg, K. Krogmann
SWTSem	Seminar Software Engineering (S. 170)	2	W/S	4	W. Tichy, R. Reussner, G. Snelting
24519	Introduction in Computer Networks (S. 101)	2/1	S	4	H. Hartenstein
24516	Database Systems (S. 99)	2/1	S	4	K. Böhm
FOO	Fortgeschrittene Objektorientierung (S. 166)	3/2	S	6	G. Snelting
SWSich	Software Security (S. 169)	2/1	W/S	3	G. Snelting

Remarks
The lecture *Communication and Database Systems* is substituted by the lectures *Introduction into Computer Networks* and *Database Systems*. Students who failed the exam can participate in the exam on the new lectures. An online registration to *Communication and Database Systems* is necessary in this case.
Students who have already passed the exam on *Communication and Database Systems* are not allowed to take the new lectures since the content is the same.
The course *Component Based Software Engineering* is offered in summer term 2010 for the last time.
The course *Software Security* is offered from summer term 2011 on.

Module: Information Services in Networks — Module key: [IW3INIDL0]

Subject: Informatics (Specialization)
Module coordination: Hartmut Schmeck
Credit points (CP): 21

Learning Control / Examinations
The assessment of the individual courses is defined in the course descriptions. The grade of the module is the credit-weighted sum of the grades of the courses and the seminar or advanced lab.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions

- Courses 24074 and 25702 are compulsary.
- Select one out of 24518 and 24941.
- Select one out of 25748, 24124, 25770, 24149.
- Following § 17, 3 of "Prüfungsordnung Inforamtionswirtschaft" a seminar of this module has to be chosen and completed.
- Seminar and advanced lab may be offered by any of the lecturers participating in this module.

Learning Outcomes
The students shall

- know technologies and applications of the Internet and the World Wide Web,
- know methods for providing security in networks and be capable of customizing these methods for specific applications,
- know how to design and utilize Internet applications in an appropriate way.

Content
The design of services in the Internet and the World Wide Web is one of the core tasks of Information Engineering and Management. The courses of this module provide a foundation for adequately specifying applications and services in the Internet and for designing and employing them efficiently in accordance with the potential and constraints of web technologies.

Courses in module *Information Services in Networks* [IW3INIDL0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24074	Networked IT-Infrastructures (S. 85)	2/1	W	5	W. Juling
25702	Algorithms for Internet Applications (S. 123)	2/1	W	5	H. Schmeck
25748	Semantic Web Technologies I (S. 128)	2/1	W	5	R. Studer, S. Rudolph
24124	Web Engineering (S. 93)	2/0	W	4	M. Nußbaumer
24149	Network and IT-Security Management (S. 96)	2/1	W	5	H. Hartenstein
25770	Service Oriented Computing 1 (S. 162)	2/1	W	5	S. Tai
xIDLs	Seminar Information Services in Networks (S. 181)	2	W/S	4	H. Schmeck, S. Tai, W. Juling, R. Studer, H. Hartenstein, W. Tichy
xIDLp	Practical Course Information Services in Networks (S. 180)	4	W/S	5	H. Schmeck, S. Tai, W. Juling, W. Tichy, R. Studer, H. Hartenstein
24518	Software Engineering I (S. 100)	3/1/2	S	6	W. Tichy, Höfer, Meder
24941	Security (S. 106)	3/1	S	6	J. Müller-Quade

Module: Business Process Engineering — Module key: [IW3INGP0]

Subject: Informatics (Specialization)
Module coordination: Andreas Oberweis
Credit points (CP): 21

Learning Control / Examinations
Students elect courses with 21 ECTS credits in total. 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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Exactly one seminar of this module has to be chosen and completed (§17, 3 of the examination regulation for Information Engineering and Management). A maximum of one practical course can be chosen.

Learning Outcomes
Students acquire in-depth knowledge of modeling languages, methodologies and software tools to support the entire life cycle of business processes. They know how to model, to analyse and to design independently business processes in enterprise taking into account given corporate goals. Moreover, they know the functionality, architecture and applications of workflow management systems, document management systems and groupware systems to support the process execution.

Content
This module teaches modelling of business processes and supporting tools.

Courses in module *Business Process Engineering* [IW3INGP0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25726	Workflow-Management (S. 124)	2/1	S	5	A. Oberweis
25736	Business Process Modelling (S. 126)	2/1	W	5	A. Oberweis, M. Mevius
25740	Knowledge Management (S. 127)	2/1	W	5	R. Studer
25748	Semantic Web Technologies I (S. 128)	2/1	W	5	R. Studer, S. Rudolph
25786	Enterprise Architecture Management (S. 131)	2/1	W	5	T. Wolf
25730	Software Technology: Quality Management (S. 125)	2/1	S	5	A. Oberweis
25790	Capability maturity models for software and systems engineering (S. 132)	2	S	4	R. Kneuper
PraBI	Computing Lab Information Systems (S. 167)	2	W/S	5	A. Oberweis, D. Seese, W. Stucky, R. Studer
BSemBI	Bachelor Seminar in Enterprise Information Systems (S. 165)	2	W/S	2	A. Oberweis
SemAIFB1	Seminar in Enterprise Information Systems (S. 171)	2	W/S	4	R. Studer, A. Oberweis, W. Stucky, T. Wolf, R. Kneuper
24518	Software Engineering I (S. 100)	3/1/2	S	6	W. Tichy, Höfer, Meder

Module: Infrastructures — Module key: [IW3INNET0]

Subject: Informatics (Specialization)
Module coordination: Martina Zitterbart
Credit points (CP): 21

Learning Control / Examinations
The assessment of each course is outlined in its course description. The grade of this module is the credit-weighted average of the grades of the selected courses.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation, especially the modules *Informatics 1* [IW_05_1ININF1] and *Informatics 2* [IW_05_1_ININF2] have to be passed.

Conditions
The lecture *Introduction in Computer Networks* or the lecture *Networked IT-Infrastructures* must be selected.
The lecture *Telematics* must be selected. At least one of the following lectures must be selected: *Public Key Cryptography, Software Techniques I, Algorithm Design I.*
One of the remaining lectures must be selected as well as one seminar (but not several ones).

Learning Outcomes
The student will

- study basic architectural concepts, protocols, and protocol mechanisms and be able to judge about their performance
- learn about the methodological basics for the design of communication systems
- be able to identify the concepts behind different communication systems and have the knowledge to apply them to new systems
- identify the methodologies used to design communication systems and be able to apply them to new systems
- learn about research in future networks

Content
Within this module, the student gets introduced to the basics in the domain of communication systems. In addition, further aspects of communication systems are examined in detail, whereas the main focus is on basic methodologies, architectures and protocols, as well as on practical relevance. The student is given the necessary knowledge to also handle new structures in the area of communications in a goal driven way.

Courses in module *Infrastructures* [IW3INNET0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24074	Networked IT-Infrastructures (S. 85)	2/1	W	5	W. Juling
24128	Telematics (S. 94)	2	W	4	M. Zitterbart
24643	Mobile Communications (S. 103)	2/0	S	4	O. Waldhorst
24674	Next Generation Internet (S. 105)	2/0	S	4	R. Bless
24132	Multimedia Communications (S. 95)	2/0	W	4	R. Bless
24601	Network Security: Architectures and Protocols (S. 102)	2/0	S	4	M. Schöller
24110	High Performance Communication (S. 90)	2/0	W	4	M. Zitterbart
24104	Wireless Sensor-Actuator-Networks (S. 89)	2/0	W	4	M. Zitterbart
24074s	Seminar in Telematics (S. 86)	2	W/S	4	M. Zitterbart, H. Hartenstein
24518	Software Engineering I (S. 100)	3/1/2	S	6	W. Tichy, Höfer, Meder
PrakATM	Lab Advanced Telematics (S. 168)	2	W/S	5	M. Zitterbart
24519	Introduction in Computer Networks (S. 101)	2/1	S	4	H. Hartenstein
24941	Security (S. 106)	3/1	S	6	J. Müller-Quade

Module: Information and Knowledge Systems — Module key: [IW3INISW0]

Subject: Informatics (Specialization)
Module coordination: Klemens Böhm
Credit points (CP): 21

Learning Control / Examinations
The assessment is described individually for each lecture within this module. The overall grade of the module will be the rounded average of the courses selected weighted by their respective credits.
The assessment of the course *Database Systems* follows Sec. 4 Subsec. 2 No. 3 of the study and examination regulations.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions

- The lectures *Database Systems* and *Knowledge Management* are mandatory.
- Exactly one seminar must be chosen.

As a complementary module from economics we recommend *Customer Relationship Management (CRM)*.

Learning Outcomes
The students should

- see the necessity of specialised systems for information management and define an deploy decision criteria for purchasing such software,
- be aware of the fundamental approaches in information and knowledge management and be able to judge their potential applications,
- understand database applications and develop simple database applications on their own,
- be 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 knowledge management. It is not only the fundamental theory and concepts that are part of this module, but also the deployment of such technology.

Courses in module *Information and Knowledge Systems* [IW3INISW0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25740	Knowledge Management (S. 127)	2/1	W	5	R. Studer
24118	Data Warehousing and Mining (S. 92)	2/1	W	5	K. Böhm
24111	Workflowmanagement-Systems (S. 91)	2	W	3	J. Mülle
25762	Intelligent Systems in Finance (S. 129)	2/1	S	5	D. Seese
prosemis	Undergraduate Seminar Information Systems (S. 177)	2	S	3	K. Böhm
SemAIFB4	Seminar Knowledge Management (S. 172)	2	W	4	R. Studer
24516	Database Systems (S. 99)	2/1	S	4	K. Böhm

Remarks
The lecture *Communication and Database Systems* is substituted by the lectures *Introduction into Computer Networks* and *Database Systems*. Students who failed the exam can participate in the exam on the new lectures. An online registration to *Communication and Database Systems* is necessary in this case.
Students who have already passed the exam on *Communication and Database Systems* are not allowed to take the new lectures since the content is the same.

5.2 BA/OR/EC

Module: Customer Relationship Management (CRM) Module key: [IW3WWCRM0]

Subject: BA/OR/EC (Specialization)
Module coordination: Andreas Geyer-Schulz
Credit points (CP): 20

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions

- Students must take the courses *Customer Relationship Management* [26508], *Operatives CRM* [26520], *Analytical CRM* [26522], and *Bachelor-Seminar CRM* [26524]
- The *Bachelor-Seminar CRM* [26524] has to be attended prior to or parallel to the course *Customer Relationship Management* [26508].
- Additionally, they may choose between *Wettbewerb in Netzen* [26240], and *Unternehmensplanung und OR* [25158].

We recommend to visit the modules *Information and Knowledge Based Systems* [IW3INISW0] or Business Processes [IW3INGP0].

Learning Outcomes

- The student understands service management as the basis of customer relationship management.
- The student sees the consequences of this strategic decision for the company as a whole as well as for all of its organisational parts.
- The student designs and implements standard CRM processes in a company environment.
- 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.
- The student designs, implements, and analyzes operative CRM processes in concrete application domains (e.g. campaign management, call center management, . . .).
- The student is aware of the problems of protecting the privacy of customers and the implications of privacy law.
- The student gains an overview of the market for CRM software.
- The student knows the current developments in CRM in science as well as in industry.

Content
In the module *Customer Relationship Management* we teach the principles of modern customer-oriented management and its support by system architectures and CRM software packages. Choosing customer relationship management as a company´s strategy requires service management and a strict 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, . . .).

Courses in module *Customer Relationship Management (CRM)* [IW3WWCRM0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26508	Customer Relationship Management (S. 151)	2/1	W	5	A. Geyer-Schulz
26522	Analytical CRM (S. 154)	2/1	S	5	A. Geyer-Schulz
26520	Operative CRM (S. 152)	2/1	W	5	A. Geyer-Schulz
26524	Bachelor Seminar in Information Engineering and Management (S. 155)	2	W/S	2	A. Geyer-Schulz
25158	Corporate Planning and Operations Research (S. 111)	2/1	W	5	W. Gaul
26240	Competition in Networks (S. 144)	2/1	W	5	K. Mitusch

Remarks
The course *Customer Relationship Management* [26508] will be held in English.

Module: Analytical CRM — Module key: [IW3WWCRM1]

Subject: BA/OR/EC (Specialization)
Module coordination: Andreas Geyer-Schulz
Credit points (CP): 10

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Students must take the courses *Analytical CRM* [26522], and *Bachelor-Seminar CRM* [26524]. Additionally, they may choose from the following courses: *Customer Relationship Management* [26508], *Wettbewerb in Netzen* [26240], and *Unternehmensplanung und OR* [25158].
The *Bachelor-Seminar CRM* [26524] has to be attended prior to or parallel to a CRM course.
We recommend to visit the modules *Information and Knowledge Based Systems* [IW3INISW0] or *Business Processes* [IW3INGP0] in informatics. The module *Foundations of Marketing* [IW3WWMAR1] is a suitable complement.

Learning Outcomes
- The student designs the ETL process (Extraction / Translation / Loading) as the interface process between analytic and operative CRM.
- The student modells and implements data-warehouse systems with performance aspects properly considered.
- The student knows the scientific methods (from business administration, statistics, informatics) which are most relevant for analytic CRM and their application to decision-making. He solves standard cases with these methods on his own.
- The student should gain an overview of the most important methods suitable for analytic CRM and he should be able to choose appropriate methods on his own.
- The student performs a standard CRM analysis of a decision problem based on real company data. His report gives recommendations together with the reasons for them.
- The student has an overview of the current market for analytic CRM software.

Content
In the module *Analytic CRM* 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.

Courses in module *Analytical CRM* [IW3WWCRM1]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26522	Analytical CRM (S. 154)	2/1	S	5	A. Geyer-Schulz
26508	Customer Relationship Management (S. 151)	2/1	W	5	A. Geyer-Schulz
25158	Corporate Planning and Operations Research (S. 111)	2/1	W	5	W. Gaul
26240	Competition in Networks (S. 144)	2/1	W	5	K. Mitusch
26524	Bachelor Seminar in Information Engineering and Management (S. 155)	2	W/S	2	A. Geyer-Schulz

Remarks
The course *Customer Relationship Management* [26508] will be held in English.

Module: Operative CRM — Module key: [IW3WWCRM2]

Subject: BA/OR/EC (Specialization)
Module coordination: Andreas Geyer-Schulz
Credit points (CP): 10

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Students must take the courses *Operatives CRM* [26520], and *Bachelor-Seminar CRM* [26524]. Additionally, they may choose from the following courses: *Customer Relationship Management* [26508], *Wettbewerb in Netzen* [26240], and *Unternehmensplanung und OR* [25158].
The *Bachelor-Seminar CRM* [26524] has to be attended prior to or parallel to a CRM course.
We recommend to visit the modules *Information and Knowledge Based Systems* [IW3INISW0] or *Business Processes* [IW3INGP0] in informatics. The module *Foundations of Marketing* [IW3WWMAR1] is a suitable complement.

Learning Outcomes
- The student understands methods of modelling business processes and he is able to apply them to operative CRM processes.
- The student designs, implements, and analyzes operative CRM processes in concrete application domains (e.g. campaign management, call center management, . . .).
- The student has an overview of the current market for operative CRM software and about current trends in operative CRM processes.
- The student is aware of the problems of protecting the privacy of customers and the implications of privacy law.
- The student is able to design and implement a standard process from operative CRM in a company environment.

Content
The module *Operative CRM* emphasizes 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, . . .)

Courses in module *Operative CRM* [IW3WWCRM2]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26520	Operative CRM (S. 152)	2/1	W	5	A. Geyer-Schulz
26508	Customer Relationship Management (S. 151)	2/1	W	5	A. Geyer-Schulz
25158	Corporate Planning and Operations Research (S. 111)	2/1	W	5	W. Gaul
26240	Competition in Networks (S. 144)	2/1	W	5	K. Mitusch
26524	Bachelor Seminar in Information Engineering and Management (S. 155)	2	W/S	2	A. Geyer-Schulz

Remarks
The course *Customer Relationship Management* [26508] will be held in English.

Module: Decision Theory — Module key: [IW3WWDEC0]

Subject: BA/OR/EC (Specialization)
Module coordination: Siegfried Berninghaus
Credit points (CP): 10

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module or of the other BA/OR/EC module has to be chosen and completed.

Learning Outcomes
The student will
- be able to apply game theoretic methods to complex strategic decision making problems
- understand computer aided methods to analyze stochastic decision making problems
- learn the theoretical foundations of decision theory under uncertainty
- be able to use experimental methods to analyze economic phenomena

Content
- Game Theory I
- Economics of Uncertainty
- Simulation
- Experimental Economics

Courses in module *Decision Theory* [IW3WWDEC0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25525	Game Theory I (S. 120)	2/2	S	6	S. Berninghaus
25369	Game Theory II (S. 116)	2/2	W	6	S. Berninghaus
25662	Simulation I (S. 121)	2/1/2	W	5	K. Waldmann
25365	Economics of Uncertainty (S. 115)	2/2	S	6	K. Ehrhart
25373	Experimental Economics (S. 117)	2/2	S	5	S. Berninghaus, Kroll

Remarks
The lecture *Simulation I* [25662] is offered irregularly. The curriculum of the next two years is available online.

Module: eBusiness Management — Module key: [IW3WWEBM0]

Subject: BA/OR/EC (Specialization)
Module coordination: Christof Weinhardt
Credit points (CP): 20

Learning Control / Examinations
Learning control is described in the course documents associated to this module. The overall grade is determined by weighting the grades from each course according to the number of credits.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions

- At least two of the three courses “Management of Business Networks” [26452] and “eFinance: Information Engineering and Management for Securities Trading” [26454] and “eServices” [26462] are compulsory.
- Substituting the course “Management of Business Networks” [26452], the introductionary course *Management of Business Networks (Introduction)* may be taken.

- Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module has to be chosen and completed.
- At most one seminar can be considered in this module.
- The practical seminar [26478] is a supplement to the course seminar Information Engineering and Management [SemIW] and it can only be chosen in conjunction with the course.

Learning Outcomes
The module eBusiness Management supplies students with knowledge and abilities for designing information (products and processes) in a strategic and operative way as well as with knowledge about the information and communication systems in enterprises and networks.
The students shall be able to analyze coordination problems within and - above all - between enterprises, to judge them and to support them by installing appropriate information services. On the one hand, a deep understanding of information as a production factor and an economic good is necessary. On the other hand, students shall know the methods of information management and business model planning. Besides the theoretical aspects, skills such as the capacity for teamwork, intercultural cooperation and applying theoretical knowledge in practice are trained.

Content
The module “eBusiness Management” 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 Prof Kersten from Concordia University, Montreal, Canada. If it is possible to organize, depending on the start of term in Canada, the case study will be worked on by the students via internet in collaboration with Canadian students. The results will jointly be presented in a telephone conference.
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 core program is complemented by further elective courses that deliver knowledge about methodology in the field of incentive engineering and coordination of business networks and supply chains.

Courses in module *eBusiness Management* [IW3WWEBM0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26452	Management of Business Networks (S. 146)	2/1	W	5	C. Weinhardt, J. Kraemer
26454	eFinance: Information Engineering and Management for Securities Trading (S. 147)	2/1	W	5	C. Weinhardt, R. Riordan
26466	eServices (S. 148)	2/1	S	5	C. Weinhardt, G. Satzger
26240	Competition in Networks (S. 144)	2/1	W	5	K. Mitusch
2118078	Logistics - Organisation, Design, and Control of Logistic Systems (S. 159)	3/1	S	6	K. Furmans
SemIW	Seminar Information Engineering and Management (S. 174)	2	W/S	4	C. Weinhardt
26477	Practical seminar Information Engineering and Management (S. 149)	0*	W/S	1	C. Weinhardt
26496	Management of Business Networks (Introduction) (S. 150)		W	4	C. Weinhardt, J. Kraemer

Remarks

The lecture *Competition in Networks* [26240] is always offerd in the winter term.
The current seminar courses for this semester are listed on following webpage: the http://www.im.uni-karlsruhe.de/lehre
The course *Management of Business Networks (Introduction)* [26496] was added to the module.
The course *Logistics - Organisation, Design, and Control of Logistic Systems* was formerly named *Logistics*.

Module: Supply Chain Management — Module key: [IW3WWEBM1]

Subject: BA/OR/EC (Specialization)
Module coordination: Christof Weinhardt
Credit points (CP): 10

Learning Control / Examinations
Learning control is described in the course documents associated to this module. The overall grade is determined by weighting the grades from each course according to the number of credits.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
It is recommended that one out of the lectures

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

is taken.

- The *practical seminar* [26478] is a supplement to the course *seminar Information Engineering and Management* [SemIW] and it can only be chosen in conjunction with this course.
- At most one seminar can be considered in this module.
- Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module or of the other BA/OR/EC module has to be chosen and completed.

Learning Outcomes
The module “Supply Chain Management” imparts knowledge for strategic and operative designing and control of supply chains spanning several enterprises. The students shall be able to analyze the coordination problems within supply chains, to judge them and to support them providing appropriate information systems. In order to be able to do this it is necessary to understand the coordination and planning mechanisms from the field of Operations Research and, on the other hand, to be familiar with methods from information management. Thus, the module gives an overview of methods and instruments of Supply Chain Management for the strategical, organizational and technical design of integrated supply chains.

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.

Courses in module *Supply Chain Management* [IW3WWEBM1]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26452	Management of Business Networks (S. 146)	2/1	W	5	C. Weinhardt, J. Kraemer
2118078	Logistics - Organisation, Design, and Control of Logistic Systems (S. 159)	3/1	S	6	K. Furmans
25486	Facility Location and Strategic Supply Chain Management (S. 118)	2/1	S	5	S. Nickel
SemIW	Seminar Information Engineering and Management (S. 174)	2	W/S	4	C. Weinhardt
26477	Practical seminar Information Engineering and Management (S. 149)	0*	W/S	1	C. Weinhardt
26496	Management of Business Networks (Introduction) (S. 150)		W	4	C. Weinhardt, J. Kraemer
25488	Tactical and Operational Supply Chain Management (S. 119)	2/1	W	5	S. Nickel
2118090	Quantitative Methods for Supply Chain Risk Management (S. 161)	3/1	S	6	Cardeneo

Remarks
The current seminar courses for this semester are listed on following webpage: the http://www.im.uni-karlsruhe.de/lehre

The course *Management of Business Networks (Introduction)* [26496] was added to the module.
The course *Logistics - Organisation, Design, and Control of Logistic Systems* was formerly named *Logistics*.
The course *Tactical and Operational Supply Chain Management* [25488] was added to the module.
The course *Quantitative Methods for Supply Chain Risk Management [*2118090*]* was added to the module.

Module: eFinance: Information Engineering and Management in Finance Module key: [IW3WWEBM2]

Subject: BA/OR/EC (Specialization)
Module coordination: Christof Weinhardt
Credit points (CP): 10

Learning Control / Examinations
Learning control is described in the course documents associated to this module. The overall grade is determined by weighting the grades from each course according to the number of credits.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions

- The core courses *eFinance* [26454] is compulsory. In addition, students have to choose further elective courses from the list below so that the number of credits equals or exceeds 10.
- The *practical seminar* [26478] is a supplement to the course *seminar Information Engineering and Management* [SemIW] and it can only be chosen in conjunction with this course.
- At most one seminar can be considered in this module.
- Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module or of the other BA/OR/EC module has to be chosen and completed.

Learning Outcomes
In the module “eFinance: Information engineering and management in finance” the students get an overview of modern approaches of information management in the finance sector. They learn to analyze specific financial problems from the point of view of information management and also to solve these problems by using the tools provided by information management. By doing so, they get to know finance products as information products and learn the state of the art of modern information processing in the finance sector.

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.
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.

Courses in module *eFinance: Information Engineering and Management in Finance* [IW3WWEBM2]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26454	eFinance: Information Engineering and Management for Securities Trading (S. 147)	2/1	W	5	C. Weinhardt, R. Riordan
25762	Intelligent Systems in Finance (S. 129)	2/1	S	5	D. Seese
25240	Market Microstructure (S. 113)	2/0	W	3	T. Lüdecke
26550	Derivatives (S. 156)	2/1	S	5	M. Uhrig-Homburg
SemIW	Seminar Information Engineering and Management (S. 174)	2	W/S	4	C. Weinhardt
26477	Practical seminar Information Engineering and Management (S. 149)	0*	W/S	1	C. Weinhardt

Remarks
The current seminar courses for this semester are listed on following webpage: the http://www.im.uni-karlsruhe.de/lehre

Module: Applied Finance — Module key: [IW3WWFIN0]

Subject: BA/OR/EC (Specialization)
Module coordination: Marliese Uhrig-Homburg
Credit points (CP): 20

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module has to be chosen and completed.
Seminars of all examiners of this module will be accepted.

Learning Outcomes
This module provides profound knowledge in modern finance. Apart from investment decisions in stock and bond markets, valuation problems and the use of derivative financial instruments are examined/discussed. The knowledge about the micro economic fundament of modern finance theory can be enhanced by choosing an economics lecture concerning decisions under uncertainty and the economics of information. Alternatively computer based simulation, which is important for many valuation issues, can be studied by choosing a lecture in operations research.

Content

- Capital Market Theory
  Investments on Financial Markets, Expected Utility, Risk Measures, Information Efficiency, Portfolio Theory, Capital Asset Pricing Model, Arbitrage Pricing Theory, Performance Measures, Duration.
- Derivatives
  Forwards, Futures, Options, No-Arbitrage and Equilibrium, Binomial Model, Black-Scholes Model, Continuous-Time Valuation (Wiener Processes, Itô´s Lemma), Financial Engineering using Derivatives.
- Statistics and Econometrics in Business and Economics
  Part 1: Introduction to Securities and Markets; Stock and Dividend Statistical Description as Binomial Model, Wiener´s and Itô´s Disturbance Process; Portfolio Management involving Markowitz Model, Tobin Model, another Stochastic Models; The CAPM and APT Models; The Mathematical Description and Term Structure of Interest Rates; Bond Portfolio Management involving Immunization; Option Pricing involving European and American Pricing, Black-Scholes Formula, Option Hedging and Speculation Strategies.
  Part 2: Time-Series Models Definitions and Main Problems; Stationary; Smoothing; AR(p)-Models; MA(p)-Models; ARMA(p,q)-Models; ARCH and GARCH Models; ARIMA-Model; Seasonal Models; Lag Structures; Estimation and Checking Time-Series Models; Forecasting with time-Series Models; Forecasting Adapted Methods; Applications of Time-Series Models.
- Ökonomische Theorie der Unsicherheit
  Axiomatische Entscheidungstheorien (Neumann/Morgenstern, Kahnemann/Tversky), Stochastische Dominanz von Verteilungen, Risikoaversions-Konzepte, Marktmodelle bei Unsicherheit und unvollständiger Information, experimentelle Überprüfung der theoretischen Resultate.
- Simulation
  Einführung. Diskrete Simulation. Erzeugung von Zufallszahlen. Erzeugung von Zufallszahlen diskreter und stetiger Zufallsvariablen. Statistische Analyse simulierter Daten. Varianzreduzierende Verfahren. Fallstudie.
- Seminar
  Changing up to date topics, related to the contents of the lectures.

Courses in module *Applied Finance* [IW3WWFIN0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26575	Investments (S. 157)	2/1	S	5	M. Uhrig-Homburg
26550	Derivatives (S. 156)	2/1	S	5	M. Uhrig-Homburg
25325	Statistics and Econometrics in Business and Economics (S. 114)	2/2	W	5	W. Heller
25365	Economics of Uncertainty (S. 115)	2/2	S	6	K. Ehrhart
25662	Simulation I (S. 121)	2/1/2	W	5	K. Waldmann
25016	Economics III: Introduction in Econometrics (S. 107)	2/2	S	5	M. Höchstötter
26580	Seminar in Financial Engineering (S. 158)	2	W	3	M. Uhrig-Homburg

Remarks
The lecture *Simulation I* [25662] is offered irregularly. The curriculum of the next two years is available online.

Module: Financial Economics — Module key: [IW3WWFIN1]

Subject: BA/OR/EC (Specialization)
Module coordination: Marliese Uhrig-Homburg
Credit points (CP): 10

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module or of the other BA/OR/EC module has to be chosen and completed.

Learning Outcomes
This module teaches profound knowledge in modern finance and its microeconomic foundation. The focus is on investment decisions in stock and bond markets.

Content

- Capital Market Theory
  Investments on Financial Markets, Expected Utility, Risk Measures, Information Efficiency, Portfolio Theory, Capital Asset Pricing Model, Arbitrage Pricing Theory, Performance Measures, Duration.
- Ökonomische Theorie der Unsicherheit
  Axiomatische Entscheidungstheorien (Neumann/Morgenstern, Kahnemann/Tversky), Stochastische Dominanz von Verteilungen, Risikoaversions-Konzepte, Marktmodelle bei Unsicherheit und unvollständiger Information, experimentelle Überprüfung der theoretischen Resultate.

Courses in module *Financial Economics* [IW3WWFIN1]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25365	Economics of Uncertainty (S. 115)	2/2	S	6	K. Ehrhart
26575	Investments (S. 157)	2/1	S	5	M. Uhrig-Homburg

Module: Quantitative Finance — Module key: [IW3WWFIN2]

Subject: BA/OR/EC (Specialization)
Module coordination: Marliese Uhrig-Homburg
Credit points (CP): 10

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module or of the other BA/OR/EC module has to be chosen and completed.

Learning Outcomes
This module deals with valuation problems and the use of derivative financial instruments. The theoretical basics of valuation in discrete and continuous time are taught, as well as the necessary knowledge in (computer based) simulation, which is needed for practical applications.

Content

- **Derivatives** Forwards, Futures, Options, No-Arbitrage and Equilibrium, Binomial Model, Black-Scholes Model, Continuous-Time Valuation (Wiener Processes, Itô´s Lemma), Financial Engineering using Derivatives.
- **Simulation** Einführung. Diskrete Simulation. Erzeugung von Zufallszahlen. Erzeugung von Zufallszahlen diskreter und stetiger Zufallsvariablen. Statistische Analyse simulierter Daten. Varianzreduzierende Verfahren. Fallstudie.

Courses in module *Quantitative Finance* [IW3WWFIN2]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
26550	Derivatives (S. 156)	2/1	S	5	M. Uhrig-Homburg
25662	Simulation I (S. 121)	2/1/2	W	5	K. Waldmann

Remarks
The lecture *Simulation I* [25662] is offered irregularly. The curriculum of the next two years is available online.

Module: Foundations of Marketing — Module key: [IW3WWMAR1]

Subject: BA/OR/EC (Specialization)
Module coordination: Wolfgang Gaul, Bruno Neibecker
Credit points (CP): 10

Learning Control / Examinations
The assessment consists of a general written exam according to §4 Abs. 2, Nr. 1 of examination regulation. The written exam has a duration of 120 min. and contains topics from the main lecture [25150] as well as from the chosen lectures [25154], [25156], [25177]. The examination is offered every semester. Re-examinations are offered at every ordinary examination date and has to be absolved within one year.
The overall grade for the module is the average of the grades for each course weighted by the credits of the course.
It is recommended, to attend more lectures than required to fulfill 10 Credit Points as it is possible to examine in these additional lecutres and influence the final grade positively.
If a Seminar is attended within the module, the assessment for this course is done individually (according to §4, Abs. 2, Nr. 3 of the examination regulation). The grade of the seminar is taking into account for the overall grade of the module.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
The lecture *Marketing and Consumer Behavior* [25150] has to be attended.

Learning Outcomes

Content

Courses in module *Foundations of Marketing* [IW3WWMAR1]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25150	Marketing and Consumer Behavior (S. 108)	2/1	W	5	W. Gaul
25154	Modern Market Research (S. 109)	2/1	S	5	W. Gaul
25156	Marketing and Operations Research (S. 110)	2/1	S	5	W. Gaul
25177	Brand Management (S. 112)	2/1	W	4	B. Neibecker

Module: Strategy and Managerial Economics — Module key: [IW3WWORG0]

Subject: BA/OR/EC (Specialization)
Module coordination: Hagen Lindstädt
Credit points (CP): 20

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions

- Students must take the courses [25900] and [25525].
- Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module has to be chosen and completed.

The remaining courses are completely optional, but only one seminar.

Learning Outcomes
The module provides knowledge and skills about economic models and management frameworks in management, strategy, and organization.
The module focuses on problem solving skills and understanding fundamental economic concepts in the area of corporate and business management.

Content
The module emphasises three aspects: The student will learn models and frameworks, which are used in strategic and managerial decisions and managing organizations. The module also deals with practical aspects of these topics.

Courses in module *Strategy and Managerial Economics* [IW3WWORG0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25900	Management and Strategy (S. 133)	2/0	S	4	H. Lindstädt
25525	Game Theory I (S. 120)	2/2	S	6	S. Berninghaus
25907	Special Topics in Management: Management and IT (S. 134)	1/0	W/S	2	H. Lindstädt
25908	Modeling Strategic Decision Making (S. 135)	2/1	S	6	H. Lindstädt
26291	Managing New Technologies (S. 145)	2/1	S	5	T. Reiß
25915/25916	Seminar: Management and Organization (S. 163)	2	W/S	4	H. Lindstädt
SemWIOR4	Seminar in Game and Decision Theory (S. 176)	2	W/S	4	S. Berninghaus
SemWIOR3	Seminar in Experimental Economics (S. 175)	2	W/S	4	S. Berninghaus

Module: Strategy and Interaction — Module key: [IW3WWORG1]

Subject: BA/OR/EC (Specialization)
Module coordination: Hagen Lindstädt
Credit points (CP): 10

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Students must take both courses.
Following § 17, 3 of „Prüfungsordnung Informationswirtschaft“ a seminar of the other BA/EC/OR module has to be chosen and completed.

Learning Outcomes
The module provides knowledge and skills about economic models and management frameworks in strategic management, game theory, and the dynamics of interaction.
The module focuses on problem solving skills and understanding fundamental economic concepts in the area of strategy, management, and economics.

Content
The module emphasises two aspects: The student will learn to apply strategy frameworks, which are used in strategic and managerial decisions. Additionally, the module deals with problems and questions concerning game theory.

Courses in module *Strategy and Interaction* [IW3WWORG1]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25900	Management and Strategy (S. 133)	2/0	S	4	H. Lindstädt
25525	Game Theory I (S. 120)	2/2	S	6	S. Berninghaus

Module: Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] Module key:

Subject: BA/OR/EC (Specialization)
Module coordination: Hagen Lindstädt
Credit points (CP): 10

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 of the course.

Prerequisites
Successful completion of the modules in semester 1–4 (key: [IW1...]) except for up to two modules. The modules *Internship* [IW1EXPRAK] and *Business and Public Law* [IW1INJURA] are not relevant in this calculation.

Conditions
Students must choose two out of the five courses, but only one seminar.
Following § 17, 3 of „Prüfungsordnung Informationswirtschaft“ a seminar of this module or of the other BA/EC/OR module has to be chosen and completed.

Learning Outcomes
The module provides knowledge and skills about economic models and management frameworks in strategic decision making and economic incentives.
The module focuses on problem solving skills and understanding fundamental economic concepts in the area of strategic management and economics.

Content
The module emphasises two aspects: The student will learn models and frameworks, which are used in strategic and managerial decision making. Additionally, the module deals with problems and questions concerning economic incentives as an important part in strategic and organizational management.

Courses in module *Modeling Strategic Decision Making and Economic Incentives* [IW3WWORG2]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25908	Modeling Strategic Decision Making (S. 135)	2/1	S	6	H. Lindstädt
26291	Managing New Technologies (S. 145)	2/1	S	5	T. Reiß
25915/25916	Seminar: Management and Organization (S. 163)	2	W/S	4	H. Lindstädt

Module: Industrial Production — Module key: [IW3WWPRO0]

Subject: BA/OR/EC (Specialization)
Module coordination: Frank Schultmann
Credit points (CP): 20

Learning Control / Examinations
There will be one written exam covering all courses. The exam is acc. to §4, Art. 2, No. 1 ER B.Sc. “Information Engineering and Management”.

Prerequisites
Successful passing of 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.

Conditions

- Courses [25950], [25952] and [25954] are compulsory.
- One seminar of this module has to be integrated in order complete the module acc. to §17, Art. 3 ER “Information Engineering and Management”.

The core courses are designed to be taken in any order.

Learning Outcomes
The students shall obtain knowledge and expertise in the following areas:

- Techno-economic assessment of trends in the development of new production techniques (industrial R&D, innovation processes, diffusion processes),
- Techno-economic assessment of production systems, technology assessment and technology transfer,
- Design and optimization of production and logistic systems:
  - Optimal machines / equipment / plant layout
  - Production optimization (PPC, CIM, ERP and Supply Chain Management systems)

Content
Courses in the field of “Industrial Production” deal with planning and implementing factory-level tasks for the production of goods. Following industries are covered: all areas of manufacturing and processing industries, energy supply and construction.
A focus is placed on emitted by-products occurring in the supply, transformation, storage and transport of goods, emphasizing environmental economics and sustainability with regard to environmental protection.
Lectures start with selected case studies covering various industrial areas and develop mathematical and modeling approaches in order to evaluate and discuss their effectiveness with regard to the case studies.

Courses in module *Industrial Production* [IW3WWPRO0]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
25950	Fundamentals of Production Management (S. 136)	2/2	S	5.5	F. Schultmann
25952	Planning and Management of Industrial Plants (S. 137)	2/2	W	5.5	F. Schultmann
25954	Production and Logistics Management (S. 138)	2/2	S	5.5	M. Fröhling, F. Schultmann
25963	The Management of R&D Projects with Case Studies (S. 141)	2/2	W/S	3.5	H. Schmied
25975	Computer-based Production Planning and Control, Process Simulation and Supply Chain Management (S. 142)	2/0	S	2	M. Fröhling, F. Schultmann
25960	Material and Energy Flows in the Economy (S. 139)	2/0	W	3.5	M. Hiete
25962	Emissions into the Environment (S. 140)	2/0	W	3.5	U. Karl
25995	Material Flow Analysis and Life Cycle Assessment (S. 143)	2/0	W	3.5	L. Schebek
SemIIP2	Seminar in Industrial Production (S. 173)	2	W/S	4	F. Schultmann, M. Fröhling, M. Hiete

Remarks
The tutorial for “Production and Logistics Management” [25954] will be held in summer 2010.

5.3 Law

Module: Intellectual Property and Data Protection Law — Module key: [IW3INJURA]

Subject: Law (Specialization)
Module coordination: Thomas Dreier
Credit points (CP): 10

Learning Control / Examinations
The module will be examined as follows:

1. written exam (§4(2), 1) of 45 minutes covering the course Industril and intellectual property law (3 CP),
2. written exam (§4(2), 1) of 45 Minuten covering the course data proetection law (3 CP),
3. and a written paper and oral presentation (§4(2), 3) in a legal seminar (4 CP).

The grade of the modul will be calculated according to the grades obtained, weighed according to the number of CPs of each course.

Prerequisites
Students must have completed all except a maximum of one of the three examinations of Module *Law* [IW1INJURA] - written exam (§ 4(2), 1 of the SPO) covering *Civil Law for Beginners*, certificate with grades (§ 4(2), 3 of the SPO) in *Exercises in Private Law*, and written exam (§ 4(2), 1 of the SPO) convering *Public Law I* and *Public Law II*.

Conditions
None.

Learning Outcomes
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. In addition, students shall learn to apply what they have learned in a written paper that will be presented and discussed in class.

Content
The module *Law* in the third year of the Bachelor studies comprises specialised courses in contract drafting, industrial and intellectual property law and data protection law. In addition, students have to participate in a seminar, where they will write a paper to presented and discussed in class.

Courses in module *Intellectual Property and Data Protection Law* [IW3INJURA]

ID	Course	Hours per week C/E/T	Term	CP	Responsible Lecturer(s)
24070	Industrial Property and Copyright Law (S. 84)	2/0	W	3	T. Dreier
24018	Data Protection Law (S. 83)	2/0	W	3	I. Spiecker genannt Döhmann
rechtsem	Seminar in Law (S. 178)	2	W/S	4	T. Dreier, P. Sester, I. Spiecker genannt Döhmann
24350	Europäische Entwicklungen im Informationsrecht (S. 98)	2/0	W/S	4	U. Brühann

5.4 General Modules

Module: Bachelor Thesis — Module key: [IW3IWBATHESIS]

Subject: nicht kategorisiert
Module coordination: Martina Zitterbart, Studiendekan (Fak. f. Wirtschaftswissenschaften), Der Vorsitzende des Prüfungsausschusses
Credit points (CP): 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.

Prerequisites
Students may start with the Bachelor thesis if they fulfill the following preconditions: They are in the 3rd year of the Bachelor programme and have passed all examinations necessary for the first two years as defined in §17 paragraph 2 of the examination regulation of the Bachelor degree programme Information Engineering and Management.

Conditions
The regulations for the Bachelor thesis can be found in §14 of the examination regulation.

Learning Outcomes
The student

- investigates a problem in information engineering and management autonomously and scientifically,
- searches for scientific literature for his problem,
- chooses and applies suitable scientific methods or develops and improves such methods,
- critically compare and evaluate his findings with the state of the art,
- communicates his results clearly and in a scientific form in his bachelor thesis.

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 Courses of term 1-4

Course: Basic Notions of Computer Science — Course key: [24001]

Lecturers: Thomas Worsch
Credit points (CP): 4 **Hours per week:** 2/1/2
Term: Wintersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Informatics 1 [IW1ININF1] (S. 15)

Learning Control / Examinations

Prerequisites
None.

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
- syntax and semantics of propositional logic

Media
Blackboard, lecture notes, slides (pdf).

Complementary literature

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

Course: Programming

Course key: [24004]

Lecturers: Gregor Snelting
Credit points (CP): 4 **Hours per week:** 2/0/2
Term: Wintersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Informatics 1 [IW1ININF1] (S. 15)

Learning Control / Examinations
See german version.

Prerequisites
None.

Conditions
None.

Learning Outcomes
See german version.

Content
See german version.

Basic literature
P. Pepper, Programmieren Lernen, Springer, 3. Auflage 2007

Complementary literature
B. Eckels: Thinking in Java. Prentice Hall 2006
J. Bloch: Effective Java, Addison-Wesley 2008

Course: Algorithms I — Course key: [24500]

Lecturers: Peter Sanders
Credit points (CP): 8 **Hours per week:** 3/1/2
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Informatics 2 [IW1ININF2] (S. 16)

Learning Control / Examinations
The assessment is described in the module.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student is supposed to

- know and understand basic, frequently used algorithms, their conception, analysis of their correctness and 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 both formal correctness arguments and mathematical efficiency analysis

Content
The module contains the „basic toolbox for algorithmics". The following topics are covered in particular:

- result analysis (checkers) and certification
- asymptotic algorithm analysis: worst case, average case, probabilistic, amortised
- basic terms of algorithm engineering
- efficient application of linked lists
- unlimited arrays, batches and queues
- hash tables: with linking, linear probing, universal hashing
- sorting: efficient algorithms (mergesort, quicksort), lower border, radix sort
- selection: quickselect
- sorted sequences/search trees: How to support all important operations within logarithmic time?
- graphs (representation, traversing: breadth search, deep search, applications (topological sorting,...), shortest path: Dijkstra's algorithm, Bellman-Ford algorithm, minimum spanning trees: Kruskals algorithm, Jarnik-Prim algorithm)
- generic optimisation algorithms (greedy, dynamic programming, systematic search, local search)

Basic literature
Algorithms and Data Structures – The Basic Toolbox
K. Mehlhorn und P. Sanders
Springer 2008

Complementary literature
Algorithmen - Eine Einführung
T. H. Cormen, C. E. Leiserson, R. L. Rivest, und C. Stein
Oldenbourg, 2007

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: Theoretical Foundation of Computer Science — Course key: [24005]

Lecturers: Jörn Müller-Quade
Credit points (CP): 8 **Hours per week:** 3/1
Term: Wintersemester **Level:** 2
Teaching language: Deutsch
Part of the modules: Informatics 3 [IW1ININF3] (S. 18)

Learning Control / Examinations
The assessment is described in the module.

Prerequisites
None.

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, lecture notes, practice sheets.

Complementary literature

- Uwe Schöning: Theoretische Informatik - kurz gefasst. Sprektrum (2001).
- Ingo Wegener: Theoretische Informatik. Teubner (1999)
- Ingo Wegener: Kompedium theoretische Informatik. Teubner (1996).

Course: Computer Organization — Course key: [24502]

Lecturers: Tamim Asfour, Rüdiger Dillmann, Jörg Henkel, Wolfgang Karl
Credit points (CP): 6 **Hours per week:** 3/1/2
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Computer Engineering [IW1INTINF] (S. 20)

Learning Control / Examinations
The asessment is described in the module.

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Complementary 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 Engineering II — Course key: [24512]

Lecturers: Wolfgang Karl
Credit points (CP): 6 **Hours per week:** 3/1/2
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Computer Engineering [IW1INTINF] (S. 20)

Learning Control / Examinations
Assessment will consist of an 1h written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of the course is to introduce the principles for the design and organization of computers. The emphasis in this course is to show the relationship between hardware and software and to focus on the concepts that are the basics for current computers. The audience should understand how computing systems work and how programs run efficiently on modern computers.

Content
The course begins with a historical perspective of computer architectures and processors. It then shows the hardware/software interface and the requirements of high-level programming languages for the instruction set architecture. The organization and components of computers, their functionality and interoperability are then described. Finally, the impact of the hardware concepts on the software is discussed in order to demonstrate why a system performs as it does.

Media
Slides

Basic literature
David A. Patterson, and John L. Hennessy. Rechnerorganisation - Die Hardware/Software-Schnittstelle Deutsche Ausgabe herausgegeben von: Arndt Bode, Wolfgang Karl, and Theo Ungerer, 3. Auflage, Elsevier Spektrum Akademischer Verlag, Heidelberg, 2005.

Complementary literature
Yale. N. Patt & S.J. Patel. :Introduction to Computing Systems: From bits & gates to C & beyond. McGrawHill, August 2003
Uwe Brinkschulte, and Theo Ungerer. Mikrocontroller und Mikroprozessoren. Springer-Verlag, Heidelberg, September 2002
Helmut Bähring. Mikrorechner-Systeme. Springer-Lehrbuch, 3. Auflage, (Band I/II), Springer-Verlag, Heidelberg, 2002
Th. Flik, H. Liebig. Mikroprozessortechnik. Springer-Lehrbuch, 5. Auflage, Springer-VErlag, Heidelberg, 1998

Course: Applied Informatics I - Modelling — Course key: [25070]

Lecturers: Andreas Oberweis, Rudi Studer, Sudhir Agarwal
Credit points (CP): 4 **Hours per week:** 2/1
Term: Wintersemester **Level:** 2
Teaching language: Deutsch
Part of the modules: Applied Informatics [IW1WWAINF] (S. 19)

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

Prerequisites
None.

Conditions
None.

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

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

Media
Slides.

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

Complementary 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 Course key: [25033]

Lecturers: Stefan Tai
Credit points (CP): 4 **Hours per week:** 2/1
Term: Sommersemester **Level:** 2
Teaching language: Deutsch
Part of the modules: Applied Informatics [IW1WWAINF] (S. 19)

Learning Control / Examinations
The assessment consists of a written examination (60 min) according to Section 4 (2),1 of the examination regulation. The grade of *Applied Informatics II* is the achieved grade in the written examination.

Prerequisites
Knowledge of content of the courses *Foundations of Informatics I* [25074] and *Foundations of Informatics II* [25076] is expected.

Conditions
None.

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

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

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

Media
Slides, internet resources.

Basic literature
Tba in the lecture.

Course: Financial Accounting and Cost Accounting — Course key: [25002/25003]

Lecturers: Thomas Burdelski
Credit points (CP): 4 **Hours per week:** 2/2
Term: Wintersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Business Administration [IW1WWBWL] (S. 21)

Learning Control / Examinations
The assessment will consist of a written exam following §4(2), 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Business transactions are economic events that affect the financial position of a business entity. After this basic course students have to be familiar with the principles of Financial and Management Accounting especially with the four financial statements and the instruments of a cost accounting system.

Content
After an introduction to the objectives of accounting the student will learn the double- Entry- System, the basic method of accounting, and the difference between accounting and bookkeeping. We examine the typical business transactions for Trading Companies and Industrial Enterprises. Financial statements are the primary means of communicating important accounting information about a business to those who have an interest in the business. Four major financial statements are used to communicate accounting information: the income statement, the statement of retained earnings, the balance sheet and the statement of cash flows, here in the context with german laws (HGB). In the second part of the course the cost accounting instruments will be analyzed: cost type accounting, cost center accounting, and unit of output costing. Aspects of modern systems in Management Accounting conclude this basic course.

Media
slides

Basic literature
- R. Buchner, Buchführung und Jahresabschluss, Vahlen Verlag
- A. Coenenberg, Jahresabschluss und Jahresabschlussanalyse, Verlag Moderne Industrie
- A. Coenenberg, Kostenrechnung und Kostenanalyse, Verlag Moderne Industrie
- R. Ewert, A. Wagenhofer, Interne Unternehmensrechnung, Springer Verlag
- J. Schöttler, R. Spulak, Technik des betrieblichen Rechnungswesen, Oldenbourg Verlag

Course: Introduction to Information Engineering and Management Course key: [26490]

Lecturers: Christof Weinhardt, Andreas Geyer-Schulz
Credit points (CP): 3 **Hours per week:** 2/2
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Business Administration [IW1WWBWL] (S. 21)

Learning Control / Examinations
The assessment of the course *Introduction to Information Engineering and Management* is an assessment according to §4(2), 3 of the examination regulation of the Bachelor programme in Information Engineering and Management.
The assessment consists of two parts:

- Examination in written form with a duration of 60 minutes and 90 points
- Working exercise: 10 points.

The grades are allocated on the basis of the following table:

Grade	Minimal Points for Grade
1.0	87
1.3	83
1.7	79
2.0	75
2.3	71
2.7	67
3.0	63
3.3	59
3.7	55
4.0	$>$ 50
4.7	40
5.0	0

Prerequisites
None.

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
Web, Audio/Slides, Full Text Documents.

Basic 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.

Complementary 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: Business Administration and Management Science B Course key: [25024/25025]

Lecturers: Wolfgang Gaul, Thomas Lützkendorf, Andreas Geyer-Schulz, Christof Weinhardt, Thomas Burdelski
Credit points (CP): 4 **Hours per week:** 2/0/2
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Business Administration [IW1WWBWL] (S. 21)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

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

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

Basic 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: Business Administration and Management Science C Course key: [25026/25027]

Lecturers: Hagen Lindstädt, Martin E. Ruckes, Marliese Uhrig-Homburg, Thomas Burdelski
Credit points (CP): 4 **Hours per week:** 2/0/2
Term: Wintersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Business Administration [IW1WWBWL] (S. 21)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

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

Content
1. Management and Organization
A) Foundations of Management
B) Foundations of Strategic Management
- Process of Strategic Management
- Strategic Analysis using the SWOT Framework
- Formulating Strategic Options
- Evaluation and Choice

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

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

2. Investment and Finance
This part of the course deals with the fundamentals of capital market theory und provides a modern introduction to the theory und practice of capital raising and capital budgeting.
These topics are covered:
- Valuation of financial und real investments
- Portfolio theory
- Pricing in financial markets
- Theory and practice of corporate finance
- Arbitrage

3. Controlling
Planning, control (e. g. monitoring), organization, leadership and information systems are the core elements of a business management system. These fields have to be coordinated with one another to achieve the corporate goals in an optimal way. This coordinating function is the main task of the german specific term controlling. Thus, controlling fulfils the coordinating task within the management system in an essential way.
These topics are covered:
- Fundamentals of controlling und its context
- Instruments of controlling for business planning and control/monitoring (selected operational instruments, benchmarking as a tactical instrument and portfolio analysis as a strategic instrument)
- Instruments of controlling for information systems (performance indicators und reporting)

Basic 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: Introduction to Operations Research I — Course key: [25040]

Lecturers: Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann
Credit points (CP): 4.5 **Hours per week:** 2/2/2
Term: Sommersemester **Level:** 2
Teaching language: Deutsch
Part of the modules: Introduction to Operations Research [IW1WWOR] (S. 24)

Learning Control / Examinations
See module description.

Prerequisites
See module information.

Conditions
None.

Learning Outcomes
See module informaion.

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

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

Basic literature
Lecture notes

Complementary literature

- 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
- Büning, Naeve, Trenkler, Waldmann: Mathematik für Ökonomen im Hauptstudium. Oldenbourg, 2000

Course: Introduction to Operations Research II — Course key: [25043]

Lecturers: Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann
Credit points (CP): 4.5 **Hours per week:** 2/2/2
Term: Wintersemester **Level:** 2
Teaching language: Deutsch
Part of the modules: Introduction to Operations Research [IW1WWOR] (S. 24)

Learning Control / Examinations
See module description.

Prerequisites
See corresponding module information. Especially the course *Introduction to Operations Research I* [25040] is assumed.

Conditions
None.

Learning Outcomes
See module information.

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

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

Basic literature
Lecture notes

Complementary literature
- 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
- Büning, Naeve, Trenkler, Waldmann: Mathematik für Ökonomen im Hauptstudium. Oldenbourg, 2000

Course: Economics I: Microeconomics — Course key: [25512]

Lecturers: Siegfried Berninghaus
Credit points (CP): 5 **Hours per week:** 3/0/2
Term: Wintersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Economics [IW1WWVWL] (S. 23)

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.

Prerequisites
None.

Conditions
None.

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

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

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

- to analyze the structure of microeconomics relationships and possibly to present own problem solutions,

Content
The students learn the basic concepts in Microeconomics and some basics in game theory. The student will understand the working of markets in modern economies and the role of decision making. Furthermore, she should be able to understand simple game theoretic argumentation in different fields of Economics.
In the two main parts of the course problems of microeconomic decision making (household behavior, firm behavior) and problems of commodity allocation on markets (market equilibria and efficiency of markets) as well are discussed. In the final part of the course basics of imperfect competition (oligopolistic markets) and of game theory are presented.

Media
downloadable from IT server

Basic 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

Complementary 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: Statistics I — Course key: [25008/25009]

Lecturers: Markus Höchstötter
Credit points (CP): 5 **Hours per week:** 4/0/2
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Statistics [IW1WWSTAT] (S. 25)

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.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The Student should understand and apply

- the basic concepts of statistical data exploration
- the basic definitions and theorems of probability theory

Content
A. Descriptive Statistics: univariate und bivariate analysis
B. Probability Theory: probability space, conditional and product probabilities

Media
lecture notes

Basic literature
Skriptum: Kurzfassung Statistik I

Complementary literature

- Bol, G.: Deskriptive Statistik, 5. Aufl., Oldenbourg, München etc., 2001
- Bol, G.: Wahrscheinlichkeitstheorie, 5. Aufl., Oldenbourg, München etc., 2001
- Bosch, K.: Statistik-Taschenbuch, Oldenbourg, München etc., 1992
- Jambu, M.: Explorative Datenanalyse, G. Fischer, Stuttgart, 1992 Polasek,W.: Explorative Statistik, Springer, Berlin etc., 1994
- Rinne, H.: Taschenbuch der Statistik, 2. Aufl., Harri Deutsch, Frankfurt a. M. etc., 1997

Course: Statistics II — Course key: [25020/25021]

Lecturers: Markus Höchstötter
Credit points (CP): 5 **Hours per week:** 4/0/2
Term: Wintersemester **Level:** 2
Teaching language: Deutsch
Part of the modules: Statistics [IW1WWSTAT] (S. 25)

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.

Prerequisites
It ist recommended to attend the course *Statistics I* [25008/25009] before the course *Statistics II* [25020/25021].

Conditions
None.

Learning Outcomes
probability theory (continued), Introduction to estimation and testing theory

Content
B. Probability Theory:

- transformation of probabilities,
- parameters of location and dispersion,
- most importand discrete and continuous distributions,
- covariance and correlation,
- convolution and limit distributions

C. Theory of estimation and testing:

- suffiency of statistics,
- point estimation (optimality, ML-method),
- internal estimations,
- theory of tests (optimality, most important examples of tests)

Media
lecture notes

Basic literature
Script: Kurzfassung Statistik II

Complementary literature

- Bohley, P.: Statistik, 5. Aufl., Oldenbourg, München etc., 1992
- Bol, G.: Wahrscheinlichkeitstheorie, 5. Aufl., Oldenbourg, München etc., 2001
- Bol, G.: Induktive Statistik, 3. Aufl., Oldenbourg, München etc., 2003
- Bosch, K.: Statistik-Taschenbuch, Oldenbourg, München etc., 1992
- Bünning, H. - Trenkler, G.: Nichtparametrische statistische Methoden, de Gruyter, Berlin, 1994
- Rinne, H.: Taschenbuch der Statistik, 2. Aufl., Harri Deutsch, Frankfurt a. M. etc., 1997
- Schaich, E.: Schätz- und Testmethoden für Sozialwissenschaftler, 2. Aufl., Vahlen, München, 1990
- Zwillinger, D. - Kokoska, S.: Standart Probability and Statistics Tables and Formulae, 2. Aufl., CRC, Boca Raton etc., 2000

Course: Civil Law for Beginners — Course key: [24012]

Lecturers: Thomas Dreier, Peter Sester
Credit points (CP): 4 **Hours per week:** 4/0
Term: Wintersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Business and Public Law [IW1INJURA] (S. 26)

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

Prerequisites
None.

Conditions
None.

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

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

Media
Transparencies/Slides

Basic literature
Tba at the beginning of the course,

Complementary literature
Tba at the beginning of the course,

Course: Advanced Civil Law — Course key: [24504]

Lecturers: Thomas Dreier, Peter Sester
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Business and Public Law [IW1INJURA] (S. 26)

Learning Control / Examinations
Assessment will consist of written exams within *Privatrechtliche Übung* following §4, Abs. 2, 3 of the examination regulation.

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

Conditions
None.

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

Basic literature
Tba at the beginning of the course.

Complementary literature
tba at the beginning of the course

Course: Commercial and Corporate Law — Course key: [24011]

Lecturers: Peter Sester
Credit points (CP): 3 **Hours per week:** 2/0
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Business and Public Law [IW1INJURA] (S. 26)

Learning Control / Examinations
Assessment will consist of written exams following §4, Abs. 2, 3 of the examination regulation.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Based on the lectures on civil law, the students are provided with an overview of the specifics of commercial transactions, commercial agency and the law of merchants. Moreover, the forms of organization available in German company law are outlined.

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.

Basic literature
Klunzinger, Eugen

- Grundzüge des Handelsrechts, Verlag Vahlen, 12. Aufl. 2003, ISBN 3-8006-2914-3
- Grundzüge des Gesellschaftsrechts, Verlag Vahlen, 13. Aufl. 2004, ISBN 3-8006-3077-X

Complementary literature
Will be announced in the lecture.

Course: Exercises in Civil Law — Course key: [24506/24017]

Lecturers: Peter Sester, Thomas Dreier
Credit points (CP): 3 **Hours per week:** 2/0
Term: Winter-/Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Business and Public Law [IW1INJURA] (S. 26)

Learning Control / Examinations
Assessment will consist of five written exams following §4, Abs. 2, 3 of the SPO. At least two exams have to be passed, to pass the course. The final grade is calculated as the median of the two exams that have been passed with the best grades.

Prerequisites
Students must have attended the course *Civil Law for Beginners* [24012] or a comparable introduction into (German) civil law. It is highly reccomended that students have likewise attended the courses *Advanced Civil Law* [24504] and *Commercial and Corporation Law* [24011].

Conditions
None.

Learning Outcomes
It is the aim of this course to enable students to solve legal cases by way of the appropriate legal technique (so-called Subsumtion). At the same time, the legal knowlegde which students have acquired in the courses “Civil Law for Beginners”, “Advanced Civil Law” and “Commercial and Corporation Law” will be repeated and deepened. This shall enable students to solve practical legal problems in a methodologically correct way.

Content
In 5 sesssions 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

Basic literature
tba in the course.

Course: Public Law I - Basic Principles — Course key: [24016]

Lecturers: Indra Spiecker genannt Döhmann
Credit points (CP): 3 **Hours per week:** 2/0
Term: Wintersemester **Level:** 2
Teaching language: Deutsch
Part of the modules: Business and Public Law [IW1INJURA] (S. 26)

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).

Prerequisites
None.

Conditions
None.

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
abstracts, sketches on blackboard, slides

Basic literature
tba in srciptum

Complementary literature
tba in scriptum

Remarks
From the winter term 2008 on, the *Public Law I* will be lectured during the winter termn and *Public Law II* will be lectured during the summer term. This means:

1. In the winter term 2008/2009, Public Law I was being lectured.
2. In the summer term 2009, Public Law II will be lectured.

Course: Public Law II - Public Economic Law — Course key: [24520]

Lecturers: Indra Spiecker genannt Döhmann
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 2
Teaching language: Deutsch
Part of the modules: Business and Public Law [IW1INJURA] (S. 26)

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.

Prerequisites
None.

Conditions
None.

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
content structure; documents

Basic literature
Will be announced in the lecture.

Complementary literature
tba in lecture slides

Remarks
In winter term 2008 on, the *Public Law I* will be lectured during the winter term and *Public Law II* will be lectured during the summer term. This means:

1. In the winter term 2008/2009, Public Law I will be lectured.
2. In the summer term 2009, Public Law II will be lectured.

Course: Mathematics I for Information Engineering and Management Course key: [01360]

Lecturers: Andreas Rieder, Christian Wieners, Nicolas Neuss
Credit points (CP): 7,5 **Hours per week:** 4/2/2
Term: Wintersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Mathematics [IW1MAMATH] (S. 27)

Learning Control / Examinations
Assessment will consist of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft and a marked proof of attendance as result checking following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

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

Basic literature
None.

Complementary 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 Course key: [01877]

Lecturers: Andreas Rieder, Christian Wieners, Nicolas Neuss
Credit points (CP): 7,5 **Hours per week:** 4/2/2
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Mathematics [IW1MAMATH] (S. 27)

Learning Control / Examinations
Assessment will consist of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft and a marked proof of attendance as result checking following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Mathematics I

Conditions
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

Basic literature
none

Complementary 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

6.2 Courses of term 5-6

Course: Data Protection Law — Course key: [24018]

Lecturers: Indra Spiecker genannt Döhmann
Credit points (CP): 3 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Intellectual Property and Data Protection Law [IW3INJURA] (S. 53)

Learning Control / Examinations
Assessment will consist of a written exam (following §4(2), 1 SPO).

Prerequisites
None.

Conditions
None.

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
abstracts, sketches on blackboard, slides

Basic literature
Will be announced in the course.

Complementary 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: Industrial Property and Copyright Law — Course key: [24070]

Lecturers: Thomas Dreier
Credit points (CP): 3 **Hours per week:** 2/0
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Intellectual Property and Data Protection Law [IW3INJURA] (S. 53)

Learning Control / Examinations
Assessment will consist of a written exam (§4, Abs. 2, 1 of the SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
It is the aim of this course to give students an overview of the law of intellectual property. The course focuses on patent law, trademark law, copyright law and also presents other laws of industrial property, including the additional legal protection by unfair competition law. Students shall understand the differences between registration and non-registration rights. Key concepts such as territoriality, conditions for protection, exclusive rights, limitations and exceptions, infringement and sacntions will be discussed. In addition, the focus will be on licensing of IP rights. The course covers national, european and international IP law.

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 oon 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.

Basic literature
Ilzhöfer, Volker Patent-, Marken- und Urheberrecht Verlag Vahlen, 7current edition

Complementary literature
Additional literature tba

Course: Networked IT-Infrastructures Course key: [24074]

Lecturers: Wilfried Juling
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29), Information Services in Networks [IW3INIDL0] (S. 31), Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
A written exam of 60 minutes, according to §4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
Dependencies according to the module.

Learning Outcomes
The goal of this lecture is to introduce the fundamental models, approaches and technologies used in today's digital telecommunication networks. The topics covered in this lecture are strongly aligned with the OSI Reference Model, a broadly accepted layer model for describing communication systems.

Content
The lecture introduces formal methods to describe communication in general. After a brief discussion covering the basics of signal processing as well as physical constraints of telecommunication technologies, the lecture follows the architectural pattern of the OSI Reference Model to point out its given systematics. Based on elementary network technologies like Ethernet and Token Ring the lecture outlines essential problems concerned with frame alignment, shared or controled medium access or error processing. Further topics deal with the realization of worldwide networks regarding protocols, technologies and alogrithms used to construct them. Particularly, technical solutions and algorithms from the TCP/IP stack of the Internet Reference Model are discussed. Furthermore, the functionality and application scope of modern components to interconnect heterogenous networks are presented. Finally dedicated communication technologies like ISDN and higher level application protocols like HTTP or SMTP are introduced to indicate the pervasion of network communication technologies towards people.

Media
Slides.

Basic literature
- A.S. Tanenbaum, Computer Networks Prentice Hall, 4. Auflage, ISBN 0130661023, 2002.
- Larry L. Peterson, Bruce S. Davie, Computer Networks - A Systems Approach, 3rd ed., Morgan Kaufmann Publishers, 2003.

Complementary literature
- F. Halsall, Data Communications, Computer Networks and OSI, Addison-Wesley, 4. Auflage, ISBN 0-201-18244-0, 1997.
- J.F. Kurose, K.W. Ross, Computer Networking - A Top-Down Approach featuring the Internet. Addison-Wesley, 2005.

Course: Seminar in Telematics — Course key: [24074s]

Lecturers: Martina Zitterbart, Hannes Hartenstein
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
The assessment of this course is according to § 4 Abs.2 Nr. 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.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students have the opportunity

- to do a literature research starting from a given subject to identify relevant literature and to review, and evaluate it.
- to identify independently issues that arise from subdomains of Telematics and to classify methods of resolution found in the literature.
- to generate 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 research in a written document in a way that is common practice for scientific publications.

Content
In this seminar, the focus lies on specific subjects that were partly introduced in the respective lectures and aims to discuss them more in detail. The following subjects are addressed:

- Future Internet: The focus of the seminar is on concepts for enabling the internet to cope with current and future requirements, including, e.g., mobility support, quality of service, and security. The discussed approaches span from incremental improvements of the current internet to a clean slate approach.
- Sensor networks: The seminar covers different new research results, e.g. concerning sensor architecture, kommunication technologies, spezial routing procedures, data aggregation, safety and algorithms in in sensor networks etc.

starting WS 10/11:

- Network Security and Hacking Prevention: Attacks aimed at the infrastructure and applications of the Internet are the subject of this seminar. Having a firm understanding of the weaknesses, the students will examine protocols, mechanisms, and tools which can be used to provide secure communication.

Course: Practical Course in Algorithm Design — Course key: [24079p]

Lecturers: Peter Sanders, Dorothea Wagner, Marcus Krug
Credit points (CP): 5 **Hours per week:** 4
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29)

Learning Control / Examinations

Prerequisites
Lecture *Algorithmentechnik*

Conditions
None.

Learning Outcomes
The purpose of the practical course in algorithm design is to make learned knowledge work. The students are given varying topics from algorithmics, which they have to implement in small working groups. Possible Topics are, for exmaple, algorithms for flow problems, shortest path problems, or clustering techniques. In this way students learn to write efficient code.

Content
In the practical course *Algorithm Engineering* the students are given miscallaneous questions from algorithmics, which they have to implement independently in small working groups. The main focus lies on object oriented programming with Java or C++. Linear programming may also occur.

Course: Seminar in Algorithm Design — Course key: [24079s]

Lecturers: Dorothea Wagner
Credit points (CP): 3 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29)

Learning Control / Examinations
Assessment will consist a written elaboration of the performed task and an oral presentation thereof following §4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students shall

- conduct literature research starting from a given topic, identify, locate, evaluate and summarize relevant literature.
- compose their written elaboration (and later their bachelor/masters thesis) with a minimum of introductory effort, and thereby respect given templates similiar to those enforced in standard scientific publication processes.
- devise a presentation in the context of the scientifc topic. To this end, techniques are presented that enable the processing and the presentation of content in a way suitable for the audience.
- present their research results in a written form similar to standard scientific dissemination.

Content
Various current topics that build upon the contents of the associated lectures.

Course: Wireless Sensor-Actuator-Networks — Course key: [24104]

Lecturers: Martina Zitterbart
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The objective of this lecture is to present topics in research. As sensor networks are more and more becoming part of our daily-life, this lecture does not only focus on classical topics, such as time-synchronization and routing, but also on security and safety.

Content
Due to the emerging miniaturization of microcontrollers during the past years a new field of research established: wireless sensor networks. These are networks that consist of huge amounts of tiny, autonomous sensor nodes which are able to fulfill some assigned sensing task totally unattended and self-organizing. One important characteristic is their restricted ressources wrt/ computational power, memory and communication capacity, which is due to the node's scarce energy ressources. Under these conditions, traditional communication architectures and protocols seem to be not well suited. The lecture will cover essential concepts, protocols and architectures which were developed with respect to the special needs of those networks. Topics of the course will be: hardware platforms for sensornetworks, media access control protocols, naming and addressing, time synchronization, localization of sensor nodes, topology control, a bunch of specialized routing protocols, service- and data-centric view of communication, security, and robustness.

Media
Slides.

Basic literature
H. Karl, and A. Willig, *Protocols and Architectures for Wireless Sensor Networks*, Wiley and Sons, 2005, ISBN 0470095105.

Course: High Performance Communication — Course key: [24110]

Lecturers: Martina Zitterbart
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min.) following § 4 Abs. 2 Nr. 2 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of the course is to introduce the fundamental technologies of todays and future wide area networks.

Content
The main focus of this course are current developments in the area of network technologies. Part of this is the well-established Multi-Protocol Label Switching (MPLS) and the precursor ATM (Asynchronous Transfer Mode). Additionally, methods to support Quality of Service, signalling of requirements for Quality of Service, and the establishment of network-internal switching and routing systems are discussed. The lecture also goes into current developments in the domain of optical networks (SONET: Synchronous Optical Networking, WDM: Wavelength Division Multiplexing).

Media
Slides.

Basic literature
H. Perros. Connection-oriented Networks. John Wiley & Sons, 2005, ISBN 0-470-02163-2.

Complementary literature

- W. Haaß. Handbuch der Kommunikationsnetze. Springer-Verlag, 1996, ISBN 3-540-61837-3.
- J. Jahn. Photonik: Grundlagen, Komponenten und Systeme. Oldenbourg-Verlag, 2001, ISBN 3-486- 25425-1.
- D. Minoli, A. Alles. LAN, ATM and LAN Emulation Technologie. Artech-House, 1996, ISBN 0-89006- 916-6.
- E. Rathgeb, E. Wallmeier. ATM-Infrastruktur für die Hochleistungskommunikation. Springer-Verlag, 1997, ISBN 3-540-60370-0.
- G. Siegmund. ATM – Die Technik. 3. Auflage, Hüthig Verlag, 1997, ISBN 3-7785-2541-7.
- W. Stallings. High-Speed Networks. Prentice Hall, 1998, ISBN 0-13-525965-7.
- M. Zitterbart Hochleistungskommunikation, Band 1: Technologie und Netze. R. Oldenbourg Verlag, 1995, ISBN 3-486-22707-6.

Course: Workflowmanagement-Systems — Course key: [24111]

Lecturers: Jutta Mülle
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information and Knowledge Systems [IW3INISW0] (S. 34)

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung or of a 20 minute oral examination following §4, Abs. 2, 2 of the Prüfungsordnung.

Prerequisites
Knowledge about database systems, e.g. from the lecture *Communications and Database Systems* [24574].

Conditions
None.

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.

Media
Slides.

Basic literature

- W.M.P. van der Aalst. The Application of Petri Nets to Workflow Management. The Journal of Circuits, Systems and Computers, Seiten 1-45, Band 7:1, 1998.
- S. Jablonski, M. Böhm, W. Schulze (Hrsg.): Workflow-Management - Entwicklung von Anwendungen und Systemen. dpunkt-Verlag, Heidelberg, 1997
- 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
- Michael Havey: Essential Business Process Modeling. O´Reilly Media, Inc., 2005

Complementary literature

- M. Dumas, Wil M. P. van der Aalst, Arthur H. M. ter Hofstede (eds.): Process-Aware Information Systems. Wiley, 2005
- D. Harel: Statecharts: A Visual Formalism for Complex Systems, Science of Computer Programming Vol. 8, 1987.
- Dirk Wodtke, Gerhard Weikum A Formal Foundation for Distributed Workflow Execution Based on State Charts. Foto N. Afrati, Phokion Kolaitis (Eds.): Database Theory - ICDT ´97, 6th International Conference, Delphi, Greece, January 8-10, 1997, Proceedings. Lecture Notes in Computer Science 1186, Springer Verlag, Seiten 230-246, 1997.
- H.M.W. Verbeek, T. Basten, and W.M.P. van der Aalst Diagnosing workflow processes using Woflan. Computing Science Report 99/02, Eindhoven University of Technology, Eindhoven, 1999.

Course: Data Warehousing and Mining — Course key: [24118]

Lecturers: Klemens Böhm
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information and Knowledge Systems [IW3INISW0] (S. 34)

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung or of a 20 minute oral examination following §4, Abs. 2, 2 of the Prüfungsordnung.

Prerequisites
Knowledge about database systems, e.g. from the lecture *Communications and Database Systems* [24574].

Conditions
This course cannot be combined with the courses *Knowledge Discovery* [25742] and *Data Mining* [25375].

Learning Outcomes
At the end of the lecture, the participants should be aware of – and able to explain – the necessity of data warehousing and of data mining concepts. They should be able to assess and compare different approaches of management and analysis of large datasets with respect to efficiency and applicability. The participants should have gained an insight into the current research issues in the area of data warehousing and data mining and should understand which problems are currently unsolved.

Content
Data warehouses and data mining raise much interest from practitioners with huge amounts of data, e.g., in retail, finance and the insurance sector. Both warehousing and mining are motivated by the desire for keeping track of large and possibly distributed datasets and for extracting interesting relations from such data, ideally with minimal effort. A data warehouse is a repository which is fed with data from one or more operational database systems. The data is preprocessed allowing for a fast evaluation of complex analytical queries (OLAP, Online Analytical Processing). In contrary, data mining provides techniques for discovering patterns in large datasets.

Media
Slides.

Basic literature
- Jiawei Han, Micheline Kamber: Data Mining: Concepts and Techniques. 2nd edition, Morgan Kaufmann Publishers, March 2006.

Complementary literature
Further literature will be mentioned at the end of each chapter in the lecture slides.

Course: Web Engineering — Course key: [24124]

Lecturers: Martin Nußbaumer
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information Services in Networks [IW3INIDL0] (S. 31)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

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

Basic literature
Will be announced in the lecture.

Course: Telematics — Course key: [24128]

Lecturers: Martina Zitterbart
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
This course details selected protocols, architectures, techniques, and algorithms, which were already presented in the communications part of the course Communication and Database Systems [24574]. 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.

Basic 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

Complementary 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: Multimedia Communications — Course key: [24132]

Lecturers: Roland Bless
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
The communication part of Kommunikation und Datenhaltung (recommended).

Conditions
None.

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, and Video on Demand.

Media
Slides. Protocol traces.

Basic literature
James F. Kurose, and Keith W. Ross *Computer Networking* 4th edition, Addison-Wesley/Pearson, 2007, ISBN 0-321-49770-8, Chapter Multimedia Networking.

Complementary literature
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, 3.
Auflage, 2007

Course: Network and IT-Security Management — Course key: [24149]

Lecturers: Hannes Hartenstein
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information Services in Networks [IW3INIDL0] (S. 31)

Learning Control / Examinations
Oral exam of 30 minutes, according to §4 Abs. 2 Nr. 2 of the SPO.

Prerequisites
Basics in computer networks, according to the lectures *Kommunikation und Datenhaltung* [24574] and *Vernetzte IT-Infrastrukturen* [24074] respectively are required.

Conditions
Dependencies according to the module description.

Learning Outcomes
The goal of this lecture is to introduce the basics of network and IT-security management. Technical as well as underlying management concepts should are described.

Content
The lecture covers architectures, models, protocols and tools for controlling and monitoring of heterogeneous networks. Additionally, issues related to security and reliability are also covered. The lecture presents technical solutions as well as corresponding management concepts. The first part of the lecture introduces management architecture in particular the Internet management architecture based on the SNMP protocol. Afterwards corresponding tools, platforms, and operational implementations are presented. Furthermore public IP coordination and current trends are described. In the IT-Security management part of the lecture the concept of a security process is introduced based on the BSI Grundschutz. Additional topics are access and identity management as well as firewalls, intrusion detection and prevention. Besides theoretical method and concepts, practical examples are shown.

Media
Slides

Basic literature
Jochen Dinger, Hannes Hartenstein, Netzwerk- und IT-Sicherheitsmanagement : Eine Einführung, Universitätsverlag Karlsruhe, 2008.

Complementary literature
Heinz-Gerd Hegering, Sebastian Abeck, Bernhard Neumair, Integriertes Management vernetzter Systeme - Konzepte, Architekturen und deren betrieblicher Einsatz, dpunkt-Verlag, Heidelberg, 1999.
James F. Kurose, Keith W. Ross, Computer Networking. A Top-Down Approach Featuring the Internet, 3rd ed., Addison-Wesley Longman, Amsterdam, 2004.
Larry L. Peterson, Bruce S. Davie, Computer Networks - A Systems Approach, 3rd ed., Morgan Kaufmann Publishers, 2003.
William Stallings, SNMP, SNMPv2, SNMPv3 and RMON 1 and 2, 3rd ed., Addison-Wesley Professional, 1998.
Claudia Eckert, IT-Sicherheit. Konzepte - Verfahren - Protokolle, 4. Auflage, Oldenbourg, 2006.
Michael E. Whitman, Herbert J. Mattord, Management of Information Security, Course Technology, 2004.

Course: Randomized Algorithms — Course key: [24171]

Lecturers: Thomas Worsch
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students know the important approaches and techniques for the use of randomization in algorithms, as well as tools for their analysis.

Students are able to find weak points in deterministic algorithms, to develop randomized approaches to eliminate them, and to assess them using tools from probabilisty theory.

Content
Randomised algorithms are not deterministic. Their behavior depends on the outcome of random experiments. One of the first uses is Rabin's randomized test for primality. Meanwhile for a multitude of problems randomized algorithms have been described which are faster (at least in some sense) than deterministic algorithms. In addition sometimes randomized algorithms are easier to understand and/or implement then deterministic algorithms.

During the course not only different kinds of randomized algorithms (Las Vegas, Monte
Carlo, ...) are presented; the foundations from probability theory needed e.g. for the analysis of the time complexity are presented, too. Also, important concepts like Markov chains are treated. Since stochastic methods are gaining importance in more and more areas in computer science, the course will also be useful outside the area of randomized algorithms.

Topics: probabilistic complexity classes, routing in hypercubes, game theory, random walks, randomized graph algorithms, randomized hashing, randomized online algorithms

Media
lecture notes and slides in pdf format;

Basic literature
- J. Hromkovic : Randomisierte Algorithmen, Teubner, 2004
- M. Mitzenmacher, E. Upfal: Probability and Computing, Cambridge Univ. Press, 2005
- R. Motwani, P. Raghavan: Randomized Algorithms, Cambridge Univ. Press, 1995

Complementary literature
- E. Behrends: Introduction to Markov Chains, Vieweg, 2000
- A. Borodin, R. El-Yaniv: Online Computation and Competitive Analysis, Cambridge Univ. Press, 1998

Course: Europäische Entwicklungen im Informationsrecht Course key: [24350]

Lecturers: Ulf Brühann
Credit points (CP): 4 **Hours per week:** 2/0
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Intellectual Property and Data Protection Law [IW3INJURA] (S. 53)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Database Systems — Course key: [24516]

Lecturers: Klemens Böhm
Credit points (CP): 4 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Design and Implementation of Complex Systems [IW3INCS0] (S. 30), Information and Knowledge Systems [IW3INISW0] (S. 34)

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

Prerequisites
Recommendation: It is recommended but not required to participate at lectures covering communication networks, system architecture and software engineering.

Conditions
None.

Learning Outcomes
The student

- is able to explain the benefits of database technology,
- has understood the development of database applications including its models and methods,
- is able to set up and query simple databases,
- is familiar with the terminology and the fundamentals of the underlying theory.

Content
Database systems are one of the crucial software fundamentals in modern information systems. Therefore, they belong to the core subjects in university curriculums in the area of computer science. The goal of the lecture is to obtain the basic knowledge to work with database systems. Key aspects are database models for design and implementation (ER models, relational model), languages for database systems (SQL) and its theoretical foundation (relational algebra) as well as aspects of transaction processing, data integrity and views.

Media
Slides.

Basic 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

Complementary 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: Software Engineering I — Course key: [24518]

Lecturers: Walter F. Tichy, Höfer, Meder
Credit points (CP): 6 **Hours per week:** 3/1/2
Term: Sommersemester **Level:** 1
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29), Design and Implementation of Complex Systems [IW3INCS0] (S. 30), Information Services in Networks [IW3INIDL0] (S. 31), Business Process Engineering [IW3INGP0] (S. 32), Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
The assessment will consist of a 60 minute written exam according to § 4 Abs. 2 Nr. 1 SPO.
The grade of the module is the grade of the written exam.

Prerequisites
The passing of the module *Informatik I* is obligatory.

Conditions
None.

Learning Outcomes

Content

Media
slides, tutorial papers

Basic literature
None.

Complementary 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: Introduction in Computer Networks — Course key: [24519]

Lecturers: Hannes Hartenstein
Credit points (CP): 4 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29), Design and Implementation of Complex Systems [IW3INCS0] (S. 30), Infrastructures [IW3INNET0] (S. 33)

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

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Basic 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.

Complementary 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

Course: Network Security: Architectures and Protocols Course key: [24601]

Lecturers: Marcus Schöller
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

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.

Basic literature
Roland Bless et al. Sichere Netzwerkkommunikation. Springer-Verlag, Heidelberg, Juni 2005.

Complementary 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: Mobile Communications — Course key: [24643]

Lecturers: Oliver Waldhorst
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of the course is to introduce the technical foundations of mobile communication systems (signal propagation, medium access, etc.). An additional focus is on topics of current research (Mobile IP, Ad hoc Networks, Mobile TCP, etc.).

Content
The course “Mobile Communications” uses prominent examples for systems of currently deployed mobile communication systems, to explain typical architectures of such systems, e.g. mobile telecommunication systems, wireless personal, local, and metropolitan area networks. Additional topics related to current research efforts include TCP/IP-based communication over mobile networks and positioning systems. The goal of the course is not to teach facts on particular architectures and standards, but to show typical problems in mobile communications and present typical solutions. The fundamental principles of digital wireless transmissions including the frequency bands, signal
propagation, modulation, and multiplexing are explained by application examples.

Media
Slides.

Basic literature
J. Schiller; Mobilkommunikation; Addison-Wesley, 2003.

Complementary 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: Component Based Software Engineering — Course key: [24654]

Lecturers: Ralf Reussner, Michael Kuperberg, Klaus Krogmann
Credit points (CP): 3 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Design and Implementation of Complex Systems [IW3INCS0] (S. 30)

Learning Control / Examinations
The assessment consists of an oral exam of approx. 20 minutes according to Sec. 4 Subsec. 2 No. 2 of the study and examination regulations.

Prerequisites
Basic knowledge about software techniques as in the lecture *Software Techniques I* [24518] is recommended.

Conditions
None.

Learning Outcomes

Content

Basic literature

- C. Szyperski, D. Gruntz, S. Murer, Component Software, Addison-Wesley, 2002, 2nd Ed.
- F. Griffel, Componentware, dPunkt Verlag, 1998

Course: Next Generation Internet — Course key: [24674]

Lecturers: Roland Bless
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Objective of the lecture is to present latest developments in Internet-based networks and to explain the related advanced methods and techniques that are used. Furthermore, architectural principles of the current Internet are discussed and it is described which new challenges threaten the Internet architecture.

Content
In the main focus of the lecture are latest developments in the area of Internet-based network technologies. At first architectural principles of the current Internet are described and discussed. Next, nowadays and future challenges are presented. Methods to support quality of service (QoS), signaling of QoS requirements as well as IPv6 and multicast support for group communications are described. Application of the presented technologies in IP-based networks are discussed. Advanced approaches like active and programmable networks are presented in this lecture and recent developments in peer-topeer networks.

Media
Slides

Basic literature
James F. Kurose, and Keith W. Ross *Computer Networking* 4th edition, Addison-Wesley/Pearson, 2007, ISBN 0-321-49770-8, Chapters 1, 2.6 (P2P), 4 (Network Layer), 75 - 76 (Scheduling, IntServ, DiffServ, RSVP)

Complementary literature
Ralf Steinmetz, Klaus Wehrle (Eds) Peer-to-Peer Systems and Applications LNCS 3854, Springer 2005
M. Blanchet: *Migrating to IPv6: A Practical Guide to Implementing IPv6 in Mobile and Fixed Network*,
John Wiley & Sons, ISBN 0-471-49892-0, November 2005

Course: Security — Course key: [24941]

Lecturers: Jörn Müller-Quade
Credit points (CP): 6 **Hours per week:** 3/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29), Information Services in Networks [IW3INIDL0] (S. 31), Infrastructures [IW3INNET0] (S. 33)

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.

Prerequisites
None.

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).

Course: Economics III: Introduction in Econometrics Course key: [25016]

Lecturers: Markus Höchstötter
Credit points (CP): 5 **Hours per week:** 2/2
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Applied Finance [IW3WWFIN0] (S. 44)

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

Prerequisites
Knowledge of the lectures Statistics I + II is required.

Conditions
None.

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

Basic 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

Complementary literature
Additional literature will be suggested in course

Course: Marketing and Consumer Behavior — Course key: [25150]

Lecturers: Wolfgang Gaul
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Foundations of Marketing [IW3WWMAR1] (S. 48)

Learning Control / Examinations

Prerequisites
See corresponding module description.

Conditions
See corresponding module description.

Learning Outcomes

Content
Starting from the S-O-R paradigm where S stands for “stimuli”, O for “organism”, and R for “reactions”, aspects of consumer behavior are explained and possibilities are provided how marketing activities can be used to create desired influences. S-R models describe how consumer reactions depend on stimuli. Cognitive processes and psychical states help to explain how the (unobservable) interior of the organism contributes to the interpretation of reactions. In this context the adequate combination of available marketing instruments (price, product, promotion, place) will be discussed.

Basic literature
Further literature references are announced in the script.

Course: Modern Market Research

Course key: [25154]

Lecturers: Wolfgang Gaul
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Foundations of Marketing [IW3WWMAR1] (S. 48)

Learning Control / Examinations
See module description.

Prerequisites
Basic knowledge of statistics.

Conditions
None.

Learning Outcomes

Content

Basic literature
Further literature references are announced in the script.

Course: Marketing and Operations Research — Course key: [25156]

Lecturers: Wolfgang Gaul
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Foundations of Marketing [IW3WWMAR1] (S. 48)

Learning Control / Examinations
See module description.

Prerequisites
Basics of Operations Research are required.

Conditions
None.

Learning Outcomes

Content

Basic literature
WIll be announced in the lecture. Further literature references are announced in the script.

Course: Corporate Planning and Operations Research — Course key: [25158]

Lecturers: Wolfgang Gaul
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Customer Relationship Management (CRM) [IW3WWCRM0] (S. 35), Analytical CRM [IW3WWCRM1] (S. 36), Operative CRM [IW3WWCRM2] (S. 37)

Learning Control / Examinations

Prerequisites
Basics of operations research are assumed.

Conditions
None.

Learning Outcomes

Content

Basic literature
Will be announced in the lecture. Further literature references are announced in the script.

Course: Brand Management — Course key: [25177]

Lecturers: Bruno Neibecker
Credit points (CP): 4 **Hours per week:** 2/1
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Foundations of Marketing [IW3WWMAR1] (S. 48)

Learning Control / Examinations
Examination performance will consist of a written exam according to §4 Abs. 2, Nr. 1 of the "Prüfungsordnung für Informationswirtschaft" within the module of "Grundlagen des Marketing". (IW3WWMAR1).

Prerequisites
None.

Conditions
None.

Learning Outcomes
(See description of the module)

Content
The students should learn the essential scientific and practical principles of Marketing, especially branding. Branding consists of any name, design, style, words or symbols, singly or in any combination that distinguish one product from another in the eyes of the consumer. Brand positioning, brand loyalty and brand equity are discussed as important elements of a management concept. The focus of the course is not limited to short-term ROI, but also long-term benefits of communication strategies facing company´s responsibilities to all of its stakeholders, e.g. consumers, investors and public. The strategies and techniques in branding are broaden by several case studies. English as an international technical language in marketing is practiced with course readings and scientific papers. Content:
The course brand management starts with the development of the corporate objectives as the heart of the brand planning process followed by definitions of brand. Setting up on the psychological and social bases of consumer behavior, aspects of an integrated marketing communication are discussed. The students should acquire the particular value of branding strategies. The concept of brand personality is considered in two perspectives, from a practical point of view and the challenging position of the theoretical construct. Methods for the measurement of a consumer-based brand equity are compared with the financial valuation of the brand. The information provided by this equity measurements are related to the equity drivers in brand management. The marketers perspective will be accomplish with the analysis of several case studies. Within the limits of a knowledge based system for advertising evaluation many of the issues accomplished in the course are summarized. At the same time it is discussed as a tool to use marketing knowledge systematically.

Media
Slides, Powerpoint presentations, Website with Online Course Readings

Basic literature

- Aaker, J. L.: Dimensions of Brand Personality. In: Journal of Marketing Research 34, 1997, 347-356.
- BBDO-Düsseldorf (Hrsg.): Brand Equity Excellence. 2002.
- Bruhn, M. und GEM: Was ist eine Marke? Gräfelfing: Albrecht (voraussichtlich 2003).
- Esch, F.-R.: Strategie und Technik der Markenführung. München: Vahlen 2003.
- Keller, K. L.: Kundenorientierte Messung des Markenwerts. In: Esch, F.-R. (Hrsg.): Moderne Markenführung. 3. Aufl. 2001.
- Kotler, P.; V. Wong; J. Saunders und G. Armstrong: Principles of Marketing (European Edition). Harlow: Pearson 2005.
- Krishnan, H. S.: Characteristics of memory associations: A consumer-based brand equity perspective. In: Internat. Journal of Research in Marketing 13, 1996, 389-405.
- Meffert, H.; C. Burmann und M. Koers (Hrsg.): Markenmanagement. Grundfragen der identitätsorientierten Markenführung. Wiesbaden: Gabler 2002.
- Neibecker, B.: Tachometer-ESWA: Ein werbewissenschaftliches Expertensystem in der Beratungspraxis. In: Computer Based Marketing, H. Hippner, M. Meyer und K. D. Wilde (Hrsg.), Vieweg: 1998, 149-157.
- Riesenbeck, H. und J. Perrey: Mega-Macht Marke. McKinsey&Company, Frankfurt/Wien: Redline 2004.
- Solomon, M., G. Bamossy, S. Askegaard und M. K. Hogg: Consumer Behavior, 3rd ed., Harlow: Pearson 2006.

Course: Market Microstructure — Course key: [25240]

Lecturers: Torsten Lüdecke
Credit points (CP): 3 **Hours per week:** 2/0
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 43)

Learning Control / Examinations
Assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Knowledge of the content of the course *Asset Pricing* [26555] is assumed.

Conditions
None.

Learning Outcomes
This lecture makes students familiar with the fundamental models of trading in financial markets. It starts with generic design features of financial markets which are used to frame price discovery as the key element of the trading process. The link between market design and market quality is pointed out by using alternative measures of market quality. Seminal models of market microstructure are used to show how dealer inventoy and/or asymmetric information affect market prices and the pricing of securities. Theoretical models are shown to provide predictions which are consistent with empiricial evidence.

Content
The focus of this lecture is on the question how the microstructure of financial markets affects price discovery and market quality. First, issues in designing market structure are presented and linked to fundamental dimensions of market quality, i.e liquidity and trading costs. In particular, the services and privileges of market makers are stressed. The main part of the lecture covers inventory-models of dealer markets and models of information-based trading. The final part gives attention to some econometric models to analyze the short-term behavior of security prices.

Media
Slides.

Basic literature
keine

Complementary literature
See reading list.

Course: Statistics and Econometrics in Business and Economics Course key: [25325]

Lecturers: Wolf-Dieter Heller
Credit points (CP): 5 **Hours per week:** 2/2
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Applied Finance [IW3WWFIN0] (S. 44)

Learning Control / Examinations
The assessment consists of a written exam (30 min) according to Section 4(2),1 of the examination regulation and by a oral exam (20 min) according to Section 4 (2), 2 o the examination regulation.
The assessment takes place at the beginning of the recess period of the winter semester (or on appointment). Re-examinations are offered at yery ordinary examination date.

Prerequisites
Basic knowledge in statistics is required.

Conditions
None

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

Basic 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

Complementary literature
See reading list

Course: Economics of Uncertainty — Course key: [25365]

Lecturers: Karl-Martin Ehrhart
Credit points (CP): 6 **Hours per week:** 2/2
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Decision Theory [IW3WWDEC0] (S. 38), Applied Finance [IW3WWFIN0] (S. 44), Financial Economics [IW3WWFIN1] (S. 46)

Learning Control / Examinations
Written exam, possible further requirements.

Prerequisites
See corresponding module information.

Conditions
Knowledge in mathematics and statistics is required.

Learning Outcomes
The student will be made familiar with the basics in modern decision making 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
In the first part of the course we deal with problems of decision making under uncertainty and introduce models like expected utility theory, stochastic dominance, risk aversion, and prospect theory. We also consider the empirical validity of the different approaches.
In the second part the concepts learned in the first part are applied for example to search models and Bayesian games.

Media
overhead slides, possibly additional printed material.

Basic literature
- Hirshleifer und Riley (1997): The Analytics of Uncertainty and Information. London: Cambridge University Press, 4. Aufl.
- Berninghaus, S.K., K.-M. Ehrhart und W. Güth (2006): Strategische Spiele. Berlin u.a.: Springer, 2., überarbeitete und erweiterte Aufl. (oder erste Auflage, 2002)

Complementary literature
- Lippman/McCall, Economics of Uncertainty, in: Handbook of Mathematical Economics I, 1986
- DeGroot, Optimal Statistical Decisions, Kap. 1 und 2, 1970

Course: Game Theory II — Course key: [25369]

Lecturers: Siegfried Berninghaus
Credit points (CP): 6 **Hours per week:** 2/2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Decision Theory [IW3WWDEC0] (S. 38)

Learning Control / Examinations
Written exam (80 minutes).

Prerequisites
See corresponding module information.
Basic knowledge of mathematics and statistics is assumed.

Conditions
None.

Learning Outcomes
This course teaches advanced knowledge in strategic decision theory. Latest developments in game theory are discussed. The student learns to judge complex strategic problems and to offer adequate solutions.

Content
This lecture aims at apmplifying the students' knowledge in game theory. Main topics are further concepts of non-cooperative game theory, cooperative game theory, evolutionary game theory and bargaining theory.

Media
Folien, Übungsblätter.

Basic literature
- Berninghaus/Ehrhart/Güth, Strategische Spiele, 2. Auflage, Springer Verlag, 2006
- van Damme, Stability and Perfection of Nash Equilibria, 2. Auflage, Springer Verlag, 1991

Complementary literature
- Aumann/Hart (edts.), Handbook of Game Theory I-III, Elsevier Publishers, North Holland, 1992/1994/2002

Course: Experimental Economics — Course key: [25373]

Lecturers: Siegfried Berninghaus, Kroll
Credit points (CP): 5 **Hours per week:** 2/2
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Decision Theory [IW3WWDEC0] (S. 38)

Learning Control / Examinations
The assessment consists of an 80 min written exam. The lecturer may offer the opportunity to reach up to 10 points by writing a seminar thesis and a presentation to an individually announced topic.

Prerequisites
See corresponding module information.

Conditions
None.

Learning Outcomes
The students should learn

- how to gain scientific experience and knowledge (philosophy of science),
- how Game Theory and Experimental Economics influenced each other in scientific research,
- about the methods as well as the strengths and weaknesses of Experimental Economics,
- some examples of experimental research, such as markets and market equilibria, coordination games, bargaining, decision making under risk,
- how to evaluate data.

Content
Experimental Economics have become a separate field in Economics. Nearly all fields of the economic discipline use economic experiments to verify theoretical results. Besides being used for empricial validation, this method is applied in political and strategic consulting. The lecture gives an introducation to experimental methods in economics and shows differences to experiments in natural sciences. Scientific studies are used to show exemplary applications.

Media
Classroom experiments or experiments in the computer laboratory will be conducted. To some extent, slides are made available online.

Complementary literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2nd ed., 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

Course: Facility Location and Strategic Supply Chain Management Course key: [25486]

Lecturers: Stefan Nickel
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Supply Chain Management [IW3WWEBM1] (S. 41)

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.

Prerequisites
Basic knowledge as conveyed in the module *Introduction to Operations Research* [IW1WWOR] is assumed.

Conditions
None.

Learning Outcomes
The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models).The exercises accompanying the lecture offer the possibility to apply the considered models to practical problems.

Content
Since the classical work “Theory of the Location of Industries” of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.
Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

Complementary 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 offered in every summer term.
The planned lectures and courses for the next three years are announced online.

Course: Tactical and Operational Supply Chain Management Course key: [25488]

Lecturers: Stefan Nickel
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Supply Chain Management [IW3WWEBM1] (S. 41)

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.

Prerequisites
Successful completion of the module *Introduction to Operations Research* [IW1WWOR].

Conditions
None.

Learning Outcomes
The main goal of the lecture is the presentation of fundamental techniques from procurement and distribution logistics. A further aspect is set on methods from inventory management and lot sizing. Students acquire the ability to efficiently utilize quantitative models from transportation planning (long-distance and distribution planning), inventory management and lot sizing in production. The introduced methods will be discussed in more detail and illustrated with case-studies in the accompanying exercises

Content
The planning of material transport is an essential element of Supply Chain Management. By linking transport connections across different facilities, the material source (production plant) is connected with the material sink (customer).
The general supply task can be formulated as follows (cf. Gudehus): For given material flows or shipments, choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints. The main goal of the inventory management is the optimal determination of order quantities in terms of minimization of fixed and variable costs subject to resource constraints, supply availability and service level requirements. Similarly, the problem of lot sizing in production considers the determination of the optimal amount of products to be produced in a time slot.
The course includes an introduction to basic terms and definitions of Supply Chain Management and a presentation of fundamental quantitative planning models for distribution, vehicle routing, inventory management and lot sizing. Furthermore, case studies from practice will be discussed in detail.

Complementary 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 offered in every winter term.
The planned lectures and courses for the next three years are announced online.

Course: Game Theory I — Course key: [25525]

Lecturers: Siegfried Berninghaus
Credit points (CP): 6 **Hours per week:** 2/2
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Decision Theory [IW3WWDEC0] (S. 38), Strategy and Managerial Economics [IW3WWORG0] (S. 49), Strategy and Interaction [IW3WWORG1] (S. 50)

Learning Control / Examinations
The assessment consists of a written exam (80 minutes) according to Section 4(2),1 of the examination regulation.
The exam takes place in the recess period and can be resited at every ordinary examination date.

Prerequisites
Basic knowledge of mathematics and statistics is assumed.
See corresponding module information.

Conditions
None.

Learning Outcomes
This course conveys established knowledge in theory of strategic decision making. The students shall be able to analyze strategic problems systematically and to give advice for behavior in concrete economic situations.

Content
Main topic is non-cooperative game theory. Models, solution concepts and applications are discussed for simultaneous as well as sequential games. Different equilibrium concepts are introduced and a short introduction to cooperative game theory is given.

Media
Folien, Übungsblätter.

Basic literature
Gibbons, A primer in Game Theory, Harvester-Wheatsheaf, 1992
Holler/Illing, Eine Einführung in die Spieltheorie, 5. Auflage, Springer Verlag, 2003
Gardner, Games for Business and Economics, 2. Auflage, Wiley, 2003
Berninghaus/Ehrhart/Güth, Strategische Spiele, 2. Auflage, Springer Verlag 2006

Complementary literature
- Binmore, Fun and Games, DC Heath, Lexington, MA, 1991

Course: Simulation I — Course key: [25662]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 5 **Hours per week:** 2/1/2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Decision Theory [IW3WWDEC0] (S. 38), Applied Finance [IW3WWFIN0] (S. 44), Quantitative Finance [IW3WWFIN2] (S. 47)

Learning Control / Examinations
The assessment consists of an 1h written exam according to Section 4 (2), 1 of the Prüfungsordnung für Informationswirtschaft. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3.

Prerequisites
Foundations in the following fields are required:

- Operations Research, as lectured in *Introduction to Operations Research I* [25040] and *Introduction to Operations Research II* [25043].
- Statistics, as lectured in *Statistics I* [25008/25009] and *Statistics II* [25020/25021].

Conditions
None.

Learning Outcomes
The lecture provides insights into the typical process in planning and conducting simulation studies.

Content
As the world is getting more complex it is often not possible to analytically provide key figures of interest without overly simplifying the problem. Thus efficient simulation techniques become more and more important. In the lecture important basic concepts are presented in terms of selected case studies.
Topics overview: Discrete event simulation, generation of random numbers, generating discrete and continous random variables, statistical analysis of simulated data.

Media
Blackboard, Slides, Flash Animations, Simulation Software

Basic literature

- Lecture Notes
- K.-H. Waldmann / U. M. Stocker: Stochastische Modelle - Eine anwendungsorientierte Einführung; Springer (2004).

Complementary literature

- A. M. Law / W. D. Kelton: Simulation Modeling and Analysis (3rd ed); McGraw Hill (2000)

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Efficient Algorithms — Course key: [25700]

Lecturers: Hartmut Schmeck
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29)

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.

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

Conditions
None.

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

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

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

Basic 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)

Complementary literature
will be announced in class

Course: Algorithms for Internet Applications — Course key: [25702]

Lecturers: Hartmut Schmeck
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Information Services in Networks [IW3INIDL0] (S. 31)

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) (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).

Prerequisites
None.

Conditions
None.

Learning Outcomes
The students will learn to master methods and concepts of essential algorithms within Internet applications and to develop capabilities for innovative improvements. The course aims at teaching advanced concepts for the design and application of algorithms with respect to the requirements in networked systems. Based on a fundamental understanding of taught concepts and methods the students should be able to select appropriate concepts and methods for problem settings in their future professional life, and - if necessary - customize and apply them in an adequate way. The students will be capable to find appropriate arguments for their chosen approach to a problem setting.
In particular, the student will - know the structure and elementary protocols of the Internet (TCP/IP) and standard routing algorithms (distance vector and link state routing), - know methods of information retrieval in the WWW, algorithms for searching information and be able to assess the performance of search engines, - know how to design and use cryptographic methods and protocols to guarantee and check confidentiality, data integrity and authenticity, - know algorithmic basics of electronic payment systems and of electronic money, - the architectures and methodologies of firewalls.

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

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

Basic 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.

Complementary literature
- Further references will be given in the course.

Course: Workflow-Management Course key: [25726]

Lecturers: Andreas Oberweis
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32)

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.

Prerequisites
Knowledge of course *Applied Informatics I - Modelling* [25070] is expected.

Conditions
None.

Learning Outcomes
Students are familiar with the concepts and principles of workflow management concepts and systems and their applications. Based on theoretical foundations they can model business process models. Furthermore they have an overview of further problems of workflow management systems in commercial use.

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.

Basic literature
- M. Dumas, W. van der Aalst, A. H. ter Hofstede (Hrsg.): Process Aware Information Systems. Wiley-Interscience, 2005
- J.F. Chang: Business Process Management. Auerbach Publications, 2006

Complementary literature
- W. van der Aalst, H. van Kees: Workflow Management: Models, Methods and Systems, Cambridge 2002: The MIT Press
- G. Vossen, J. Becker (Hrsg.): Geschäftsprozessmodellierung und Workflow-Management. Modelle, Methoden, Werkzeuge; Int. Thomson Pub. Company, 1996.
- A. Oberweis: Modellierung und Ausführung von Workflows mit Petri-Netzen. Teubner-Reihe Wirtschaftsinformatik, B.G. Teubner Verlag, 1996.
- G. Alonso, F. Casati, H. Kuno, V. Machiraju: Web Services, 2004, Springer Verlag, Heidelberg 1997
- S. Jablonski, C. Bussler: Workflow-Management, Modeling Concepts, Architecture and Implementation, Int. Thomson Computing Press, 1996.

Course: Software Technology: Quality Management — Course key: [25730]

Lecturers: Andreas Oberweis
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32)

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.

Prerequisites
Programming knowledge in Java and basic knowledge of computer science are expected.

Conditions
None.

Learning Outcomes
Students are familiar with basic concepts and principles of software quality and software quality management. They know key measures and models for certification of quality in software development. They are aware of different test methods and evaluation methods. Furthermore, they are able to asses quality management aspects in different standard process models.

Content
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

Media
Slides, access to internet resources.

Basic literature
- Helmut Balzert: Lehrbuch der Software-Technik. Spektrum-Verlag 1998
- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002

Complementary literature
Further literature is given in lectures.

Course: Business Process Modelling — Course key: [25736]

Lecturers: Andreas Oberweis, Marco Mevius
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32)

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.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students know goals of business process modelling and master different modelling languages. They are able to choose the appropriate modelling language according to a given context and to use the modelling language with suitable modelling tools. They master methods for analysing and assessing process modells and methods for analysing them according to specific quality characteristics.

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.

Basic literature
Literature will be given in the lecture.

Course: Knowledge Management — Course key: [25740]

Lecturers: Rudi Studer
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32), Information and Knowledge Systems [IW3INISW0] (S. 34)

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.

Prerequisites
Basics in logic, e.g. from lecture Foundations of Informatics 1.

Conditions
None.

Learning Outcomes
Making students sensitive to the problems of corporate knowledge management, knowledge about the central dimensions of influence as well as of relevant technologies for supporting knowledge management.

Content
In modern corporations, knowledge is an increasingly important aspect for fullfilling central tasls (amelioration of business processes, increasing innovation, increasing customer satisfaction, strategic planning and the like). Therfore, knowledge management has become a determining factor of siccess.
The lecture covers the 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 further emphasize the following computer science techniques for knowledge management:

- Communities of Practice, Collaboration Tools, Skill Management
- ontology-based knowledge management
- Business Process oriented Knowledge Management
- Personal Knowledge Management
- Case Based Reasoning (CBR)

Media
Slides and scientific publications as reading material.

Basic 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 3-540-40834-7, Springer Verlag, 2004.
- 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

Complementary 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. Handschuh, Staab. Annotation for the Semantic Web. 2003 (ISBN 158603345X).
5. J. Sowa. Knowledge Representation. Brooks/Cole 1999
6. Tim Berners-Lee. Weaving the Web. Harper 1999 geb. 2000 Taschenbuch.

Course: Semantic Web Technologies I — Course key: [25748]

Lecturers: Rudi Studer, Sebastian Rudolph
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information Services in Networks [IW3INIDL0] (S. 31), Business Process Engineering [IW3INGP0] (S. 32)

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.

Prerequisites
Lectures on Informatics of the Bachelor on Information Management (Semester 1-4) or equivalent.

Conditions
None.

Learning Outcomes
- Basic knowledge about the main ideas and the realisation of Semantic Web Technologies

Content
”Semantic Web” denotes an extension of the World Wide Web by meta data and applications in order to make the meaning (semantics) of data on the web usable by intelligent systems, e.g. in e-commerce and internet portals. Central to this is the representation and processing of knowledge in form of ontologies. This lecture provides the foundations for knowledge representation and processing for the corresponding technologies and presents example applications. It covers the following topics:
- Extensible Markup Language (XML)
- Resource Description Framework (RDF) and RDF Schema
- Web Ontology Language (OWL)
- Rule Languages
- Applications

Media
Slides.

Basic literature
- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer 2003.

Complementary literature
1. Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, Foundations of Semantic Web Technologies. Textbooks in Computing, Chapman and Hall/CRC Press, 2009.
2. G. Antoniou, Grigoris Antoniou, Frank Van Harmelen, A Semantic Web Primer, MIT Press, 2004
3. Uwe Schöning. Logik für Informatiker. Spektrum Akademischer Verlag, 5. Auflage 2000
4. Steffen Hölldobler. Logik und Logikprogrammierung. Synchron Verlag, 3. Auflage 2003
5. Dieter Fensel. Spinning the Semantic Web. 2003 (ISBN 0262062321).
6. Handschuh, Staab. Annotation for the Semantic Web. 2003 (ISBN 158603345X).
7. J. Sowa. Knowledge Representation. Brooks/Cole 1999
8. Tim Berners-Lee. Weaving the Web. Harper 1999 geb. 2000 Taschenbuch.

Course: Intelligent Systems in Finance — Course key: [25762]

Lecturers: Detlef Seese
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information and Knowledge Systems [IW3INISW0] (S. 34), eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 43)

Learning Control / Examinations
The assessment is a written examination.
See the German part for special requirements to be admitted for the examination.

Prerequisites
None.

Conditions
None.

Learning Outcomes
- The students acquire abilities and knowledge of methods and systems from the area of machine learning and learn how to use them in the area of finance, which is the core area of application of this lecture.
- It is taught the ability to choose and change these methods and systems adequate to the situation and to use them for problem solving in the area of finance.
- The students get the ability to find strategic and creative answers in their search for solutions for precisely defined, concrete and abstract problems.
- At the same time the lecture aims to give foundational knowledge and methods in the context of their application in practise. On the basis of the basic understanding of concepts and methods of informatics the students should be able to comprehend quickly the new developments in the area and to use them correctly.

Content
A new generation of computing methods, commonly known as “intelligent systems”, has recently been successfully applied to a variety of business and financial modelling tasks. In many application fields these novel methods outperform traditional statistical techniques. The lecture provides a comprehensive coverage of the area, including foundations and applications. In particular it deals with intelligent software agents, genetic algorithms, neural networks, support vector machines, fuzzy-logic, expert systems and intelligent hybrid systems. The presented applications focus on the finance area and are related to risk management (credit risk, operational risk), financial trading, portfolio management and economic modelling. The lecture is given in cooperation with the company msgGILLARDON. The lecture starts with an introduction of the central problems of application in this area, e.g. decision support for investors, Portfolioselection under constraints, information retrieval from business reports, automatic development of trading rules for the capital market, modelling of time series at the capital market, explanation of phenomena at capital markets by simulation, decision support in risk management (credit risk, operational risk). After this the basics of intelligent systems are discussed. Basic ideas and essential results for different stochastic heuristics for local search are discussed next, especially Hill Climbing, Simulated Annealing, Threshold Accepting and Tabu Search. After this different population-based approaches of evolutionary methods are presented, e.g. Genetic Algorithms, Evolutionary Strategies and Programming, Genetic Programming, Memetic Algorithms and Ant-Algorithms. It follows an introduction into Neural Networks, Support Vector Machines and Fuzzylogic. Softwareagents and agentbased stock market models are the next topic. The lecture ends with an overview on the complexity of algorithmic problems in the area of finance, giving in this way one of the key reasons for the necessity to use heuristics and intelligent systems. Essential examples and basic applications are choosen from the area of finance.

Media
Slides.

Basic literature
There is no text book covering completely the content of the lecture.

- Z. Michalewicz, D. B. Fogel. How to Solve It: Modern Heuristics. Springer 2000.
- J. Hromkovic. Algorithms for Hard Problems. Springer-Verlag, Berlin 2001.
- P. Winker. Optimization Heuristics in Econometrics. John Wiley & Sons, Chichester 2001.
- A. Brabazon, M. O´Neill. Biologically Inspired Algorithms for Financial Modelling. Springer, 2006.
- A. Zell. Simulation Neuronaler Netze. Addison-Wesley 1994.
- R. Rojas. Theorie Neuronaler Netze. Springer 1993.
- N. Cristianini, J. Shawe-Taylor. An Introduction to Support Vector Machines and other kernal-based learning methods. Cambridge University Press 2003.
- G. Klir, B. Yuan. Fuzzy Sets and Fuzzy Logic: Theory and Applications. Prentice-Hall, 1995.
- F. Schlottmann, D. Seese. Modern Heuristics for Fiance Problems: A Survey of Selected Methods and Applications. In S. T. Rachev (Ed.) Handbook of Computational and Numerical Mrthods in Finance, Birkhäuser, Boston 2004, pp. 331 - 359.

Further references will be given in each lecture.

Complementary literature

- S. Goonatilake, Ph. Treleaven (Eds.). Intelligent Systems for Finance and Business. John Wiley & Sons, Chichester 1995.
- F. Schlottmann, D. Seese. Financial applications of multi-objective evolutionary algorithms, recent developments and future directions. Chapter 26 of C. A. Coello Coello, G. B.Lamont (Eds.) Applications of Multi-Objective Evolutionary Algorithms, World Scientific, New Jersey 2004, pp. 627 - 652.
- D. Seese, F. Schlottmann. Large grids and local information flow as reasons for high complexity. In: G. Frizelle, H. Richards (eds.), Tackling industrial complexity: the ideas that make a difference, Proceedings of the 2002 conference of the Manufacturing Complexity Network, University of Cambridge, Institute of Manufacturing, 2002, pp. 193-207. (ISBN 1-902546-24-5).
- R. Almeida Ribeiro, H.-J. Zimmermann, R. R. Yager, J. Kacprzyk (Eds.). Soft Computing in Financial Engineering. Physica-Verlag, 1999.
- S. Russel, P. Norvig. Künstliche Intelligenz Ein moderner Ansatz. 2. Auflage, Pearson Studium, München 2004.
- M. A. Arbib (Ed.). The Handbook of Brain Theory and neural Networks (second edition). The MIT Press 2004.
- J.E. Gentle, W. Härdle, Y. Mori (Eds.). Handbook of Computational Statistics. Springer 2004.
- F. Schweitzer. Brownian Agents and Active Particles. Collective Dynamics in the Natural and Social Sciences, Springer 2003.
- D. Seese, C. Weinhardt, F. Schlottmann (Eds.) Handbook on Information Technology in Finance, Springer 2008.
- Further references will be given in the lecture.

Remarks

The content of the lecture will permanently be adapted to actual developments. This can be the cause to changes of the described contend and schedule.

Course: Enterprise Architecture Management — Course key: [25786]

Lecturers: Thomas Wolf
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32)

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Prerequisites
None.

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.

Basic 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: Capability maturity models for software and systems engineering Course key: [25790]

Lecturers: Ralf Kneuper
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32)

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

Prerequisites
None.

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.

Basic literature
Literature is given in each lecture individually.

Course: Management and Strategy — Course key: [25900]

Lecturers: Hagen Lindstädt
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Strategy and Managerial Economics [IW3WWORG0] (S. 49), Strategy and Interaction [IW3WWORG1] (S. 50)

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.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The participants learn about central concepts of strategic management along the ideal-typical strategy process: internal and external strategic analysis, concept and sources of competitive advantages, their importance when establishing competitive and corporate strategies as well as strategy assessment and implementation. This aims in particular to provide a summary of the basic concepts and models of strategic management, i.e. to provide in particular an action-oriented integration.

Content
- Corporate management principles
- Strategic management principles
- Strategic analysis
- Competitive strategy: modelling and selection on a divisional level
- Strategies for oligopolies and networks: anticipation of dependencies
- Corporate strategy: modelling and evaluation on a corporate level
- Strategy implementation

Media
Slides.

Basic literature
- Grant, R.M.: *Contemporary Strategy Analysis.* Blackwell, 5. Aufl. Massachusetts 2005.
- Lindstädt, H.; Hauser, R.: *Strategische Wirkungsbereiche von Unternehmen.* Gabler, Wiesbaden 2004.

The relevant excerpts and additional sources are made known during the course.

Course: Special Topics in Management: Management and IT — Course key: [25907]

Lecturers: Hagen Lindstädt
Credit points (CP): 2 **Hours per week:** 1/0
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Strategy and Managerial Economics [IW3WWORG0] (S. 49)

Learning Control / Examinations
The assessment consists of a written exam (30 min) at the beginning of the recess period (according to Section 4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-eaminations are offered at every ordinary examination date.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The course discusses management questions and concepts that are clearly motivating from a current and practical perspective. Here the integration of IT and process issues into corporate management from the management's perspective is one of the subjects of particular interest. The event takes place in close cooperation with leading, practical managers.

Content
(Excerpt):

- A summary of current management concepts and questions.

Media
Slides.

Basic literature
The relevant excerpts and additional sources are made known during the course.

Course: Modeling Strategic Decision Making — Course key: [25908]

Lecturers: Hagen Lindstädt
Credit points (CP): 6 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Strategy and Managerial Economics [IW3WWORG0] (S. 49), Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] (S. 51)

Learning Control / Examinations
Written exam 100% following §4, Abs. 2.

Prerequisites
None.

Conditions
Following § 17, 3 of „Prüfungsordnung Informationswirtschaft“ a seminar of this module has to be chosen and completed.

Learning Outcomes
Starting from the basic model of economic decision theory, fundamental decision principles and calculi for multi-attribute decisions in certain and uncertain conditions up to subjective expected utility theory and the economic assessment of information are described. To confront numerous infringements by decision-makers against principles and axioms of this calculus, in addition non-expected utility calculi and advanced models for decisions by economic agents are discussed; these are especially important for management decisions.
Within the chapter concerning leadership frameworks the students are given the possibility to individually analyze their management style on the basis of classical concepts of leadership. These concepts will be presented and discussed in detail.

Content
- Principles of strategic management decisions
- Leadership: Classical leadership concepts
- Basic economic decision models
- Limits of the basic models and advanced concepts
- Advanced models: individual decisions with uncertainty and vague information

Media
Slides.

Basic literature

- Eisenführ, F.; Weber, M.: *Rationales Entscheiden*. Springer, 4. Aufl. Berlin 2003.[1]
- Laux, H.: Entscheidungstheorie. Springer, 6. Aufl. Berlin 2003.[2]
- Lindstädt, H: *Entscheidungskalküle jenseits des subjektiven Erwartungsnutzens*. In: Zeitschrift für betriebswirtschaftliche Forschung 56 (September 2004), S. 495 - 519.
- Scholz, C.: *Personalmanagement*. Vahlen, 5. Aufl. München 2000, Kap. 9.4, S.923 - 948

Course: Fundamentals of Production Management — Course key: [25950]

Lecturers: Frank Schultmann
Credit points (CP): 5.5 **Hours per week:** 2/2
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
See module description.

Prerequisites
None.

Conditions
This course is compulsory in module “Industrial Production” [IW3WWPRO0].

Learning Outcomes

- Students shall describe the tasks of strategic corporate planning.
- Students shall 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.
Medien und Pflichtliteratur: können aus der alten Fassung übernommen werden.

Media
Media will be provided on learning platform.

Basic literature
will be announced in the course

Course: Planning and Management of Industrial Plants — Course key: [25952]

Lecturers: Frank Schultmann
Credit points (CP): 5.5 **Hours per week:** 2/2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
See module description.

Prerequisites
None.

Conditions
This course is compulsory in module “Industrial Production” [IW3WWPRO0].

Learning Outcomes

- Students shall be able to describe the tasks of plant management.
- Students shall be proficient in using selected methods of investment and cost estimates.
- Students shall be able to consider necessary processing and logistical requirements of designing industrial plants.
- Students shall be able to discuss interdependencies between capacity planning, process design and plant optimization.
- Students shall be proficient in discussing and applying selected methods of quality management, plant maintenance and plant dismantling.

Content
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.
During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

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

Basic literature
will be announced in the course

Course: Production and Logistics Management — Course key: [25954]

Lecturers: Magnus Fröhling, Frank Schultmann
Credit points (CP): 5.5 **Hours per week:** 2/2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
See module description.

Prerequisites
None.

Conditions
This course is compulsory in module “Industrial Production” [IW3WWPRO0].

Learning Outcomes

- Students shall be able to discuss the basic tasks of an operative production and logistics management.
- Students shall be able to discuss approaches to solve these tasks and shall be able to apply certain ones.
- Students shall consider the interdependencies between the tasks and methods to solve.
- Students shall discuss possible IT supporting tools.
- Students shall be able to describe emerging trends in production and logistics management.

Content
This course covers central tasks and challenges of an operative production and logistics management. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Methods to solve these tasks will be explored with respect to manufacturing program planning, material and time. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in PPS. Finally, commercially available PPS-, ERP- and Advanced Planning Systems will be presented and discussed.

Media
Media will be provided on the e-learning plattform.

Basic literature
will be announced in the course

Remarks
The tutorial to „Production and Logistics Management“ [25954] will be offered in summer 2010. For interim regulations, please contact the institute

Course: Material and Energy Flows in the Economy — Course key: [25960]

Lecturers: Michael Hiete
Credit points (CP): 3.5 **Hours per week:** 2/0
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
See module description.

Prerequisites
Successful passing of 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.

Conditions
None.

Learning Outcomes
Students shall be aware of issues concerning the material and energy flow in an economy and shall apply strategies to solve these issues.

Content
Internal and external management of material flows 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.
These topics will be analysed with tools such as eco-balancing and environmental-controlling accompanied by special IT-tools. Further approaches, decision supporting models and OR-algorithms are being introduced in case studies.

Basic literature
will be announced in the course

Remarks
This lecture will be called “Stoffstromorientierte Produktionswirtschaft” from Winter 2010/2011 onwards.

Course: Emissions into the Environment — Course key: [25962]

Lecturers: Ute Karl
Credit points (CP): 3.5 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
See module description.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student shall identify problems of industrial pollution control.
The student knows solutions to these problems and their ways of application.

Content
The course will provide an overview of sources of air pollution, waste and municipal waste; methods to monitor and to reduce/manage pollutant flows; regulatory framework on national and international level.
A Air pollution control

- Indtroduction and definitions
- Sources an dpoluutants
- Regulatory framework
- Emission monitoring
- Air pollution control measures

B Waste management and Recycling

- Introduction and regulatory framework
- Statistics and logistics
- Recycling and disposal
- Waste treatment

C Waste water treatment

- Municipal waste water treatment systems
- Sewage sludge disposal

Media
Media will be provided on learning platform.

Complementary literature
A compilation of documents is made available on the web.

Course: The Management of R&D Projects with Case Studies Course key: [25963]

Lecturers: Helwig Schmied
Credit points (CP): 3.5 **Hours per week:** 2/2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
See module description.

Prerequisites
None.

Conditions
None

Learning Outcomes

- Students shall be able to discuss different tasks of R&D-management.
- Students shall be able to apply common approaches to solve these general problems.

Content

- The communication between R&D, production and marketing
- Problems concerning measuring the productivity of the R&D system
- Methods for improving the productivity of R&D systems
- Planning of R&D projects with the help of the Communication-Matrix-Methods for controlling R&D projects´ progress
- The marketing of scientific skills
- The communication matrix as a tool for the implementation of simultaneous engineering

Case studies.

Basic literature
will be announced in the course

Course: Computer-based Production Planning and Control, Process Simulation and Supply Chain Management Course key: [25975]

Lecturers: Magnus Fröhling, Frank Schultmann
Credit points (CP): 2 **Hours per week:** 2/0
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
See module description.

Prerequisites
None.

Conditions
None.

Learning Outcomes

- Students shall be able to discuss problems arising out of IT-based PPS, process simulations and Supply Chain Management.
- Students shall be able to apply general approaches to solve the addressed problems.

Content
Following an introduction into the structure, the history and still existing shortcomings of systems for planning and control of production, this lecture introduces different approaches for computer-assisted planning. The approaches are subdivided into methodologies for the simulation of processes on the one hand and optimising and descriptive planning models on the other hand. Finally, commercially available, industry-specific software tools are presented and discussed, which focus on production planning (PP) and materials management (MM) in the mySAP ERP system.
Furthermore, process engineering software tools are presented and discussed in the light of integration into production planning as well as tools to simulate material flows and supply chains (with respect to Advanced Planning Systems).

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

Basic literature
will be announced in the course

Course: Material Flow Analysis and Life Cycle Assessment Course key: [25995]

Lecturers: Liselotte Schebek
Credit points (CP): 3.5 **Hours per week:** 2/0
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
See module description.

Prerequisites
None.

Conditions
None.

Learning Outcomes

- Students shall be aware of the important role of material flow systems for the economy and ecology.
- Students shall be proficient in understanding the basics and methodology of analytical tools for material flow analysis and Life Cycle Assessment.
- Students shall be able to apply Life Cycle Assessment in case studies.

Content
Materials – in the sense of raw materials taken from nature – represent the physical basis of the economy and the human society in general. At the same time, global environmental problems, e. g., the greenhouse effect, as well as economic problems, e.g., the availability and the price development of raw materials, are directly linked to the increasing use of specific materials like fossil carbon resources or metals. Hence, for the development of solution strategies, the understanding of material flow systems of the techno-sphere, i. e. the environment made by humans, is essential. The lecture is an introduction into basic system theory and modelling techniques of material flow analysis. On this basis, the methodology of the Life Cycle Assessment (LCA) is then presented, which comprises material flows and their environmental effects throughout the entire life cycle of production, use and disposal of products. For decision-makers in economy and policy, LCA serves as an instrument of analysis in order to compare the different possibilities of the design of products, technologies and services. In this lecture, the structure and particular modules of the Life Cycle Assessment are presented in detail. Furthermore, the applications of the Life Cycle Assessment in the context of decision support are explained, in particular within the context of development of innovative technologies. Recent developments of the Life Cycle Costing and the Social LCA will also be considered.

Media
Media will be provided on learning platform.

Basic literature
will be annouced in the course

Course: Competition in Networks — Course key: [26240]

Lecturers: Kay Mitusch
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Customer Relationship Management (CRM) [IW3WWCRM0] (S. 35), Analytical CRM [IW3WWCRM1] (S. 36), Operative CRM [IW3WWCRM2] (S. 37), eBusiness Management [IW3WWEBM0] (S. 39)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
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.

Conditions
None.

Learning Outcomes
The lecture provides the students with the basic economic understanding of network industries like telecom, utilities, IT and transport sectors.
Students are prepared for a possible job in the network industries. The student should get a vivid idea of the special characteristics of network industries concerning planning, competition, competitive distortion and state intervention. He should be able to apply abstract concepts and formal methods to use in these fields.

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

Basic literature
Will be announced in the lecture.

Remarks
Beginning in WT 2009/2010, the lecture *Competition in Networks* [26240] will always be held during the winter term.

Course: Managing New Technologies — Course key: [26291]

Lecturers: Thomas Reiß
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Strategy and Managerial Economics [IW3WWORG0] (S. 49), Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] (S. 51)

Learning Control / Examinations
Written exam 100% following §4, Abs. 2.

Prerequisites
None.

Conditions
None.

Learning Outcomes
New technologies can contribute substantially to the international competitiveness of different industrial sectors. This course provides the necessary knowledge for understanding how industrial enterprises and policy-makers are dealing with the challenge to realise in time the potentials of new technologies and to use them most efficiently. Key tasks of the management of new technologies will be practised.

Content
The course provides an overview of the international development of a selected number of key technologies such as biotechnology, nanotechnology, neurotechnologies, converging technologies. Methods for monitoring new technologies including foresight approaches will be presented and the economic and social impacts of new technologies will be discussed.

Media
Slides.

Basic literature
- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle; Gabler Lexikon Technologiemanagement

Course: Management of Business Networks — Course key: [26452]

Lecturers: Christof Weinhardt, Jan Kraemer
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: eBusiness Management [IW3WWEBM0] (S. 39), Supply Chain Management [IW3WWEBM1] (S. 41)

Learning Control / Examinations
The assessment of this course is a written examination (60 min) (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4, Abs. 2, 3 SPO). The total grade for this lecture will consist to 50% of the grade achieved in the written mid term examination, to 10% of the assignments during the exercises, and to 40% of a project work, which includes a term paper and a presentation.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student will become acquainted with the theoretical fundamentals of economic networks and how to manage them. Support of economic networks by information systems will be accomplished by several case studies, which will be worked on by groups autonomously. Basic knowledge of organisation theory, network analysis, strategic & operative management and logic systems will be communicated to the student. Furthermore, he will have a focused view on the mechanisms and supporting tools for interaction between companies, especially in negotiations and negotiation-supporting systems. In small groups, the student is trained in team-oriented and autonomous working techniques. Within this domain, the student will be trained to seek and read relevant technical literature in English, the language of science, and to adopt it to a specific problem.

Content
The significant and lasting impact of web-based business-to-business (B2B) networks has just recently become apparent. The exploratory phase during the first Internet hype bred a variety of approaches which were often bold in business nature, yet simple and unfounded in system architecture. Only very few survived and proved sustainable. Nowadays web-based B2B networks are increasingly reappearing and even promoted by major traditional companies and governments. However, this new wave of networks is more mature and more powerful in functionality than their predecessors. As such they provide not only auction systems but also facilities for electronic negotiation. This implies a shift from price-focused to relationship-oriented trading. But what motivates this shift? Why do firms enter business networks? How can these networks be best supported by IT? The course intends to resolve these questions. Firstly, an introduction in organization theory will be given. Secondly, the problems of networks will be addressed. Thirdly, an analysis of how IT can alleviate those problems will be undertaken.

Media
Powerpoint presentations, recorded lecture available on the internet, (if circumstances allow videoconferencing).

Basic 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: eFinance: Information Engineering and Management for Securities TradingCourse key: [26454]

Lecturers: Christof Weinhardt, Ryan Riordan
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: eBusiness Management [IW3WWEBM0] (S. 39), eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 43)

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

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of the lecture is to make the students familiar with the theoretical as well as the practical aspects of electronic trading and exchanges and the IT systems used in the financial industry. While markets for products and services are discussed, the focus is on the trading of financial securities. Existing centralized equity exchanges face competition from new alternative trading systems make possible by today´s information technology. This course will also examine the impact and implications of this dynamic. The focus is on the economic and technical design of markets as information processing systems.

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

Basic 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

Complementary 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: eServices Course key: [26466]

Lecturers: Christof Weinhardt, Gerhard Satzger
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Englisch
Part of the modules: eBusiness Management [IW3WWEBM0] (S. 39)

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

Prerequisites
None.

Conditions
None.

Learning Outcomes
This course conveys the fundamental knowledge to understand the importance of services in our economy and the impact of information and communication technology (ICT) on existing and emerging service industries. Combining theoretical models with multiple case studies and application scenarios, this course will enable students:
• to understand different service perspectives and apply the general concept of “value co-creation”
• to know and to be able to apply concepts, methods and tools used for the design, engineering and management of eServices
• to be familiar with current research topics
• to gain experience in group work and to improve their presentation skills
• to be exposed to English language in preparation for working in international environments

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

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

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

Media
PowerPoint slides;

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

Course: Practical seminar Information Engineering and Management Course key: [26477]

Lecturers: Christof Weinhardt
Credit points (CP): 1 **Hours per week:** 0*
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: eBusiness Management [IW3WWEBM0] (S. 39), Supply Chain Management [IW3WWEBM1] (S. 41), eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 43)

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

Prerequisites
None.

Conditions
The practical seminar is a supplement to the course seminar Information Engineering and Management [26474] and it can only be chosen in conjunction with the course [26474] in a given semester.

Learning Outcomes
The student should be able to do a literature review based on a predefined topic in the context of information engineering and management. The approach comprises the identification of relevant literature according to the topic and an analysis as well as an evaluation of the methods presented in the literature. The student learns to present his results in a paper and in front of an audience on a academic level. This process gives him the knowledge and practice for further research work like a master thesis or a doctoral thesis

Content
As a supplement to the seminar Information Management and Engineering [26474] the student has to analyse the selected topic from course [26474] by applying practical methods, e.g. implementation of algorithms or creating a market survey

Media
- PowerPoint slides
- eLearning Platform Ilias
- Software Development Tools

Basic literature
The student will receive the necessary literature for his research topic.

Remarks
- Students from Bachelor and Master Course can visit the practical 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 practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen. The current topics of the practical seminars are available at the following homepage: http://www.im.uni-karlsruhe.de/lehre.
- *) The practical seminar is a supplement to the seminar Seminar Information Engineering and Management [26474] and does not require additional semester periods per week.

Course: Management of Business Networks (Introduction) Course key: [26496]

Lecturers: Christof Weinhardt, Jan Kraemer
Credit points (CP): 4 **Hours per week:** ???
Term: Wintersemester **Level:** 3
Teaching language: Englisch
Part of the modules: eBusiness Management [IW3WWEBM0] (S. 39), Supply Chain Management [IW3WWEBM1] (S. 41)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student will become acquainted with the theoretical fundamentals of economic networks and how to manage them. Support of economic networks by information systems will be accomplished by several case studies, which will be worked on by groups autonomously. Basic knowledge of organisation theory, network analysis, strategic & operative management and logic systems will be communicated to the student. Furthermore, he will have a focused view on the mechanisms and supporting tools for interaction between companies, especially in negotiations and negotiation-supporting systems. In small groups, the student is trained in team-oriented and autonomous working techniques. Within this domain, the student will be trained to seek and read relevant technical literature in English, the language of science, and to adopt it to a specific problem.

Content
The significant and lasting impact of web-based business-to-business (B2B) networks has just recently become apparent. The exploratory phase during the first Internet hype bred a variety of approaches which were often bold in business nature, yet simple and unfounded in system architecture. Only very few survived and proved sustainable. Nowadays web-based B2B networks are increasingly reappearing and even promoted by major traditional companies and governments. However, this new wave of networks is more mature and more powerful in functionality than their predecessors. As such they provide not only auction systems but also facilities for electronic negotiation. This implies a shift from price-focused to relationship-oriented trading. But what motivates this shift? Why do firms enter business networks? How can these networks be best supported by IT? The course intends to resolve these questions. Firstly, an introduction in organization theory will be given. Secondly, the problems of networks will be addressed. Thirdly, an analysis of how IT can alleviate those problems will be undertaken.

Media
Powerpoint presentations, recorded lecture available on the internet.

Basic 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. The lecture was first offered in the winter term of 2009/10.

Course: Customer Relationship Management — Course key: [26508]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Customer Relationship Management (CRM) [IW3WWCRM0] (S. 35), Analytical CRM [IW3WWCRM1] (S. 36), Operative CRM [IW3WWCRM2] (S. 37)

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

Grade	Minimum points
1.0	104
1.3	98
1.7	92
2.0	86
2.3	80
2.7	74
3.0	68
3.3	62
3.7	56
4.0	50
4.7	40
5.0	0

Prerequisites
None.

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 concepts 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

Basic literature
Christian Grönroos. Service Management and Marketing : A Customer Relationship Management Approach. Wiley, Chichester, 2nd edition, 2000.

Complementary 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: Operative CRM — Course key: [26520]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Customer Relationship Management (CRM) [IW3WWCRM0] (S. 35), Operative CRM [IW3WWCRM2] (S. 37)

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

Grade	Minimum points
1.0	104
1.3	98
1.7	92
2.0	86
2.3	80
2.7	74
3.0	68
3.3	62
3.7	56
4.0	50
4.7	40
5.0	0

Prerequisites
None.

Conditions
The attendance of courses *Customer Relationship Management* [26508] and *Analyitical CRM* [26522] 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.

Basic 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.

Complementary literature
Alex Berson, Kurt Thearling, and Stephen J. Smith. Building Data Mining Applications for CRM. Mc Graw-Hill, New York, 2000.
Stanley A. Brown. Customer Relationship Management: A Strategic Imperative in theWorld of E-Business. John Wiley, Toronto, 2000.
Dimitris N. Chorafas. Integrating ERP, CRM, Supply Chain Management, and SmartMaterials. Auerbach Publications, Boca Raton, Florida, 2001.
Keith Dawson. Call Center Handbook: The Complete Guide to Starting, Running, and Improving Your Call Center. CMP Books, Gilroy, CA, 4 edition, 2001.
Andreas Eggert and Georg Fassot. eCRM – Electronic Customer Relationship Management: Anbieter von CRM-Software im Vergleich. Schäffer-Poeschel, Stuttgart, 2001.

Seth Godin. Permission Marketing. Kunden wollen wählen können. FinanzBuch Verlag, München, 1999.
Paul Greenberg. CRM at the Speed of Light: Capturing and Keeping Customers in Internet Real Time. Osborne/McGraw-Hill, 3rd ed. edition, Aug 2004.
Philip Kotler. Marketing Management: Millennium Edition. Prentice Hall, Upper Saddle River, 10 edition, 2000.
Don Peppers and Martha Rogers. The One To One Future. Currency Doubleday, New York, 1997.
Duane E. Sharp. Customer Relationship Management Systems Handbook. Auerbach, 2002.
Len Silverston. The Data Model Resource Book: A Library of Universal Data Models for All Entreprises, volume 1. John Wiley & Sons, 2001.
Toby J. Teorey. Database Modeling and Design. Morgan Kaufmann, San Francisco, 3 edition, 1999.
Chris Todman. Designing a Data Warehouse : Supporting Customer Relationship Management.

Course: Analytical CRM — Course key: [26522]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Customer Relationship Management (CRM) [IW3WWCRM0] (S. 35), Analytical CRM [IW3WWCRM1] (S. 36)

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

Grade	Minimum points
1.0	104
1.3	98
1.7	92
2.0	86
2.3	80
2.7	74
3.0	68
3.3	62
3.7	56
4.0	50
4.7	40
5.0	0

Prerequisites
None.

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

Learning Outcomes
The Student should

- understand the principal scientific methods from statistics and informatics used in analytical CRM and their application to enterprise decision problems and be able to independently apply these methods to standard cases,
- understand the components for creating and managing a data warehouse from operative system sources including the processes and steps involved and should be able to apply these methods to a simple example, and
- use his knowledge to conduct a standard CRM analysis on enterprise data for a busines decision problem and deduce and justify 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).

Media
slides

Basic literature
Ponnia, Paulraj. Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals. Wiley, New York, 2001.
Duda, Richard O. und Hart, Peter E. und Stork, David G. Pattern Classification. Wiley-Interscience, New York, 2. Ausgabe, 2001.
Maddala, G. S. Introduction to Econometrics. Wiley, Chichester, 3rd Ed., 2001.
Theil, H. Principles of Econometrics. Wiley, New York, 1971.

Course: Bachelor Seminar in Information Engineering and Management [26524] Course key:

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 2 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Customer Relationship Management (CRM) [IW3WWCRM0] (S. 35), Analytical CRM [IW3WWCRM1] (S. 36), Operative CRM [IW3WWCRM2] (S. 37)

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 of the Prüfungsordnung für Informationswirtschaft 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.

Prerequisites
See corresponding module description. Futhermore, knowledge from CRM is required. Therefore, the lecture *Customer Relationship Management* [26508] (or a similiar one) has to be attended parallel or before the seminar.

Conditions
None.

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.

Basic 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.

Complementary 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: Derivatives — Course key: [26550]

Lecturers: Marliese Uhrig-Homburg
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 43), Applied Finance [IW3WWFIN0] (S. 44), Quantitative Finance [IW3WWFIN2] (S. 47)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft and of possible assignments during the course as an "Erfolgskontrolle anderer Art" following § 4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

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

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

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

Course: Investments — Course key: [26575]

Lecturers: Marliese Uhrig-Homburg
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Applied Finance [IW3WWFIN0] (S. 44), Financial Economics [IW3WWFIN1] (S. 46)

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.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The objective of this course is to become familiar with the basics of investment decisions on stock,bond, and derivatives markets. Forthat 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, followed by an introduction into derivatives markets, especially forwards and futures. The lecture concludes with investments on bond markets.

Complementary literature
Bodie/Kane/Marcus (2001): Essentials of Investments, 4. Aufl., McGraw-Hill Irwin, Boston

Course: Seminar in Financial Engineering — Course key: [26580]

Lecturers: Marliese Uhrig-Homburg
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Applied Finance [IW3WWFIN0] (S. 44)

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 of the Prüfungsordnung für Informationswirtschaft in form of an examination of the written seminar thesis, its presentation, class participation, and possible further tasks.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Learn to work independently with scientific articles and to become familiar with scientific writing. Furthermore, presentation and discussion skills are developed during the seminar class sessions.

Content
Changing current topics complementing the lectures´ contents.

Media
Aktuelle wissenschaftliche Artikel.

Basic literature
wird jeweils zu den einzelnen Seminarthemen angegeben

Complementary literature
Über die beim Seminar angegebene Einstiegsliteratur hinaus ist eigenständige Literaturrecherche erforderlich.

Course: Logistics - Organisation, Design, and Control of Logistic Systems Course key: [2118078]

Lecturers: Kai Furmans
Credit points (CP): 6 **Hours per week:** 3/1
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: eBusiness Management [IW3WWEBM0] (S. 39), Supply Chain Management [IW3WWEBM1] (S. 41)

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.

Prerequisites
Requied are lectures on “Linear Algebra” and “Stochastic”.

Conditions
None.

Learning Outcomes
After successfully finishing this course, the student is able to plan simple material handling and logistic systems and is able to assign the right models to a certain task. He is able to evaluate the performance of the most important elements of material handling and logistic systems.

Content
Introduction

- historical overview
- lines of development

Structure of logistics systems
Distribution logistics

- location planning
- Vehicle Routing Planning
- distribution centers

Inventory management

- demand forecasting
- Inventory management policies
- Bullwhip effect

Production logistics

- layout planning
- material handling
- flow control

Supply Managament

- information flow
- transportation organization
- controlling and development of a logistics system
- co-operation mechanisms
- Lean SCM
- SCOR model

Identification Technologies

Media
Blackboard, LCD projector, in excercises also PCs.

Complementary literature

- Arnold/Isermann/Kuhn/Tempelmeier. Handbuch Logistik, Springer Verlag, 2002 (Neuauflage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren, Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, Oldenbourg Verlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Neumann-Morlock. Operations-Research, Hanser-Verlag, 1993
- Tempelmeier. Bestandsmanagement in Supply Chains, Books on Demand 2006
- Schönsleben. Integrales Logistikmanagement, Springer, 1998

Remarks
Formerly, the course was known as *Logistics*.

Course: Quantitative Methods for Supply Chain Risk Management Course key: [2118090]

Lecturers: Cardeneo
Credit points (CP): 6 **Hours per week:** 3/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Supply Chain Management [IW3WWEBM1] (S. 41)

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

Prerequisites
Knowledge in Logistics and Operations Research are recommended (linear and mixed integer optimization, simple graph theory, and basic knowledge of statistics).

Conditions
None.

Learning Outcomes
The student

- identifies, analyzes and assigns risks of logistic systems
- plans location and transport decisions under uncertainty
- knows risk-relevant elements and knows adequate countermeasures for planning processes (regarding procurement, demand, infrastructure, continuity management)

Content
The planning and the operation of logistics systems are strongly connected with uncertainty: It is the unknown demand, varying transportation times, unexpected delays, irregularly production yield or volatile rates of exchange: Quantities, times, qualities and prices are uncertain values. Therefore it is necessary to deal with particular these uncertain values to avoid negative effects . In this lecture we mostly work with mathematical models and methods to control the various kinds of risks.

Basic literature
Will be announced in the lecture.

Course: Service Oriented Computing 1 Course key: [25770]

Lecturers: Stefan Tai
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information Services in Networks [IW3INIDL0] (S. 31)

Learning Control / Examinations
The assessment of this course is a written examination (60min.) in the first week after lecture period (nach §4(2), 1 SPO).

Prerequisites
Lecture *AI2* [25033] is recommended.

Conditions
None.

Learning Outcomes
The course introduces concepts, methods, and techniques of “service-oriented computing”, including languages for (Web) service description, methods and tools for the development of services, and platforms (middleware, runtimes) for the Web-based deployment, delivery, and execution of services. The course provides a solid technical foundation that enables the student to address the increasingly relevant challenges of developing “service-oriented architectures (SOA)” in the industry.

Content
Web services represent the next-generation of Web technology, and are an evolution of conventional distributed middleware. They enable new and improved ways for enterprise computing, including application interoperability and integration, and business process management. Modern software systems are being designed as service-oriented architectures (SOA), introduding increased agility and flexibilty at both the software systems and the business level. Web services and SOA thus have a profound impact on software development and the businesses that they support. The course “Service-oriented Computing” introduces the concepts, methods and technology that provide a solid foundation in this area. Topics include:

- Service description
- Service engineering, including development and implementation
- Service composition (aggregation), including process-based service orchestration
- Interoperability formats and protocols
- Service platforms and runtimes (middleware)

Media
Slides, access to internet resources.

Basic literature
Will be announced in the lecture.

Course: Seminar: Management and Organization Course key: [25915/25916]

Lecturers: Hagen Lindstädt
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Strategy and Managerial Economics [IW3WWORG0] (S. 49), Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] (S. 51)

Learning Control / Examinations
Term paper (50%) and presentation (50%).

Prerequisites
See corresponding module information.

Conditions
None.

Learning Outcomes
The aim of the seminar is to describe corporate and organisational management approaches, to assess them critically and clarify them using practical examples. The focus is on assessing the models with a view to their applicability and theoretical limits.

Content
The subjects are redefined each semester on the basis of current issues.

Media
Slides.

Basic literature
The relevant sources are made known during the course.

Course: Algorithmen II

Course key: [Algo2]

Lecturers: Peter Sanders
Credit points (CP): 6 **Hours per week:** 3/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Bachelor Seminar in Enterprise Information Systems Course key: [BSemBI]

Lecturers: Andreas Oberweis
Credit points (CP): 2 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32)

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 of the examination regulation of the Bachelor of Science programme in Information Engineering and Management in form of an examination of the a presentation of the seminar topic and of the written abstract of the seminar topic. The final mark is based on the quality of the presentation but can be upgraded or downgraded according to the examination of the written abstract .

Prerequisites
- Prior attendance of a lecture in the topic of the seminar is precondition.

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.
- 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 form of a written abstract generally found in scientific publications.

Content
The bachelor seminar intensifies and extends specific topis which are discussed within corresponding lectures. The actual topics are changing each semester. Knowledge of these lecture topics is a precondition.
The bachelor seminar introduces the process of scientific work. Students will write an abstract about a choosen scientific topic. First, a thorogh literature search to collect knowledge on this subject is necessary. The abstract is written in the style of the department which is comparable with the style of a publisher.

Basic literature
Literature will be given individually in the specific seminar.

Remarks
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.
For signing the seminar the formular “Seminarschein” must be filled out as “Bachelor-Seminar” with “2 Credits” before the start of the seminar.

Course: Fortgeschrittene Objektorientierung — Course key: [FOO]

Lecturers: Gregor Snelting
Credit points (CP): 6 **Hours per week:** 3/2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Design and Implementation of Complex Systems [IW3INCS0] (S. 30)

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

Prerequisites
None.

Conditions
None.

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
- Aspect oriented programming
- Traits and mixins, virtual classes
- Cardelli's type system
- Palsberg-Schwartzbach type inference
- Analyses on the call graph, points-to analyses
- operational semantics, type safety
- bytecode JVM, bytecode verifier, dynamic compilation

Remarks
The course is not lectured in the summer term 2010.

Course: Computing Lab Information Systems — Course key: [PraBI]

Lecturers: Andreas Oberweis, Detlef Seese, Wolffried Stucky, Rudi Studer
Credit points (CP): 5 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32)

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.

Prerequisites
None.

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 learn during the course.
- present results of the research in written form generally found in scientific publications.

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

Basic 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: Lab Advanced Telematics — Course key: [PrakATM]

Lecturers: Martina Zitterbart
Credit points (CP): 5 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Infrastructures [IW3INNET0] (S. 33)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students can

- understand and master a concrete protocol or application in the domain of Telematics in detail
- implement protocols or applications in the domain computer networks in a common programming language
- work goal driven based on a given exercise of a given subject independently, but also in a team.

Content
This lab course examines concrete subjects that were introduced in the corresponding lectures. It is advised but not compulsory to attend the respective lectures before the lab course.

The following subjects are covered:

- Project lab “Sensor Networks”
- Project lab “Future Internet Technologies”
- Lab “Mobile Communications”

Course: Software Security — Course key: [SWSich]

Lecturers: Gregor Snelting
Credit points (CP): 3 **Hours per week:** 2/1
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Design and Implementation of Complex Systems [IW3INCS0] (S. 30)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
Knowledge of the fundamental techniques of software security; gaining insight in ongoing research

Content
Whereas the classical notion of computer security bases on access control, certificates, cryptography, etc., software security checks analyze the program code to find security leaks. Attackers try, in return, to make use of deficiencies of programming languages or techniques. This lecture presents such attacks and security checks, that target the program or binary code directly, and outlines the state-of-the-art in science.

Topics:

- confidentiality and integrity
- buffer-overflow attacks
- library functions and linker
- scripting languages
- noninterference
- information flow control
- taint analysis
- security type systems
- program analyses
- tools

Remarks
The course is not lectured in the summer term 2010.

Course: Seminar Software Engineering — Course key: [SWTSem]

Lecturers: Walter F. Tichy, Ralf Reussner, Gregor Snelting
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Design and Implementation of Complex Systems [IW3INCS0] (S. 30)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

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 in Enterprise Information Systems Course key: [SemAIFB1]

Lecturers: Rudi Studer, Andreas Oberweis, Wolffried Stucky, Thomas Wolf, Ralf Kneuper
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Process Engineering [IW3INGP0] (S. 32)

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 of the examination regulation of the Bachelor of Science programme in Information Engineering and Management 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.

Prerequisites
See corresponding module information.

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.
- write the seminar thesis (and later the Bachelor-/Masterthesis) with a minimal learning curve by using format requirements such as those recommended by well-known publishers.
- give presentations in a scientific context in front of an auditorium. These techniques are presented and learned during the seminar.
- present results of the research in written form generally found in scientific publications.

Content
The seminar intensifies and extends specific topis which are discussed within corresponding lectures. Knowledge of these lecture topics is an advantage but not a precondition.
Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at http://www.aifb.uni-karlsruhe.de/Lehre

Basic literature
Literature will be given individually in the specific seminar.

Course: Seminar Knowledge Management — Course key: [SemAIFB4]

Lecturers: Rudi Studer
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information and Knowledge Systems [IW3INISW0] (S. 34)

Learning Control / Examinations
The assessment will be an “Erfolgskontrolle anderer Art”, based on §4, 2,3 Prüfungsordnung Informationswirtschaft, usually a talk and a written seminar paper.

Prerequisites
The mandatory lectures of the module are a prerequisite.

Conditions
None.

Learning Outcomes
The students will learn to perform literature searches on current topics in computer science 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.

Media
Slides.

Basic 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.)

Complementary literature
None.

Remarks
The number of students is limited. Students have to observe the designated registration process.

Course: Seminar in Industrial Production — Course key: [SemIIP2]

Lecturers: Frank Schultmann, Magnus Fröhling, Michael Hiete
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Industrial Production [IW3WWPRO0] (S. 52)

Learning Control / Examinations
Special assessment acc. to §4 (2), No.3 ER “Information Engineering and Management” (B.Sc.) by assessing the written seminar thesis, the oral presentation and active participation in public discussions. The final grade will be formed by weighing the individual assessment grades.

Prerequisites
Students should have completed the modules „Industrial Production I“ [WW3BWLIIP], „Industrial Production II“ [WW4BWLIIP2] and/or “Industrial Production III” [WW3BWLIIP6].

Conditions
None.

Learning Outcomes
Students shall gain insights into selected research projects of the Institute of Industrial Production (IIP).

- Students shall search for, identify, review and evaluate relevant literature.
- Students shall prepare their seminar thesis (and later on bachelor/master thesis) with a minimum expense in becoming acquainted with their topic and general layout.
- Students shall produce an oral presentation in a scientific context by using the outlined techniques of scientific presentation.
- Students shall 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 Course key: [SemIW]

Lecturers: Christof Weinhardt
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: eBusiness Management [IW3WWEBM0] (S. 39), Supply Chain Management [IW3WWEBM1] (S. 41), eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 43)

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

Prerequisites
See corresponding module information.

Conditions
Business Engineering/Economics Engineering: Preferably at least one module offered by the institute should have been chosen before attending this seminar.

Learning Outcomes
The student should be able to do a literature review based on a predefined topic in the context of information engineering and management. The approach comprises the identification of relevant literature according to the topic and an analysis as well as an evaluation of the methods presented in the literature. The student learns to present his results in a paper and in front of an audience on a academic level. This process gives him the knowledge and practice for further research work like a master thesis or a doctoral thesis

Content
In the seminar the student should learn to apply the research methods to a predefined topic area. The topics are based on research questions in Information Engineering and Management across different industry sectors. This problem analysis requires a interdisciplinary examination.

Media
- Powerpoint,
- eLearning Platform Ilias
- Software Tools, if necessary

Basic literature
The student will receive the necessary literature for his research topic.

Remarks
- Students from Bachelor and Master Course can visit the seminar. The research topic as well as the evaluation of the work and the presentation will have a different focus between Bachelor and Master Course.
- All the seminars offered at the chair of Prof. Dr. Weinhardt can be chosen. The current topics of the seminars are available at the following homepage: http://www.im.uni-karlsruhe.de/lehre.

Course: Seminar in Experimental Economics — Course key: [SemWIOR3]

Lecturers: Siegfried Berninghaus
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Strategy and Managerial Economics [IW3WWORG0] (S. 49)

Learning Control / Examinations
Term paper and presentation.

Prerequisites
See corresponding module information.
A course in the field of Game Theory should be attended beforehand.

Conditions
None.

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.

Basic literature
Will be announced at the end of the recess period.

Course: Seminar in Game and Decision Theory — Course key: [SemWIOR4]

Lecturers: Siegfried Berninghaus
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Strategy and Managerial Economics [IW3WWORG0] (S. 49)

Learning Control / Examinations
Term paper and presentation.

Prerequisites
Completion of all 1st an 2nd year modules of the Bachelor Program.
See corresponding module information.

Conditions
None.

Learning Outcomes
The seminar wants to deepen the methods of scientific work. Students shall learn to discuss critical the latest research results in game theory.
Procurement of SQs: 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.

Basic literature
Will be announced at the end of the recess period.

Course: Undergraduate Seminar Information Systems — Course key: [prosemis]

Lecturers: Klemens Böhm
Credit points (CP): 3 **Hours per week:** 2
Term: Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Information and Knowledge Systems [IW3INISW0] (S. 34)

Learning Control / Examinations
The assessment involves writing a seminar paper and an oral presentation as a graded “Erfolgskontrolle anderer Art” according to §4, Abs. 2 of the Prüfungsordnung. The final grade for the seminar will be the grade for the written paper which can be increased or decreased by up to two grade points (”Notenstufen”) according to the performance of the oral presentation.

Prerequisites
Lectures held at the Information Systems Group related to the current topic of the seminar are strongly recommended.

Conditions
None.

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.

Basic literature
Will be announced for every seminar.

Complementary literature
Literature from lectures concerning the seminar topic.

Course: Seminar in Law — Course key: [rechtsem]

Lecturers: Thomas Dreier, Peter Sester, Indra Spiecker genannt Döhmann
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Intellectual Property and Data Protection Law [IW3INJURA] (S. 53)

Learning Control / Examinations
Written paper and oral presentation (§4, Abs. 2, 3 of the SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
It is the goal of the seminar to enable students 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).

Basic literature
Tba in the lecture.

Course: Algorithm Engineering — Course key: [xAlgoEng]

Lecturers: Peter Sanders, Dorothea Wagner
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Algorithm Design [IW3INALG0] (S. 29)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Lecture *Algorithmentechnik*

Conditions
None.

Learning Outcomes
The students come to know the methodology of algorithm engineering. Moreover, examples of well done algorithm engineering are presented.

Content

- What is algorithm engineering, why is it interesting, ...?
- Realistic models of machines and applications
- Practice-oriented design of algorithms
- Implementation techniques
- Experimental methods
- Analysis of measured data

The above skills are taught using concrete examples. In the past the following topics from the area of fundamental algorithms and data structures have been used for example:

- linked lists without special cases
- Sorting: parallel, external, superscalar,...
- Priority queues (chache efficiency,...)
- Search trees for integer keys
- Full-text indexing
- Graph algorithms: minimum spanning trees (external,...), route planning

The best practical and theoretical techniques known are considered. In most cases, these techniques are very different from the methods taught in a beginner's course.

Media
Slides, Scriptum, papers, source codes

Complementary literature

- K. Mehlhorn, P. Sanders, Algorithms and Data Structures - The Basic Toolbox, Springer 2008

Course: Practical Course Information Services in Networks Course key: [xIDLp]

Lecturers: Hartmut Schmeck, Stefan Tai, Wilfried Juling, Walter F. Tichy, Rudi Studer, Hannes Hartenstein
Credit points (CP): 5 **Hours per week:** 4
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Information Services in Networks [IW3INIDL0] (S. 31)

Learning Control / Examinations

Prerequisites
None.

Conditions
the advanced lab may offered by any of the lecturers participatingin this module

Learning Outcomes
Students can,

- carry out a literature search 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: Seminar Information Services in Networks — Course key: [xIDLs]

Lecturers: Hartmut Schmeck, Stefan Tai, Wilfried Juling, Rudi Studer, Hannes Hartenstein, Walter F. Tichy
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Information Services in Networks [IW3INIDL0] (S. 31)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students can,

- carry out a literature search 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.

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Neubekanntmachung der Studien- und Prüfungsordnung der Universität Karlsruhe (TH) für den Bachelorstudiengang Informationswirtschaft

in der Fassung vom 15. August 2008

Aufgrund von § 34 Abs. 1, Satz 1 des Landeshochschulgesetzes (LHG) vom 1. Januar 2005 hat der Senat der Universität Karlsruhe (TH) am 12. August 2005 die folgende Studien- und Prüfungsordnung für den Bachelorstudiengang Informationswirtschaft beschlossen.

Der Rektor hat seine Zustimmung am 12. August 2005 erteilt.

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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 die Kandidatin bzw. der Kandidat 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 Bachelorstudiengang Informationswirtschaft (englischsprachig: for the Degree Programme Information Engineering and Management) verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Umfang des Lehrangebots

(1) Die Regelstudienzeit beträgt sechs Semester. Sie umfasst ein Betriebspraktikum, 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. Art, Umfang und Zuordnung der Module zu einem Fach sowie die Möglichkeiten, Module untereinander zu kombinieren, beschreibt der Studienplan. 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 182 Leistungspunkte. Die Semester 1 bis 4 umfassen 119 Leistungspunkte, die Semester 5 bis 6 umfassen 63 Leistungspunkte.

(5) Die Verteilung der Leistungspunkte im Studienplan auf die Semester hat in der Regel gleichmäßig zu erfolgen.

(6) Lehrveranstaltungen können auch in englischer Sprache angeboten werden.

§ 4 Aufbau der Prüfungen

(1) Die Bachelorprüfung besteht aus einer Bachelorarbeit und Fachprüfungen, jede der Fachprüfungen aus einer oder mehreren Modulprüfungen, jede Modulprüfung aus einer oder mehreren Lehrveranstaltungsprüfungen. Eine Lehrveranstaltungsprüfung besteht aus mindestens einer Erfolgskontrolle.

(2) Erfolgskontrollen sind:

1. schriftliche Prüfungen,
2. mündliche Prüfungen oder
3. Erfolgskontrollen anderer Art.

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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).

§ 5 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 Professorinnen, Juniorprofessorinnen, Hochschul- oder Privatdozentinnen bzw. Professoren, Juniorprofessoren, Hochschul- oder Privatdozenten, zwei Vertreterinnen bzw. Vertretern der Gruppe der wissenschaftlichen Mitarbeiter nach § 10 Abs. 1, Satz 2, Nr. 2 LHG und einer Vertreterin bzw. einem Vertreter der Studierenden mit beratender Stimme. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) Die bzw. der Vorsitzende, ihre bzw. seine Stellvertreterin oder ihr bzw. sein Stellvertreter, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreterinnen bzw. Stellvertreter werden von den jeweiligen Fakultätsräten bestellt, die Mitglieder der Gruppe der wissenschaftlichen Mitarbeiter nach § 10 Abs. 1, Satz 2, Nr. 2 LHG und die Vertreterin bzw. der Vertreter der Studierenden auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Die bzw. der Vorsitzende und deren bzw. dessen Stellvertreter oder Stellvertreterin müssen Professorin oder Juniorprofessorin bzw. Professor oder Juniorprofessor aus je einer beteiligten Fakultät sein. Der Vorsitz wechselt zwischen den Fakultäten alle zwei Jahre. Die bzw. 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 Prüfungsordnung in die Prüfungspraxis der Fakultäten. Er achtet darauf, dass die Bestimmungen der Prüfungsordnung eingehalten werden. 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 Prüfungsordnung.

(4) Die Mitglieder des Prüfungsausschusses haben das Recht, der Abnahme von Prüfungen beizuwohnen. Die Mitglieder des Prüfungsausschusses, die Prüferinnen und Prüfer und die Beisitzenden unterliegen der Amtsverschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch die bzw. den Vorsitzenden zur Verschwiegenheit zu verpflichten.

(5) In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses eine fachlich zuständige und von der betroffenen Fakultät zu nennende Professorin, Juniorprofessorin, Hochschul- oder Privatdozentin bzw. ein fachlich zuständiger Professor, Juniorprofessor, Hochschul- oder Privatdozent hinzuzuziehen. Sie bzw. er hat in diesem Punkt Stimmrecht.

§ 6 Prüferinnen, Prüfer und Beisitzende

(1) Der Prüfungsausschuss bestellt die Prüferinnen, die Prüfer und die Beisitzenden. Er kann die Bestellung der bzw. dem Vorsitzenden übertragen.

(2) Zur Abnahme von Erfolgskontrollen (§ 4 Abs. 2) sind vorrangig Professorinnen, Juniorprofessorinnen, Hochschul- und Privatdozentinnen bzw. Professoren, Juniorprofessoren, Hochschul- und Privatdozenten zu bestellen.

(3) Soweit Lehrveranstaltungen von anderen als den unter § 6 Abs. 2 genannten Personen durchgeführt werden, sollen diese zur Prüferin bzw. zum Prüfer bestellt werden, wenn die jeweilige Fakultät ihr bzw. ihm 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.

§ 7 Anmeldung und Zulassung zu den Prüfungen

(1) Um zu schriftlichen und/oder mündlichen Prüfungen (§ 4 Abs. 2, Nr. 1 und 2) in einem bestimmten Modul zugelassen zu werden, muss die Studentin bzw. der Student 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. Darüber hinaus muss sich die Studentin bzw. der Student für jede einzelne Lehrveranstaltungsprüfung, die in Form einer schriftlichen oder mündlichen Prüfung (§ 4 Abs. 2, Nr. 1 und 2) durchgeführt wird, beim Studienbüro anmelden. Dies gilt auch für die Zulassung zur Bachelorarbeit.

(2) Die Zulassung darf nur abgelehnt werden, wenn

1. die Kandidatin bzw. der Kandidat in einem mit der Informationswirtschaft vergleichbaren oder einem verwandten Studiengang bereits eine Diplomvorprüfung, Diplomprüfung, Bachelor- oder Masterprüfung 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.

§ 8 Durchführung von Prüfungen und Erfolgskontrollen

(1) Erfolgskontrollen werden 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 von der Prüferin bzw. dem 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 Prüferin bzw. Prüfer muss mindestens sechs Wochen vor Semesterbeginn bekannt gegeben werden. Im Einvernehmen von Prüferin bzw. Prüfer und Kandidatin bzw. Kandidat kann die Art der Erfolgskontrolle auch nachträglich geändert werden. Dabei ist jedoch § 4 Abs. 3 zu berücksichtigen.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfung auch mündlich oder eine mündlich durchzuführende Prüfung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfung bekannt gegeben werden.

(4) Macht eine Kandidatin bzw. ein Kandidat glaubhaft, dass sie bzw. 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 Vorsitzende bzw. Vorsitzender – gestatten, Erfolgskontrollen in einer anderen Form zu erbringen.

(5) Bei Lehrveranstaltungen in englischer Sprache können mit Zustimmung der Kandidatin bzw. des Kandidaten die entsprechenden Erfolgskontrollen in englischer Sprache abgenommen werden.

(6) Schriftliche Prüfungen (§ 4 Abs. 2, Nr. 1) sind in der Regel von zwei Prüferinnen bzw. Prüfern nach § 6 Abs. 2 oder § 6 Abs. 3 zu bewerten. Die Note ergibt sich aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in § 9 Abs. 2, Satz 2 definierten Notenstufen, so ist auf die nächstbessere Notenstufe zu runden. Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. Schriftliche Einzelprüfungen dauern mindestens 60 und höchstens 240 Minuten.

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(7) Mündliche Prüfungen (§ 4 Abs. 2, Nr. 2) sind von mehreren Prüferinnen bzw. Prüfern (Kollegialprüfung) oder von einer Prüferin bzw. einem Prüfer in Gegenwart einer oder eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört die Prüferin bzw. der Prüfer die anderen an der Kollegialprüfung mitwirkenden Prüferinnen bzw. Prüfer an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 45 Minuten pro Kandidatin bzw. Kandidat. Dies gilt auch für die mündliche Nachprüfung gemäß § 10 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 der Kandidatin bzw. dem Kandidaten jeweils am Tag der mündlichen Prüfung bekannt zu geben.

(9) Studierende, die sich in einem späteren Prüfungszeitraum der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen als Zuhörerinnen bzw. Zuhörer bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse. Aus wichtigen Gründen oder auf Antrag der Kandidatin bzw. des Kandidaten 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 der Kandidatin bzw. dem Kandidaten 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 der Prüferin bzw. dem Prüfer eine Beisitzerin oder ein Beisitzer anwesend sein, die bzw. der zusätzlich zur Prüferin bzw. zum Prüfer die Protokolle zeichnet.

§ 9 Bewertung von Prüfungen und Erfolgskontrollen

(1) Das Ergebnis einer Erfolgskontrolle wird von den jeweiligen Prüferinnen bzw. Prüfern in Form einer Note festgesetzt.

(2) Im Bachelorzeugnis dürfen nur folgende Noten verwendet werden:

1 = „sehr gut“ (very good) für eine hervorragende Leistung;

2 = „gut“ (good) für eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt;

3 = „befriedigend“ (satisfactory) für eine Leistung, die durchschnittlichen Anforderungen entspricht;

4 = „ausreichend“ (sufficient) für eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt;

5 = „nicht ausreichend“ (failed) für eine Leistung, die wegen erheblicher Mängel den Anforderungen nicht mehr genügt.

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Für die Bachelorarbeit und die Lehrveranstaltungsprüfungen 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) und

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 Leistungsnachweise 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 jeweils nur einmal angerechnet werden.

(6) Erfolgskontrollen können in Form von Leistungsnachweisen dokumentiert werden. Leistungsnachweise dürfen in Lehrveranstaltungsprüfungen oder Modulprüfungen nur eingerechnet werden, wenn die Benotung nicht nach § 9 Abs. 3 erfolgt ist. Die durch Leistungsnachweise zu dokumentierenden Erfolgskontrollen und die daran geknüpften Bedingungen werden im Studienplan festgelegt.

(7) Eine Lehrveranstaltungsprüfung 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 wird im Studienplan geregelt. Die differenzierten Lehrveranstaltungsnoten (§ 9 Abs. 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 Lehrveranstaltungsprüfung endgültig nicht bestanden wurde.

(9) Die Ergebnisse der Modulprüfungen und der Lehrveranstaltungsprüfungen, der Leistungsnachweise, der Bachelorarbeit und die Bescheinigung über das abgeleistete Betriebspraktikum sowie die erworbenen Leistungspunkte werden beim 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 nachgewiesen wird.

(11) Innerhalb der Regelstudienzeit, einschließlich der Urlaubssemester für das Studium an einer ausländischen Hochschule (Regelprüfungszeit), können in einem Fach auch mehr Leistungspunkte erworben werden als für das Bestehen der Fachprüfung erforderlich sind. In diesem Fall werden bei der Festlegung der Fachnote nur die Modulnoten berücksichtigt, die unter Abdeckung der erforderlichen Leistungspunkte die beste Fachnote ergeben.

(12) Die Gesamtnote der Bachelorprüfung, die Fachnoten und die Modulnoten lauten:

bei einem Durchschnitt bis 1.5 „sehr gut“ (very good),

bei einem Durchschnitt über 1.5 bis 2.5 „gut“ (good),

bei einem Durchschnitt über 2.5 bis 3.5 „befriedigend“ (satisfactory),

bei einem Durchschnitt über 3.5 bis 4.0 „ausreichend“ (sufficient).

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(13) Zusätzlich zu den Noten nach § 9 Abs. 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 Studentinnen bzw. Studenten definiert, die diese Note in der Regel erhalten. Dabei ist von einer mindestens fünfjährigen Datenbasis über mindestens 30 Studentinnen bzw. Studenten auszugehen. Für die Ermittlung der Notenverteilungen, die für die ECTS-Noten erforderlich sind, ist das Studienbüro der Universität zuständig.

(14) 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 Studentinnen bzw. Studenten 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.

§ 10 Erlöschen des Prüfungsanspruchs, Orientierungsprüfungen, Wiederholung von Prüfungen und Erfolgskontrollen

(1) Die Modulprüfungen im Modul Informatik 1 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 abgelegt hat, verliert den Prüfungsanspruch im Studiengang, es sei denn, dass er die Fristüberschreitung nicht zu vertreten hat; hierüber entscheidet der Prüfungsausschuss auf Antrag der Kandidatin bzw. des Kandidaten. Eine zweite Wiederholung von Prüfungen der Orientierungsprüfungen ist ausgeschlossen.

(2) Kandidatinnen bzw. Kandidaten 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 bestandenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als „ausreichend“ sein.

(3) Kandidatinnen bzw. Kandidaten können eine nicht bestandene mündliche Prüfung (§ 4 Abs. 2, Nr. 2) einmal wiederholen.

(4) Wiederholungsprüfungen nach § 10 Abs. 2 und 3 müssen in Inhalt, Umfang und Form (mündlich oder schriftlich) der ersten entsprechen. Ausnahmen kann der zuständige Prüfungsausschuss 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 Ausnahmefällen zulässig. Einen Antrag auf Zweitwiederholung hat die Kandidatin bzw. der Kandidat schriftlich beim Prüfungsausschuss zu stellen. Über den ersten Antrag einer Kandidatin bzw. eines Kandidaten auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet die Rektorin

bzw. der Rektor. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses die Rektorin bzw. der Rektor. § 10 Abs. 2, Satz 2 und 3 gilt entsprechend.

(7) Hat eine Kandidatin bzw. ein Kandidat eine Erfolgskontrolle nicht bestanden, so sind ihr bzw. ihm Umfang und Fristen der Wiederholung der Erfolgskontrolle in geeigneter Weise bekannt zu machen.

(8) Die Wiederholung einer bestandenen Erfolgskontrolle ist nicht zulässig.

(9) Eine Fachprüfung ist endgültig nicht bestanden, wenn mindestens ein Modul des Faches endgültig nicht bestanden ist.

(10) Die Bachelorarbeit kann bei einer Bewertung mit „nicht ausreichend“ einmal wiederholt werden. Eine zweite Wiederholung der Bachelorarbeit ist ausgeschlossen.

(11) Ist gemäß § 34 Abs. 2, Satz 3 LHG die Bachelorprüfung bis zum Beginn der Vorlesungszeit des zehnten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Studiengang, es sei denn, dass die Studentin oder der Student die Fristüberschreitung nicht zu vertreten hat. Die Entscheidung darüber trifft der Prüfungsausschuss.

§ 11 Versäumnis, Rücktritt, Täuschung, Ordnungsverstoß

(1) Erscheint die Kandidatin bzw. der Kandidat zum Termin einer schriftlichen oder mündlichen Prüfung (§ 4 Abs. 2, Nr. 1 und 2) ohne triftige Gründe nicht oder tritt sie bzw. er nach Beginn der Prüfung ohne triftige Gründe von der Prüfung zurück, so gilt die Prüfung als mit „nicht ausreichend“ (5.0) bewertet. Die Abmeldung von einer schriftlichen Prüfung ohne Angabe von Gründen ist bis zur Ausgabe der Prüfungsaufgaben möglich. Bei mündlichen Prüfungen muss der Rücktritt spätestens drei Werktage vor dem betreffenden Prüfungstermin erklärt werden. Die Sätze 1–3 gelten für Erfolgskontrollen anderer Art (§ 4 Abs. 2, Nr. 3) entsprechend.

(2) Die für den Rücktritt oder das Versäumnis geltend gemachten Gründe müssen der Prüferin bzw. dem Prüfer unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit der Kandidatin bzw. des Kandidaten bzw. eines von ihr bzw. ihm zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann die Vorlage eines ärztlichen Attestes verlangt werden. Werden die Gründe anerkannt, so soll die Kandidatin bzw. der Kandidat die Prüfung zum nächstmöglichen Termin ablegen. Ergebnisse bereits bestandener Erfolgskontrollen sind in diesem Falle anzurechnen.

(3) Versucht die Kandidatin bzw. der Kandidat, 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. Eine Kandidatin bzw. ein Kandidat, die bzw. der den ordnungsgemäßen Ablauf der Prüfung stört, kann von der jeweiligen Prüferin bzw. dem jeweiligen Prüfer oder Aufsichtsführenden 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 die Kandidatin bzw. den Kandidaten von der Erbringung weiterer Prüfungen ausschließen. Die Sätze 1–3 gelten für Erfolgskontrollen anderer Art (§ 4 Abs. 2, Nr. 3) entsprechend.

(4) Die Kandidatin bzw. der Kandidat kann innerhalb von 14 Tagen verlangen, dass die Entscheidung nach § 11 Abs. 3, Satz 1 und 2 vom Prüfungsausschuss überprüft wird. Belastende Entscheidungen des Prüfungsausschusses sind der Kandidatin bzw. dem Kandidaten unverzüglich schriftlich mitzuteilen, zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen.

§ 12 Mutterschutz

Werdende Mütter müssen in den letzten sechs Wochen vor der Entbindung und bis zum Ablauf von acht Wochen nach der Entbindung nicht an Erfolgskontrollen teilnehmen. § 6 Abs. 1 Satz 2 des Mutterschutzgesetzes (Regelung für Früh- und Mehrlingsgeburten) gilt entsprechend. Anträge

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auf Inanspruchnahme des Mutterschutzes sind an den Prüfungsausschuss zu richten. Wird der Mutterschutz in Anspruch genommenen, so verlängern sich alle Fristen dieser Prüfungsordnung entsprechend.

§ 13 Anerkennung von Studienzeiten, Studienleistungen und Prüfungsleistungen

(1) Studienzeiten, Studienleistungen und Prüfungsleistungen im Bachelorstudiengang Informationswirtschaft an einer Universität oder einer gleichgestellten Hochschule in Deutschland werden angerechnet, sofern Gleichwertigkeit nachgewiesen wird. Studienzeiten, Studienleistungen und Prüfungsleistungen in anderen Studiengängen werden anerkannt, soweit die Gleichwertigkeit festgestellt ist. Die Anerkennung von Teilen der Bachelorprüfung wird in der Regel versagt, wenn die Anerkennung von mehr als der Hälfte der Leistungspunkte oder mehr als der Hälfte der Modulprüfungen oder die Anerkennung der Bachelorarbeit beantragt worden ist.

(2) Für Studienzeiten, Studienleistungen und Prüfungsleistungen in staatlich anerkannten Fernstudien gilt § 13 Abs. 1 entsprechend. Das gleiche gilt außerdem auch für Studienzeiten, Studienleistungen und Prüfungsleistungen an anderen Bildungseinrichtungen, insbesondere an staatlichen oder staatlich anerkannten Berufsakademien sowie an Fach- und Ingenieurschulen.

(3) Über die Gleichwertigkeit von Studien- bzw. Prüfungsleistungen entscheidet der Prüfungsausschuss im Einvernehmen mit der zuständigen Prüferin bzw. dem zuständigen Prüfer. Gleichwertigkeit ist festzustellen, wenn die Studienzeiten, Studienleistungen und Prüfungsleistungen in Inhalt, Umfang und in den Anforderungen denjenigen des entsprechenden Studiums an der Universität Karlsruhe (TH) im Wesentlichen entsprechen. Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung und Gesamtbewertung vorzunehmen. Bei der Anerkennung von Studienzeiten, Studienleistungen und Prüfungsleistungen, die außerhalb Deutschlands erbracht wurden, sind die von Kultusministerkonferenz und Hochschulrektorenkonferenz gebilligten Äquivalenzvereinbarungen sowie Absprachen im Rahmen von Hochschulpartnerschaften zu beachten. Soweit solche nicht vorliegen, kann die Zentralstelle für ausländisches Bildungswesen gehört werden. § 13 Abs. 1, Satz 1 gilt entsprechend.

(4) Der Prüfungsausschuss entscheidet in Abhängigkeit von Art und Umfang der anzurechnenden Studien- und Prüfungsleistungen über die Einstufung in ein höheres Fachsemester.

(5) Werden Studien- und Prüfungsleistungen anerkannt, so werden die Noten im Falle der Vergleichbarkeit der Notensysteme übernommen und entsprechend § 9 in die Berechnung der Gesamtnote einbezogen. Bei unvergleichbaren Notensystemen wird der Vermerk „anerkannt“ aufgenommen. Bei der Berechnung der Gesamtnote wird die entsprechende Leistung ausgeschlossen.

(6) Bei Vorliegen der Voraussetzungen nach § 13 Abs. 1 – 4 besteht ein Rechtsanspruch auf Anrechnung. Die Anrechnung von Studienzeiten, Studienleistungen und Prüfungsleistungen, die in Deutschland erbracht wurden, erfolgt von Amts wegen. Die Studierenden haben die für die Anrechnung erforderlichen Unterlagen vorzulegen.

(7) Erbringt eine Studentin bzw. ein Student Studienleistungen an einer ausländischen Universität, soll die Gleichwertigkeit vorab durch einen Studienvertrag nach den ECTS-Richtlinien festgestellt und nach diesem verfahren werden.

§ 14 Bachelorarbeit

(1) Die Bachelorarbeit soll zeigen, dass die Kandidatin bzw. der Kandidat in der Lage ist, ein Problem aus ihrem bzw. 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 neun Monate. Die Bachelorarbeit kann auch auf Englisch geschrieben werden.

(2) Die Bachelorarbeit kann von jeder Prüferin bzw. von jedem Prüfer nach § 6 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.

Der Kandidatin bzw. dem Kandidaten 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 der einzelnen Kandidatin bzw. des einzelnen Kandidaten aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach § 14 Abs. 1 erfüllt.

(3) Voraussetzung für die Zulassung zur Bachelorarbeit ist, dass die Kandidatin bzw. der Kandidat sich in der Regel im 3. Studienjahr befindet und nicht mehr als eine der Fachprüfungen der ersten beiden Studienjahre laut § 17 Abs. 2 noch nicht bestanden wurde. Auf Antrag der Kandidatin bzw. des Kandidaten sorgt ausnahmsweise die bzw. der Vorsitzende des Prüfungsausschusses dafür, dass die Kandidatin bzw. der Kandidat innerhalb von vier Wochen nach Antragstellung von einer Betreuerin oder einem Betreuer ein Thema für die Bachelorarbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über die Vorsitzende bzw. den Vorsitzenden des Prüfungsausschusses.

(4) Thema, Aufgabenstellung und Umfang der Bachelorarbeit sind von der Betreuerin bzw. dem Betreuer so zu begrenzen, dass sie mit dem in § 14 Abs. 1 festgelegten Arbeitsaufwand bearbeitet werden kann.

(5) Die Bachelorarbeit hat 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.“ Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen.

(6) Der Zeitpunkt der Ausgabe des Themas der Bachelorarbeit und der Zeitpunkt der Abgabe der Bachelorarbeit sind aktenkundig zu machen. Der Kandidat bzw. die Kandidatin kann das Thema der Bachelorarbeit nur einmal und nur innerhalb der ersten zwei Monate der Bearbeitungszeit zurückgeben. Auf begründeten Antrag der Kandidatin bzw. des Kandidaten kann der Prüfungsausschuss die in § 14 Abs. 1 festgelegte Bearbeitungszeit um höchstens drei Monate verlängern. Wird die Bachelorarbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend“ bewertet, es sei denn, dass die Kandidatin bzw. der Kandidat dieses Versäumnis nicht zu vertreten hat. § 12 Abs. 1 (Mutterschutz) gilt entsprechend.

(7) Die Bachelorarbeit wird von einer Betreuerin bzw. von einem Betreuer sowie in der Regel von einer weiteren Prüferin bzw. einem weiteren Prüfer bewertet. Eine bzw. einer der beiden muss Juniorprofessorin oder Professorin bzw. Juniorprofessor oder Professor sein. Bei nicht übereinstimmender Beurteilung der beiden Prüferinnen bzw. Prüfer setzt der Prüfungsausschuss im Rahmen der Bewertung der beiden Prüferinnen bzw. Prüfer die Note der Bachelorarbeit fest. Der Bewertungszeitraum soll sechs Wochen nicht überschreiten.

§ 15 Betriebspraktikum

(1) Während des Bachelorstudiums ist ein mindestens sechswöchiges Betriebspraktikum abzuleisten, welches geeignet ist, den Studierenden eine Anschauung von berufspraktischer Tätigkeit in Informationswirtschaft zu vermitteln. Dem Betriebspraktikum sind 8 Leistungspunkte zugeordnet.

(2) Die Studentin bzw. der Student setzt sich in eigener Verantwortung mit geeigneten privaten bzw. öffentlichen Einrichtungen in Verbindung, an denen das Praktikum abgeleistet werden kann. Die Studentin bzw. der Student wird dabei von einer Prüferin bzw. einem Prüfer nach § 6 Abs. 2 und einer Firmenbetreuerin bzw. einem Firmenbetreuer betreut.

(3) Am Ende des Betriebspraktikums ist ein kurzer Bericht der Prüferin bzw. dem Prüfer abzugeben und eine Kurzpräsentation der Erfahrungen im Betriebspraktikum zu halten.

(4) Das Betriebspraktikum ist abgeschlossen, wenn eine mindestens sechswöchige Tätigkeit nachgewiesen wird, der Bericht abgegeben und die Kurzpräsentation gehalten wurde. Die Durchführung des Betriebspraktikums ist im Studienplan zu regeln. Das Betriebspraktikum geht nicht in die Gesamtnote ein.

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§ 16 Zusatzmodule und Zusatzleistungen

(1) Die Kandidatin bzw. der Kandidat kann sich weiteren Prüfungen in Modulen im Umfang von höchstens 20 Leistungspunkten unterziehen. § 3 und § 4 der Prüfungsordnung bleiben davon unberührt.

(2) Das Ergebnis maximal zweier Module, die jeweils mindestens 9 Leistungspunkte umfassen müssen, wird auf Antrag der Kandidatin bzw. des Kandidaten in das Bachelorzeugnis als Zusatzmodule aufgenommen und als solche gekennzeichnet. Zusatzmodule werden bei der Festsetzung der Gesamtnote nicht mit einbezogen. Alle Zusatzleistungen werden im Transcript of Records automatisch aufgenommen und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach § 9 vorgesehenen Noten gelistet. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein.

(3) Die Kandidatin bzw. der Kandidat hat bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

II. Bachelorprüfung

§ 17 Umfang und Art der Bachelorprüfung

(1) Die Bachelorprüfung besteht aus den Fachprüfungen nach § 17 Abs. 2 und § 17 Abs. 3 sowie der Bachelorarbeit (§ 14).

(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 15 Leistungspunkten,
2. Volkswirtschaftslehre: im Umfang von 5 Leistungspunkten,
3. Informatik: im Umfang von 38 Leistungspunkten,
4. Mathematik: im Umfang von 15 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 § 7 erfüllt.

(3) Im dritten Studienjahr sind Fachprüfungen aus den Fächern Informatik, Recht und aus dem Fach BWL/OR/VWL abzulegen. Dabei sind dem Fach Informatik ein oder mehrere Module im Umfang von 21 Leistungspunkten, dem Fach Recht ein oder mehrere Module im Umfang von 10 Leistungspunkten und dem Fach BWL/OR/VWL ein Modul im Umfang von 20 Leistungspunkten oder zwei Module im Umfang von 10 Leistungspunkten zugeordnet. Die in den Fächern zur Auswahl stehenden Module sowie die diesen zugeordneten Lehrveranstaltungen werden im Studienplan bekannt gegeben, der von den beiden Fakultätsräten der beteiligten Fakultäten jährlich aktualisiert wird. In den von der Studentin bzw. dem Studenten in jedem Fach gewählten Modulen muss mindestens ein Seminar im Umfang von mindestens 1 Leistungspunkt und höchstens 4 Leistungspunkten enthalten sein, das in die Modulnote eingeht.

(4) Im dritten Studienjahr ist als eine weitere Prüfungsleistung eine Bachelorarbeit gemäß § 14 anzufertigen.

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§ 18 Leistungsnachweise für die Bachelorprüfung

Voraussetzung für die Anmeldung zur letzten Modulprüfung der Bachelorprüfung ist die Bescheinigung über das erfolgreich abgeleistete Betriebspraktikum nach § 15. In Ausnahmefällen, die die Kandidatin bzw. der Kandidat nicht zu vertreten hat, kann der Prüfungsausschuss die nachträgliche Vorlage dieses Leistungsnachweises genehmigen.

§ 19 Bestehen der Bachelorprüfung, Bildung der Gesamtnote

(1) Die Bachelorprüfung ist bestanden, wenn alle in § 17 genannten Prüfungsleistungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Bachelorprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt. Dabei werden die Noten des dritten Studienjahres (§ 17 Abs. 3) und der Bachelorarbeit jeweils mit dem doppelten Gewicht der Noten der ersten beiden Studienjahre (§ 17 Abs. 2) berücksichtigt.

(3) Hat die Kandidatin bzw. der Kandidat die Bachelorarbeit mit der Note 1.0 und die Bachelorprüfung mit einem Durchschnitt von 1.2 oder besser abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen.

§ 20 Bachelorzeugnis und Urkunde

(1) Über die Bachelorprüfung wird nach Bewertung der letzten Prüfungsleistung eine Bachelorurkunde und ein Zeugnis erstellt. Die Ausfertigung von Bachelorurkunde und Zeugnis soll nicht später als sechs Wochen nach der Bewertung der letzten Prüfungsleistung erfolgen. Bachelorurkunde und Bachelorzeugnis werden in deutscher und englischer Sprache ausgestellt. Bachelorurkunde und Zeugnis tragen das Datum der erfolgreichen Erbringung der letzten Prüfungsleistung. Sie werden der Kandidatin bzw. dem Kandidaten gleichzeitig ausgehändigt. In der Bachelorurkunde wird die Verleihung des akademischen Bachelorgrades beurkundet. Die Bachelorurkunde wird von der Rektorin bzw. vom Rektor und den Dekaninnen und 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 Dekaninnen bzw. Dekanen der beteiligten Fakultäten und von der bzw. dem Vorsitzenden des Prüfungsausschusses zu unterzeichnen.

(3) Weiterhin erhält die Kandidatin bzw. der Kandidat 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 der Kandidatin bzw. des Kandidaten (Transcript of Records).

(4) Die Abschrift der Studiendaten (Transcript of Records) enthält in strukturierter Form alle von der Kandidatin bzw. dem Kandidaten erbrachten Prüfungsleistungen. Dies beinhaltet alle Fächer, Fachnoten und ihre entsprechende ECTS-Note samt den zugeordneten Leistungspunkten, die dem jeweiligen Fach zugeordneten Module mit den Modulnoten, entsprechender ECTS-Note und zugeordneten Leistungspunkten sowie die den Modulen zugeordneten Lehrveranstaltungen samt Noten und zugeordneten Leistungspunkten. Aus der Abschrift der Studiendaten soll die Zugehörigkeit von Lehrveranstaltungen zu den einzelnen Modulen und die Zugehörigkeit der Module zu den einzelnen Fächern deutlich erkennbar sein.

(5) Die Bachelorurkunde, das Bachelorzeugnis und das Diploma Supplement einschließlich des Transcript of Records werden vom Studienbüro der Universität ausgestellt.

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III. Schlussbestimmungen

§ 21 Bescheid über Nicht-Bestehen, Bescheinigung von Prüfungsleistungen

(1) Der Bescheid über die endgültig nicht bestandene Bachelorprüfung wird der Kandidatin bzw. dem Kandidaten durch den Prüfungsausschuss in schriftlicher Form erteilt. Der Bescheid ist mit einer Rechtsbehelfsbelehrung zu versehen.

(2) Hat die Kandidatin bzw. der Kandidat die Bachelorprüfung endgültig nicht bestanden, wird ihr bzw. ihm auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Prüfungsleistungen und deren Noten sowie die zur Prüfung noch fehlenden Prüfungsleistungen enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 22 Ungültigkeit der Bachelorprüfung, Entziehung des Bachelorgrades

(1) Hat die Kandidatin bzw. der Kandidat 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 die Kandidatin bzw. der Kandidat 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 die Kandidatin bzw. der Kandidat hierüber täuschen wollte, so wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat die Kandidatin bzw. der Kandidat die Zulassung vorsätzlich zu Unrecht erwirkt, so entscheidet der Prüfungsausschuss nach Maßgabe des Landesverwaltungsverfahrensgesetzes in der jeweils gültigen Fassung.

(3) Der Kandidatin bzw. dem Kandidaten ist vor einer Entscheidung nach § 22 Abs. 1 und § 22 Abs. 2, Satz 2 Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Prüfungszeugnis ist einzuziehen und gegebenenfalls ein neues zu erteilen. Dies bezieht sich auch auf alle davon betroffenen Anlagen (Transcript of Records und Diploma Supplement). Mit dem unrichtigen Prüfungszeugnis sind auch die Bachelorurkunde, das Bachelorzeugnis und alle Anlagen (Transcript of Records und Diploma Supplement) einzuziehen, wenn die Prüfung aufgrund einer Täuschung für „nicht bestanden“ erklärt wurde.

(5) Die Entziehung des akademischen Bachelorgrades richtet sich nach den gesetzlichen Bestimmungen.

(6) Eine Entscheidung nach § 22 Abs. 1 oder § 22 Abs. 2, Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Prüfungszeugnisses ausgeschlossen.

§ 23 Einsicht in die Prüfungsakten

(1) Innerhalb eines Jahres nach dem Ablegen einer Erfolgskontrolle (§ 4 Abs. 2) ist einer Kandidatin bzw. einem Kandidaten auf Antrag in angemessener Frist Einsicht in die ihn betreffenden Unterlagen dieser Erfolgskontrolle zu gewähren. Die bzw. der Vorsitzende des Prüfungsausschusses bestimmt Ort und Zeit der Einsichtnahme. Kann die Kandidatin bzw. der Kandidat einen festgesetzten Termin zur Einsichtnahme nicht wahrnehmen, muss sie bzw. er dies gegenüber dem Prüfungsausschuss anzeigen und begründen. Der Prüfungsausschuss entscheidet über eine weitere Gelegenheit zur Einsichtnahme.

(2) § 23 Abs. 1 gilt entsprechend für die Einsicht in die Prüfungsakte.

(3) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

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§ 24 In-Kraft-Treten

(1) Diese Studien- und Prüfungsordnung tritt am 1. Oktober 2005 in Kraft.

(2) Gleichzeitig tritt die Prüfungsordnung der Universität Karlsruhe (TH) für den Bachelorstudiengang Informationswirtschaft vom 20. September 2004 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 48, vom 07. Oktober 2004) außer Kraft, behält jedoch ihre Gültigkeit bis zum 30. September 2009 für Prüflinge, die auf Grundlage der Prüfungsordnung der Universität Karlsruhe (TH) für den Bachelorstudiengang Informationswirtschaft vom 20. September 2004 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 48, vom 07. Oktober 2004) ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben. Auf Antrag können Studierende, die auf Grundlage der Prüfungsordnung der Universität Karlsruhe (TH) für den Bachelorstudiengang Informationswirtschaft vom 20. September 2004 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 48, vom 07. Oktober 2004) ihr Studium an der Universität Karlsruhe aufgenommen haben, ihr Studium auf Grundlage der Prüfungsordnung vom 12. August 2005 fortsetzen.

(3) Ebenso tritt die Prüfungsordnung für den Diplomstudiengang Informationswirtschaft vom 19. August 1999 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 11, vom 18. Oktober 1999), geändert mit der Satzung vom 12. September 2000 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 27, vom 12. Dezember 2000), zuletzt geändert mit Satzung vom 20. September 2004 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 49, vom 07. Oktober 2004), außer Kraft, behält jedoch ihre Gültigkeit bis zum 31. März 2011 für Prüflinge, die auf Grundlage der Prüfungsordnung für den Diplomstudiengang Informationswirtschaft vom 19. August 1999 ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben. Auf Antrag können Studierende, die auf Grundlage der Prüfungsordnung für den Diplomstudiengang Informationswirtschaft vom 19. August 1999 ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben, ihr Studium auf Grundlage der Prüfungsordnung vom 12. August 2005 fortsetzen.

Karlsruhe, den 12. August 2005

Professor Dr. sc. tech. Horst Hippler
(Rektor)

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