

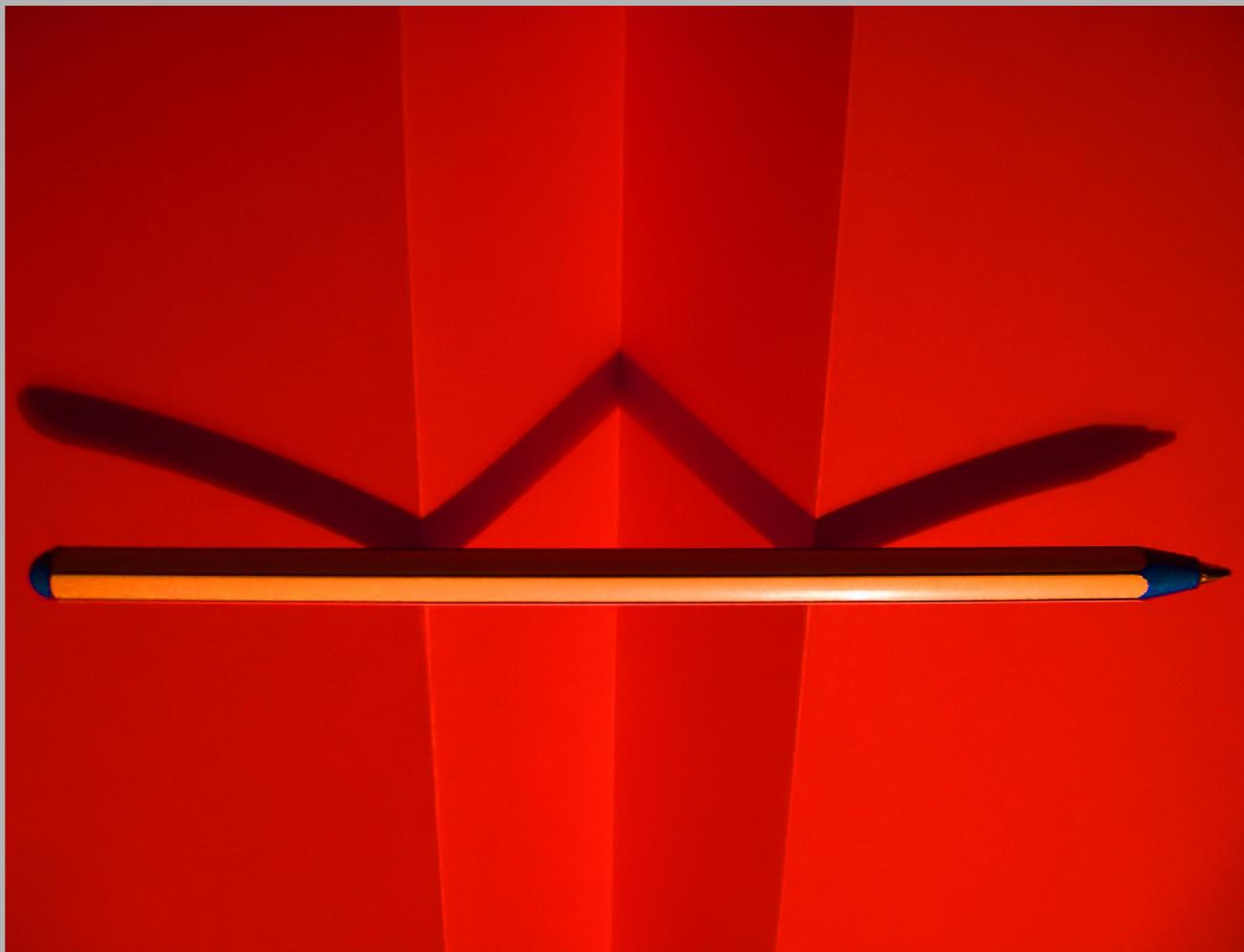
# Module Handbook Information Engineering and Management (B.Sc.) ER 2005

Summer term 2009

Long version

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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.

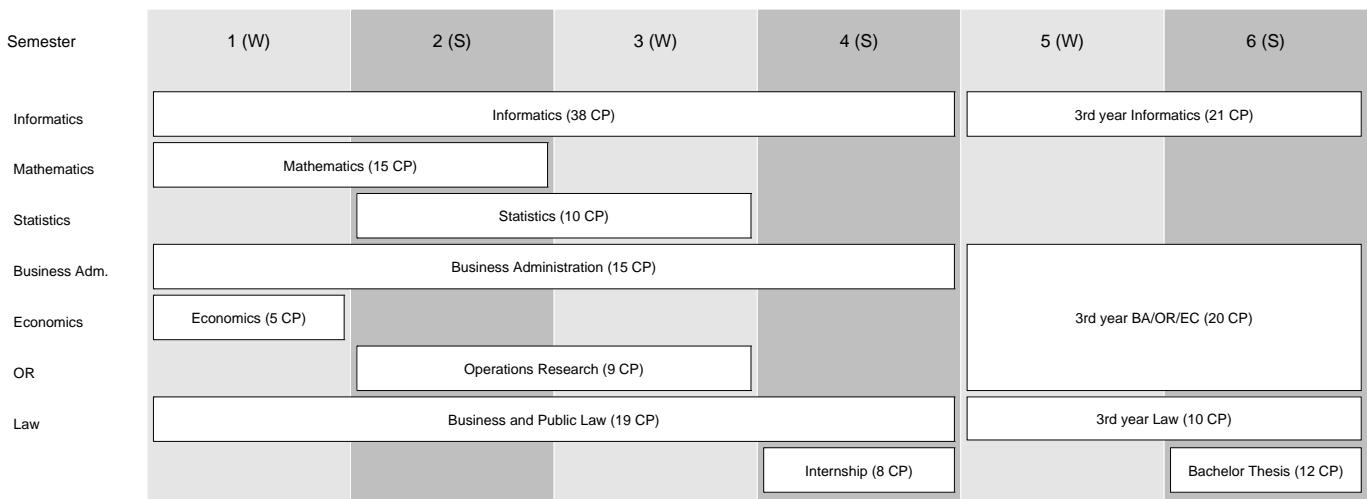


Abbildung 1: Structure of Bachelor Programme in Information Engineering and Management

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
<b>Subject Informatics</b>			
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
<b>Subjects Business Administration, OR, Economics, and Statistics</b>			
IW1WWBWL	Business Administration	Uhrig-Homburg, Weinhardt	15
IW1WWVWL	Economics	Berninghaus, Puppe	5
IW1WWOR	Operations Research	Waldmann, Stein	9
IW1WWSTAT	Statistics	Rachev, Höchstötter	10
<b>Subject Mathematics</b>			
IW1MAMATH	Mathematics	Wieners	15
<b>Subject Law</b>			
IW1INJURA	Law	Dreier	19
<b>Internship</b>			
IW1EXPRAK	Internship	Geyer-Schulz, Waldmann	8
Sum			119

Tabelle 1: Modules in the terms 1-4

ModulID	Course	Term	SWS	CP
<b>1st Term</b>				
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
<b>2nd Term</b>				
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
<b>3rd Term</b>				
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
<b>4th Term</b>				
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.

The following list of modules gives an overview of the modules a student may choose. They define the currently offered curriculum in the 3rd year.

<b>Modules in Informatics</b>			
ModulID	Module	Coordinator	CP
IW3INISW0	Information and Knowledge Systems	Böhm	21
IW3INCS0	Design and Implementation of Complex Software Systems	Tichy	21
IW3INNET0	Infrastructures	Zitterbart	21
IW3INGP0	Business Process Engineering	Oberweis	21
IW3INIDL0	Internet Applications	Schmeck	21
IW3INALG0	Algorithm Design	Wagner	21

<b>Modules BA/OR/EC</b>			
ModulID	Module	Coordinator	CP
IW3WWCRM0	Customer Relationship Management (CRM)	Geyer-Schulz	20
IW3WWCRM1	Analytic CRM	Geyer-Schulz	10
IW3WWCRM2	Operative CRM	Geyer-Schulz	10
IW3WWDEC0	Decision Theory	Waldmann	20
IW3WWEBM0	eBusiness Management	Weinhardt	20
IW3WWEBM1	Supply Chain Management: Information Management in Supply Networks	Weinhardt	10
IW3WWEBM2	eFinance	Weinhardt	10
IW3WWFIN0	Finance	Uhrig-Homburg	20
IW3WWFIN1	Financial Economics	Uhrig-Homburg	10
IW3WWFIN2	Quantitative Finance	Uhrig-Homburg	10
IW3WWFIN3	Financial Markets	Uhrig-Homburg	10
IW3WWMAR1	Foundations of Marketing	Gaul	10
IW3WWORG0	Strategy and Managerial Economics	Lindstädt	20
IW3WWORG1	Strategy, Interaction and Industrial Economics	Lindstädt	10
IW3WWORG2	Models of Strategic Decisions	Lindstädt	10
IW3WPRO0	Industrial Production	Rentz	20

<b>Module Law</b>			
ModulID	Module	Coordinator	CP
IW3INJURA	Law	Dreier, Kühling	10

## 2 Helpful information

### Module Handbook

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, their structure and extent (in CP), their dependencies, their learning outcomes, their learning control and examinations. Therefore it 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 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).

### 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 in the bachelor programme takes place online via the self-service function for students. The following functions can be accessed on <https://zvwgate.zvw.uni-karlsruhe.de/sb/> by means of the access information of the student card (FriCard):

- 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](https://zvwgate.zvw.uni-karlsruhe.de/download/leitfaden_studierende.pdf)

For students of the master programme the registration currently takes place at the **advisory service** of the faculty or at the respective institutes. Further information available on <http://www.wiwi.uni-karlsruhe.de/studium/pruefung/anabmelden/>.

### Repeating exams

Principally, a failed exam can be 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 losing the examination claim. A counseling interview is mandatory. For further information see <http://www.wiwi.uni-karlsruhe.de/studium/hinweise/>.

### 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.

## Used abbreviations

LP/CP	Credit Points/ECTS	Leistungspunkte/ECTS
LV	course	Lehrveranstaltung
RÜ	computing lab	Rechnerübung
S	summer term	Sommersemester
Sem.	semester/term	Semester
SPO	examination regulations	Studien- und Prüfungsordnung
SQ	key qualifikation	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.

### 3.1 Changes regarding modules

#### Computer Engineering [IW1INTINF] (S. 20)

##### remarks

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

#### Design and Implementation of Complex Systems [IW3INCS0] (S. 29)

##### remarks

The lecture *Softwaretechnik* was offered in the winter term 08/09 for the last time. An examination of the course is still possible in the summer term 2009. Starting from the summer term 09, *Softwaretechnik I* [24518] will be offered instead.

#### Infrastructures [IW3INNET0] (S. 33)

##### remarks

The lecture *Softwaretechnik* [25073] was offered in the winter term 08/09 for the last time. The exam will still be offered in the summer term 09. Registrations are no longer possible.

#### eBusiness Management [IW3WWEBM0] (S. 38)

##### remarks

[...] The lecture *Incentives in Markets and Firms* was offered in the winter term 2008/2009 for the last time and though will not be available in the module from summer term 2009 on.

#### Strategy and Managerial Economics [IW3WWORG0] (S. 48)

##### remarks

[...] The lecture *Incentives in Markets and Firms* was offered in the winter term 2008/2009 for the last time and though will not be available in the module from summer term 2009 on.

#### Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] (S. 50)

##### remarks

[...] The lecture *Incentives in Markets and Firms* was offered in the winter term 2008/2009 for the last time and though will not be available in the module from summer term 2009 on.

### 3.2 Changes regarding courses

#### Algorithm Engineering [xAlgoEng] (S. 175)

##### remarks

The lecture will be offered again in the winter term 09/10.



## 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 successfully. 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24001	Grundbegriffe der Informatik (S. <a href="#">55</a> )	2/1/2	W	4	Worsch
24004	Programming (S. <a href="#">56</a> )	2/0/2	W	4	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 solve 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 algoritm, 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 horizontal 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24500	Algorithmen I (S. 57)	3/1/2	S	8	Sanders

**Remarks**

Starting from the summer term 2009, the lecture *Algorithms I* will be offered in this module.

Students, who have already begun this module with the lecture *Informatik II*, but have not finished it completely, have to take part in the "straggler"-exam in the summer term 2009!

**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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
theogrundinfo	Theoretische Grundlagen der Informatik (S. 58)	3/1	W	8	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:

- Become familiar with relevant modelling languages for describing application domains and aspects of early software system design.
- Gain insight into methods and systems in computer science that support electronic business, and learn 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 addresses 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 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25070	Applied Informatics I - Modelling (S. 61)	2/1	W	4	Oberweis, Studer
25033	Applied Informatics II - IT Systems for e-Commerce (S. 62)	2/1	S	4	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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24512	Computer Engineering II (S. 60)	3/1/2	S	6	Karl
24502	Rechnerorganisation (S. 59)	3/1/2	S	6	Dillmann, Hanebeck, Henkel, Karl

### Remarks

Starting in the summer term 2009, it is possible to choose the lecture *Rechnerorganisation* [24502] in this module. Students, who have already started the lecture *Technische Informatik* [24512] can not subscribe in *Rechnerorganisation*.

Exceptionally for the summer term 2009, both lectures are the same, with different titles. 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*, weighted 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.

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.

#### Courses in module **Business Administration [IW1WWBWL]**

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25002/25003 26490	Financial Accounting and Cost Accounting (S. 63)	2/2	W	4	Burdelski Weinhardt, Geyer-Schulz
	Introduction to Information Engineering and Management (S. 64)	2/2	S	3	
25026/25027	Business Administration and Management Science C (S. 67)	2/0/2	W	4	Lindstädt, Ruckes, Uhrig-Homburg, Burdelski
25024/25025	Business Administration and Management Science B (S. 66)	2/0/2	S	4	Gaul, Lützkendorf, Geyer-Schulz, Weinhardt, Burdelski

## 4.3 Operations Research

### Module: Introduction to Operations Research

**Module key: [IW1WWOR]**

**Subject:** Operations Research

**Module coordination:** Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel

**Credit points (CP):** 9

#### Learning Control / Examinations

The assessment of the module is a written examination (120 minutes) according to §4(2), 1 of the examination regulation. In each term (usually in March and July), one examination is held for both courses.

The grade of the module corresponds to the grade of this 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

In this module students learn all the methods and models which are required for quantitative analysis. It forms the basis of a series of advanced lectures with a focus on both theoretical and practical aspects.

#### Content

This module treats the following topics: linear programming, network models, integer programming, nonlinear programming, dynamic programming, queuing theory, heuristic models.

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

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25040	Introduction to Operations Research I (S. 68)	2/2/2	S	4.5	Stein, Waldmann, Nickel
25043	Introduction to Operations Research II (S. 69)	2/2/2	W	4.5	Stein, Waldmann, Nickel

## 4.4 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.

#### 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,
- 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,
- 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25512	Economics I: Microeconomics (S. 70)	3/0/2	W	5	Puppe

#### Remarks

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

## 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 §4(2), 1 of the examination regulation (one for each of the courses Statistics I and II).

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

#### Prerequisites

None.

#### Conditions

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 important discrete and continuous distributions, covariance and correlation, convolution and limit distributions

C. Theory of estimation and testing: sufficiency of statistics, point estimation (optimality, ML-method ), internal estimations, theory of tests (optimality, most important examples of tests)

**Courses in module *Statistics* [IW1WWSTAT]**

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25008/25009	Statistics I (S. 71)	4/0/2	S	5	Höchstötter
25020/25021	Statistics II (S. 72)	4/0/2	W	5	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 commercial 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24012	Civil Law for Beginners (S. 73)	4/0	W	4	Dreier, Sester
24504	Advanced Civil Law (S. 74)	2/0	S	3	Dreier, Sester
24011	Commercial and Corporate Law (S. 75)	2/0	W	3	Sester
24016	Public Law I - Basic Principles (S. 77)	2/0	W	3	Spiecker genannt Döhmann
24520	Public Law II - Public Economic Law (S. 78)	2/0	S	3	Spiecker genannt Döhmann
24506/24017	Exercises in Civil Law (S. 76)	2/0	W/S	3	Sester, Dreier

#### Remarks

From the summer 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.

## 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 examination 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
01360	Mathematics I for Information Engineering and Management (S. <a href="#">79</a> )	4/2/2	W	7,5	Rieder, Wieners, Neuss
01877	Mathematics II for Information Engineering and Management (S. <a href="#">80</a> )	4/2/2	S	7,5	Rieder, Wieners, Neuss

#### Remarks

None.

## 4.8 General Modules

### Module: Internship

**Module key: [IW1EXPRAK]**

**Subject:** no category

**Module coordination:** Andreas Oberweis, Martina Zitterbart, alle Dozenten des Studiengangs

**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 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

#### 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 be 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

This module consists of one course from each of the following four blocks and the total number of credits is at least 21:

1. At least one of the courses [24079] and [25700] has to be selected.
2. At least one of the following course [24518], [24574], [24074] and [24116] has to be selected.
3. A seminar has to be selected.
4. At least one of the following course [24171], [24624] and [24649] has to be selected.
5. The lecture *Algorithmtechnik* has to be passed for the lectures [24171] and [24624].

#### 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24079	Algorithm Design (S. 88)	3/1	W	6	Wagner, Sanders
25700	Efficient Algorithms (S. 123)	2/1	S	5	Schmeck
24574	Communication and Database Systems (S. 101)	4/2	S	4/8	Böhm, Zitterbart
24074	Telematics for Information Management and Engineering (S. 85)	2/1	W	4	Juling
24072	Public Key Cryptography (S. 84)	2/1	W	5	Geiselmann
24079s	Seminar in Algorithm Design (S. 90)	2	W/S	3	Wagner
24079p	Practical Course in Algorithm Design (S. 89)	4	W/S	5	Sanders, Wagner
24171	Randomized Algorithms (S. 99)	2	W	4	Worsch
xAlgoEng	Algorithm Engineering (S. 175)	2	W/S	4	Sanders, Wagner
24518	Software Engineering I (S. 100)	3/1/2	S	6	Tichy

#### Remarks

None.

**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.

**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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24518	Software Engineering I (S. 100)	3/1/2	S	6	Tichy
24660	Software Development for modern, parallel platforms (S. 106)	2	S	3	Tichy, Pankratius
24574	Communication and Database Systems (S. 101)	4/2	S	4/8	Böhm, Zitterbart
24626	Component Based Software Engineering (S. 104)	2	S	3	Reussner
SWTSem	Seminar in Software Engineering (S. 166)	2	W/S	3	Tichy, Reussner, Snelting

**Remarks**

The lecture *Softwaretechnik* was offered in the winter term 08/09 for the last time. An examination of the course is still possible in the summer term 2009.

Starting from the summer term 09, *Softwaretechnik I* [24518] will be offered instead.

## 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25726	Workflow-Management (S. 125)	2/1	S	5	Oberweis
25736	Business Process Modelling (S. 127)	2/1	W	5	Oberweis, Mevius
25740	Knowledge Management (S. 128)	2/1	W	5	Studer
25748	Semantic Web Technologies I (S. 129)	2/1	W	5	Studer, Hitzler, Rudolph, Rudolph
25786	Enterprise Architecture Management (S. 133)	2/1	W	5	Wolf
25730	Software Technology: Quality Management (S. 126)	2/1	S	5	Oberweis
25790	Capability maturity models for software and systems engineering (S. 134)	2	S	4	Kneuper
PraBI	Computing Lab Information Systems (S. 165)	2	W/S	5	Oberweis, Seese, Stucky, Studer
BSemBI	Bachelor Seminar in Enterprise Information Systems (S. 164)	2	W/S	2	Oberweis
SemAIFB1	Seminar in Enterprise Information Systems (S. 167)	2	W/S	4	Studer, Oberweis, Stucky, Wolf, Kneuper
24518	Software Engineering I (S. 100)	3/1/2	S	6	Tichy

### Remarks

None.

## 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 compulsory.
- Select one out of 24518 and 24116.
- Select one out of 25748, 24124, 25770, 24149.
- Following § 17, 3 of “Prüfungsordnung Informatiionswirtschaft” 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24074	Telematics for Information Management and Engineering (S. 85)	2/1	W	4	Juling
25702	Algorithms for Internet Applications (S. 124)	2/1	W	5	Schmeck
24072	Public Key Cryptography (S. 84)	2/1	W	5	Geiselmann
25748	Semantic Web Technologies I (S. 129)	2/1	W	5	Studer, Hitzler, Rudolph, Rudolph
24124	Web Engineering (S. 95)	2/1	W	4	Nußbaumer
24149	Network and IT-Security Management (S. 98)	2/1	W	5	Hartenstein
25770	Service-oriented Computing 1 (S. 132)	2/1	W	5	Tai
xIDLs	Seminar Information Services in Networks (S. 177)	2	W/S	4	Schmeck, Tai, Juling, Studer, Hartenstein, Tichy
xIDLp	Practical Course Information Services in Networks (S. 176)	4	W/S	5	Schmeck, Tai, Juling, Tichy, Studer, Hartenstein
24518	Software Engineering I (S. 100)	3/1/2	S	6	Tichy

## 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.

### 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 “Communications and 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24574	Communication and Database Systems (S. 101)	4/2	S	4/8	Böhm, Zitterbart
25740	Knowledge Management (S. 128)	2/1	W	5	Studer
24118	Data Warehousing and Mining (S. 94)	2/1	W	5	Böhm
24111	Workflow Management Systems (S. 93)	2	W	3	Mülle
24603	The Digital Library (S. 103)	2	S	3	Schütte
25762	Intelligent Systems in Finance (S. 130)	2/1	S	5	Seese
prosemis	Undergraduate Seminar Information Systems (S. 173)	2	S	3	Böhm
SemAIFB4	Seminar Knowledge Management (S. 168)	2	W	4	Studer

## Module: Infrastructures

**Module key:** [IW3INNET0]

**Subject:** Informatics (Specialization)

**Module coordination:** Martina Zitterbart

**Credit points (CP):** 21

### 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

Courses for at least 21 credits have to be passed.

- One of the following lectures is mandatory: the communication part (K-Teil) of the lecture *Communication and Database Systems* [24574] (4 CP) or the lecture *Telematics for Information Management and Engineering* [24074].
- The lecture *Telematics* [24128] is mandatory.
- At least one of the following lectures has to be chosen: *Public Key Cryptography for Information Engineering and Management* [24072], *Software Technology* [24073], *Algorithm Design* [24079].
- In addition, at least one of the following lectures has to be chosen: *Multimedia Communication* [24132], *Next Generation Internet* [24674], *Mobile Communication* [24643], *Network Security: Architectures and Protocols* [24601], *High Speed Communication* [24110], *Wireless Sensor-Actuator-Networks* [24104].
- A seminar in the field of Telematics has to be attended (but not more than one).

### Learning Outcomes

Students shall

- be aware of basic architectures, protocols and protocol mechanisms and be able to assess their performance.
- be able to identify underlying concepts of communication systems and be able to apply and implement them in new systems.
- know basic methods for the design of communication systems.
- know current research concerning future networks.

### Content

This module teaches basic principles in the field of communication systems. In addition, several aspects of communication networks are presented in more detail. Basic methods, architectures and protocols as well as the practical applicability of the concepts taught in this module play an important role. Students acquire the knowledge required to handle future systems and applications in the field of communication.

### Courses in module *Infrastructures* [IW3INNET0]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24574	Communication and Database Systems (S. 101)	4/2	S	4/8	Böhm, Zitterbart
24074	Telematics for Information Management and Engineering (S. 85)	2/1	W	4	Juling
24128	Telematics (S. 96)	2/1	W	4	Zitterbart
24072	Public Key Cryptography (S. 84)	2/1	W	5	Geiselmann
24079	Algorithm Design (S. 88)	3/1	W	6	Wagner, Sanders
24643	Mobile Communication (S. 105)	2/0	S	4	Zitterbart, Waldhorst
24674	Next Generation Internet (S. 107)	2/0	S	4	Bless
24132	Multimedia Communication (S. 97)	2/0	W	4	Bless
24601	Network Security: Architectures and Protocols (S. 102)	2/0	S	4	Zitterbart, Völker, Schöller
24110	High Performance Communication (S. 92)	2/0	W	4	Zitterbart
24104	Wireless Sensor-Actuator-Networks (S. 91)	2/0	W	4	Zitterbart
24074s	Seminar in Telematics (S. 87)	2	W/S	4	Zitterbart, Hartenstein
24074p	Practical Course in Telematics (S. 86)	2	W/S	5	Zitterbart, Hartenstein
24518	Software Engineering I (S. 100)	3/1/2	S	6	Tichy

### Remarks

The lecture *Softwaretechnik* [25073] was offered in the winter term 08/09 for the last time. The exam will still be offered in the summer term 09. Registrations are no longer possible.

## 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].
- 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 implementation of service management in all parts of the company.

For operative CRM we present the design of customer-oriented, IT-supported business processes based on business process modelling and we explain these processes in concrete application scenarios (e.g. marketing campaign management, call center management, sales force management, field services, ...).

Analytic CRM is dedicated to improve the use of knowledge about customers in the broadest sense for decision-making (e.g. product-mix decisions, bonus programs based on customer loyalty, ...) and for the improvement of services. A requirement for this is the tight integration of operative systems with a data warehouse, the development of customer-oriented and flexible reporting systems, and – last but not least – the application of statistical methods (clustering, regression, stochastic models, ...).

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

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26508	Customer Relationship Management (S. 155)	2/1	W	5	Geyer-Schulz
26522	Analytical CRM (S. 158)	2/1	S	5	Geyer-Schulz
26520	Operative CRM (S. 156)	2/1	W	5	Geyer-Schulz
26524	Bachelor Seminar in Information Engineering and Management (S. 160)	2	W/S	2	Geyer-Schulz
25158	Corporate Planning and Operations Research (S. 112)	2/1	W	5	Gaul
26240	Competition in Networks (S. 149)	2/1	S	5	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].

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 models 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 loyalty, ...). A basic requirement for this is the integration and collection of data from operative processes in a suitably defined data-warehouse in which all relevant data is kept for future analysis. The process of transferring data from the operative systems into the data warehouse is known as the ETL process (Extraction / Translation / Loading). The process of modelling a data-warehouse as well as the so-called extraction, translation, and loading process for building and maintaining a data-warehouse are discussed in-depth. The data-warehouse serves as a base for flexible management reporting. In addition, various statistic methods (e.g. cluster analysis, regression analysis, stochastic models, ...) are presented which help in computing suitable key performance indicators or which support decision-making.

**Courses in module Analytical CRM [IW3WWCRM1]**

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26522	Analytical CRM (S. 158)	2/1	S	5	Geyer-Schulz
26508	Customer Relationship Management (S. 155)	2/1	W	5	Geyer-Schulz
25158	Corporate Planning and Operations Research (S. 112)	2/1	W	5	Gaul
26240	Competition in Networks (S. 149)	2/1	S	5	Mitusch
26524	Bachelor Seminar in Information Engineering and Management (S. 160)	2	W/S	2	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].

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 management, permission marketing, ...)
- Customer service processes (sales force management, field services, call center management, ...)

**Courses in module *Operative CRM* [IW3WWCRM2]**

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26520	Operative CRM (S. 156)	2/1	W	5	Geyer-Schulz
26508	Customer Relationship Management (S. 155)	2/1	W	5	Geyer-Schulz
25158	Corporate Planning and Operations Research (S. 112)	2/1	W	5	Gaul
26240	Competition in Networks (S. 149)	2/1	S	5	Mitusch
26524	Bachelor Seminar in Information Engineering and Management (S. 160)	2	W/S	2	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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25525	Game Theory I (S. 120)	2/2	S	6	Berninghaus
25369	Game Theory II (S. 118)	2/2	W	6	Berninghaus
25662	Simulation I (S. 122)	2/1/2	W/S	5	Waldmann
25365	Economics of Uncertainty (S. 117)	2/2	S	6	Barbie, Berninghaus
25373	Experimental Economics (S. 119)	2/1	S	5	Berninghaus, Bleich

### Remarks

The lecture Experimental Economics is offered for the last time in summer 2009.

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.
- 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 trading” provides theoretically profound and also practical-oriented background about the functioning of international financial markets. The focus is placed on the economic and technical design of markets as information processing systems.

In “eServices” the increasing impact of electronic services compared to the traditional services is outlined. The Information- und Communication Technologies enable the provision of services, which are mainly characterized by interactivity and individuality. This course provides basic knowledge about the development and management of ICT-based services.

The 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26452	Management of Business Networks (S. 151)	2/1	W	5	Weinhardt, Kraemer
26454	eFinance: Information Engineering and Management for Securities Trading (S. 152)	2/1	W	5	Weinhardt, Riordan
26466	eServices (S. 153)	2/1	S	5	Weinhardt, Satzger
26240	Competition in Networks (S. 149)	2/1	S	5	Mitusch
21078	Logistics (S. 81)	3/1	S	6	Furmans
25598	Operations Management (S. 121)	3	W	5	Schön
SemIW	Seminar Information Engineering and Management (S. 170)	2	W/S	4	Weinhardt
26478	Practical seminar Information Engineering and Management (S. 154)	0*	W/S	1	Weinhardt

**Remarks**

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

The lecture *Incentives in Markets and Firms* was offered in the winter term 2008/2009 for the last time and though will not be available in the module from summer term 2009 on.

## 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

- The core courses *Management of Business Networks* [26452] 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

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 organizational, technical and mental-social 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. 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 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26452	Management of Business Networks (S. 151)	2/1	W	5	Weinhardt, Kraemer
21078	Logistics (S. 81)	3/1	S	6	Furmans
25598	Operations Management (S. 121)	3	W	5	Schön
SemIW	Seminar Information Engineering and Management (S. 170)	2	W/S	4	Weinhardt
26478	Practical seminar Information Engineering and Management (S. 154)	0*	W/S	1	Weinhardt

### Remarks

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

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

**Module key:**

**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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26454	eFinance: Information Engineering and Management for Securities Trading (S. 152)	2/1	W	5	Weinhardt, Riordan
25762	Intelligent Systems in Finance (S. 130)	2/1	S	5	Seese
26555	Asset Pricing (S. 162)	2/1	S	5	Uhrig-Homburg
25240	Market Microstructure (S. 115)	2/0	W	3	Lüdecke
SemIW	Seminar Information Engineering and Management (S. 170)	2	W/S	4	Weinhardt
26478	Practical seminar Information Engineering and Management (S. 154)	0*	W/S	1	Weinhardt

### Remarks

From the winter term 2008/2009 on, *Capital Market Theory* will be lectured during the summer term and will be offered in a different form, thereby leading to a reduction of CP.

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.

### 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 fundamant 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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26555	Asset Pricing (S. 162)	2/1	S	5	Uhrig-Homburg
26550	Derivatives (S. 161)	2/1	S	5	Uhrig-Homburg
25325	Statistics and Econometrics in Business and Economics (S. 116)	2/2	W	5	Heller
25365	Economics of Uncertainty (S. 117)	2/2	S	6	Barbie, Berninghaus
25662	Simulation I (S. 122)	2/1/2	W/S	5	Waldmann
25016	Economics III: Introduction in Econometrics (S. 108)	2/2	S	5	Höchstötter
26580	Seminar in Financial Engineering (S. 163)	2	W	3	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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26555	Asset Pricing (S. 162)	2/1	S	5	Uhrig-Homburg
25365	Economics of Uncertainty (S. 117)	2/2	S	6	Barbie, Berninghaus

### Remarks

From the winter term 2008/2009 on, *Capital Market Theory* will be lectured during the summer term and will be offered in a different form, thereby leading to a reduction of CP.

**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	SWs C/E/T	Term	CP	Responsible Lecturer(s)
26550	Derivatives (S. 161)	2/1	S	5	Uhrig-Homburg
25662	Simulation I (S. 122)	2/1/2	W/S	5	Waldmann

**Remarks**

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

## Module: Financial Markets

**Module key:** [IW3WWFIN3]

**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

The module teaches basics of price formation and microstructure of financial markets. Besides basic questions of the evaluation of investment decisions on stock and bond markets it is analyzed how structural properties of a financial market affect the price formation process and the qualitative properties of financial 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.
- Marktmikrostruktur  
Historischer Überblick, Struktur- und Qualitätsmerkmale von Finanzmärkten, Preisbildung auf Händler- und Auktionsmärkten, Auswirkungen asymmetrischer Information, kurzfristiges Zeitreihenverhalten von Marktpreisen.
- Seminar  
Changing up to date topics, related to the contents of the lectures.

### Courses in module *Financial Markets* [IW3WWFIN3]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26555	Asset Pricing (S. 162)	2/1	S	5	Uhrig-Homburg
25240	Market Microstructure (S. 115)	2/0	W	3	Lüdecke
26580	Seminar in Financial Engineering (S. 163)	2	W	3	Uhrig-Homburg

### Remarks

From the winter term 2008/2009 on, *Capital Market Theory* will be lectured during the summer term and will be offered in a different form, thereby leading to a reduction of CP.

**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**

Assessment consist of a written module exam according to §4 Abs. 2, Nr. 1 of the Prüfungsordnung für Informationswirtschaft. The module 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].

If the Bachelor-Seminar [25191] is attended, the assessment for this course is done following §4, Abs. 2, Nr. 3 as an individual examination. In this case, the module exam could be restricted to 90 min.

The final mark for the module is the average of the marks for each course weighted by the credits of the course.

**Assessment cycle:** every semester**Assessment repetition:** possible at each regular examination date within one year.

It is recommended, to attend more lectures than required to fulfill 10 CP as it is possible to examine in these additional lectures and influence the final mark positively.

**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.
- Following § 17, 3 of „Prüfungsordnung Informationswirtschaft“ a seminar of this module or of the other BA/OR/EC module has to be chosen and completed.
- At least 10 CP must be achieved.

**Learning Outcomes****Content****Courses in module *Foundations of Marketing* [IW3WWMAR1]**

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25150	Marketing and Consumer Behavior (S. 109)	2/1	W	5	Gaul
25154	Modern Market Research (S. 110)	2/1	S	5	Gaul
25156	Marketing and Operations Research (S. 111)	2/1	S	5	Gaul
25177	Brand Management (S. 113)	2	W	3,5	Neibecker
25191	Bachelor Seminar in Foundations of Marketing (S. 114)	2	W/S	2	Gaul

**Module: Strategy and Managerial Economics****Module key: [W3WWORG0]****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* [W3WWORG0]**

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25900	Management and Strategy (S. 135)	2/0	S	4	Lindstädt
25525	Game Theory I (S. 120)	2/2	S	6	Berninghaus
25907	Special Topics in Management: Management and IT (S. 136)	1/0	W/S	2	Lindstädt
25908	Modeling Strategic Decision Making (S. 137)	2/1	S	6	Lindstädt
26291	Managing New Technologies (S. 150)	2/1	S	5	Reiß
25915	Seminar: Management and Organization (S. 138)	2	S	4	Lindstädt
25916	Seminar: Management and Organization (S. 139)	2	W	4	Lindstädt
SemWIOR4	Seminar in Game and Decision Theory (S. 172)	2	W/S	4	Berninghaus
SemWIOR3	Seminar in Experimental Economics (S. 171)	2	W/S	4	Berninghaus

**Remarks**

The lecture *Incentives in Markets and Firms* was offered in the winter term 2008/2009 for the last time and though will not be available in the module from summer term 2009 on.

**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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25900	Management and Strategy (S. <a href="#">135</a> )	2/0	S	4	Lindstädt
25525	Game Theory I (S. <a href="#">120</a> )	2/2	S	6	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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25908	Modeling Strategic Decision Making (S. 137)	2/1	S	6	Lindstädt
26291	Managing New Technologies (S. 150)	2/1	S	5	Reiß
25915	Seminar: Management and Organization (S. 138)	2	S	4	Lindstädt
25916	Seminar: Management and Organization (S. 139)	2	W	4	Lindstädt

### **Remarks**

- Die Vorlesung Modelle strategischer Führungsentscheidungen [25908] wird ab S 09 gelesen.

The lecture *Incentives in Markets and Firms* was offered in the winter term 2008/2009 for the last time and though will not be available in the module from summer term 2009 on.

## 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 a written exam for all courses together.

### 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 courses [25950], [25952], [25954] are obligatory.
- Following §17, 3 of the examination regulation for Information Engineering and Management, a seminar of this module has to be chosen and completed.

The courses are conceived as independent ones, such that they can be followed in any order.

### Learning Outcomes

Objectives of the courses are:

- Techno-economic assessment of trends in technical development and of new production techniques (industrial research and development (R&D), innovation processes),
- Techno-economic assessment of production techniques and systems, technology assessment, technology transfer,
- Design and optimisation of (technical) production systems:
  - Optimal layout of machines / equipment / plants,
  - Production optimisation within a given plant (PPS, CIM, etc.).

### Content

The courses in the field “Industrial Production” deal with the planning and implementation of all business tasks in relation with the production of goods. In addition to the production industries, energy supply and construction are covered in the courses. Besides the desired products, emissions arise during the supply, transformation, storage and transport of goods. Therefore, special emphasis is put on aspects of environmental protection in relation with industrial production. The lectures begin with a practical way of looking at a problem at hand of selected case studies from different industrial sectors. Subsequently, models and mathematical approaches are introduced and discussed with regard to their effectiveness as for the case studies.

**Courses in module *Industrial Production* [IW3WWPRO0]**

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25950	Fundamentals of Production Management (S. 140)	2/2	S	7,5	Schultmann
25952	Planning and Management of Industrial Plants (S. 141)	2/2	W	5,5	Schultmann, n.n.
25954	Production and Logistics Management (S. 142)	2/2	S	5,5	Fröhling, Schultmann
25963	The Management of R&D Projects with Case Studies (S. 146)	2/2	W/S	3,5	Schmid
25975	Computer-assisted Planning and Control of Production and Simulation of Processes (S. 147)	2/0	S	3,5	Möst, Fröhling
25959	Energy Policy (S. 143)	2/0	S	3,5	Wietschel
25960	Material and Energy Flows in the Economy (S. 144)	2/0	W	3,5	Hiete, Hiete
25962	Exhaust Emissions (VWL), Emissions into the Environment (ING) (S. 145)	2/0	W	3,5	Karl
25995	Material flow analysis and life cycle assessment (S. 148)	2/0	W	3,5	Schebek
SemIIP2	Seminar in Industrial Production (S. 169)	2	W/S	4	Schultmann

## 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 Industriel and intellectual property law (3 CP),
2. written exam (§4(2), 1) of 45 Minuten covering the course data protection 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) covering *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	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24070	Industrial Property and Copyright Law (S. 83)	2/0	W	3	Dreier
24018	Data Protection Law (S. 82)	2/0	W	3	Spiecker genannt Döhmann
rechtsem	Seminar in Law (S. 174)	2	W/S	4	Dreier, Sester, Spiecker genannt Döhmann

## 5.4 General Modules

### Module: Bachelor Thesis

**Module key: [IW3IWBA**  
**TESIS]**

**Subject:** no category

**Module coordination:** Andreas Oberweis, Martina Zitterbart, Der Vorsitzende des Prüfungsausschusses

**Credit points (CP):** 12

#### Learning Control / Examinations

The Bachelor thesis is examined by an examiner following the examination regulation.

#### 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: Grundbegriffe der Informatik

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

#### Content

#### 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.

**Course: Algorithmen 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****Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content**

**Course: Theoretische Grundlagen der Informatik****Course key:** [theogrundinfo]**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 ist described in the module.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content**

**Course: Rechnerorganisation****Course key: [24502]****Lecturers:** Rüdiger Dillmann, Uwe D. Hanebeck, 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 assessment is described in the module.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content**

## 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

**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 of this course is a written examination (60 min) according to the examination regulation in the first week after lecture period.

### 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 aspects, 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 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 of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation of the Bachelor of Science programme in Information Engineering and Management. 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, assess, 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**

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 Rechnungswesens, 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
- Written report about one exercise case: 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 venture creation, capital budgeting and outsourcing.
- 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
- Financial planning and investment
- Information and information technology
- Outsourcing und horizontale Unternehmensintegration

- Service Engineering
- Electronic markets
- Logistics/SCM
- Web/Internet-Marketing
- Production and Procurement

**Media**

Web, Audio/Slides, Full Text Documents.

**Basic literature**

- 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****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., developments in the society, changing conditions of markets, alterations w.r.t. buying behavior) to benefit different target groups.

Main topics will deal with market research and optimized application of marketing mix instruments with emphasis on "marketing and the web", "innovation management", and "international marketing".

**2. Production economics**

In the part of production economics the student will learn basics in the field of production theory, procurement and resource acquisitions, 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 competitive 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, market engineering

**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****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

**Basic literature**

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

**Course: Introduction to Operations Research I****Course key: [25040]****Lecturers:** Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel**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. 22)**Learning Control / Examinations****Prerequisites**

See module information.

**Conditions**

None.

**Learning Outcomes**

Siehe Modulbeschreibung.

**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**

Tafel, Folien, Skript, OR-Software

**Basic literature**

Skript

**Complementary literature**

- Hillier, Lieberman: Introduction to Operations Research. McGraw-Hill
- Murty: Operations Research. Prentice-Hall
- Neumann, Morlock: Operations Research. Hanser
- Winston: Operations Research - Applications and Algorithms. PWS-Kent
- Büning, Naeve, Trenkler, Waldmann: Mathematik für Ökonomen im Hauptstudium. Oldenbourg 2000

**Course: Introduction to Operations Research II****Course key: [25043]****Lecturers:** Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel**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. [22](#))**Learning Control / Examinations**

See description of this module.

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

None.

**Learning Outcomes**

Siehe Modulbeschreibung.

**Content**

Integer and Combinatorial Programming: Basic notions, cutting plane methods, 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, dynamical and stochastic inventory models, queuing theory.

**Media**

Tafel, Folien, Skript, OR-Software

**Basic literature**

Skript

**Complementary literature**

- Hillier, Lieberman: Introduction to Operations Research. McGraw-Hill
- Murty: Operations Research. Prentice-Hall
- Neumann, Morlock: Operations Research. Hanser
- Winston: Operations Research - Applications and Algorithms. PWS-Kent
- Büning, Naeve, Trenkler, Waldmann: Mathematik für Ökonomen im Hauptstudium. Oldenbourg 2000

## Course: Economics I: Microeconomics

Course key: [25512]

**Lecturers:** Clemens Puppe

**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

Assessment will consist of a written exam (120 min) following §4, Abs. 2, 1 of the SPO.

### 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), Oldenbourg Verlag

Pindyck, Robert S./Rubinfeld, Daniel L., Mikroökonomie, 6. Aufl., Pearson. München, 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. [24](#))**Learning Control / Examinations**

Assessment will consist of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

**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. [24](#))**Learning Control / Examinations**

Assessment will consist of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

**Prerequisites**

None.

**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 important discrete and continuous distributions, covariance and correlation, convolution and limit distributions

C. Theory of estimation and testing: sufficiency of statistics, point estimation (optimality, ML-method ), internal estimations, theory of tests (optimality, most important examples of tests)

**Media**

lecture notes

**Basic literature**

Skriptum: 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
- Büning, 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.: Standard 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. [25](#))

### Learning Control / Examinations

Assessment will consist of a written exam following §4, Abs. 2, 1 of the SPO. Time: 90 min.

### 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 basics of jurisdiction, international conflicts and alternative dispute settlement will be discussed. The main focus of the course is on the fundamental notions of civil law as defined and regulated in the German Civil Code (Bürgerliches Gesetzbuch, BGB), such as subjects and objects of law, legally binding declarations, agency, the formation of contracts, standard terms and conditions, consumer protection, performance of contractual promises. The course ends with an outlook to the law of contracts and property law.

### Media

Transparencies/Slides

### 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. [25](#))**Learning Control / Examinations**

Assessment will consist of written exams within *Privatrechtliche Übung* following §4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

**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. [25](#))**Learning Control / Examinations**

Assessment will consist of written exams following §4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content****Media**

Folien

**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**

tba in Vorlesungsfolien

**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. [25](#))**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 recommended 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 knowledge 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 sessions the substantive law which 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 are reserved to written exam problems which cover the totality of what students have learned so far. Additional 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. [25](#))**Learning Control / Examinations**

Assessment will consist of a written exam concerning the courses *Public Law I* [24016] and *Public Law II* [24520] (following §4(2), 1 SPO).

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes**

[Jonas wiederherstellen]

**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 (easy) administrative and constitutional cases.

**Media**

abstracts, sketches on blackboard, slides

**Basic literature**

tba in scriptum

**Complementary literature**

tba in scriptum

**Remarks**

From the 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 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. [25](#))**Learning Control / Examinations**

Assessment will consist of a written exam concerning the courses *Public Law I* [24016] and *Public Law II* [24520] (following §4(2), 1 SPO).

**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. [26](#))

**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 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“ ,eduate 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, Birkhäuser
- 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. [26](#))

**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 lectures in mathematics give an overview in basic mathematical knowledge which is required to understand modern computer science and economical sciences. Part II consists 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, Birkhäuser
- 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: Logistics

Course key: [21078]

**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. 38), Supply Chain Management [IW3WWEBM1] (S. 40)

#### Learning Control / Examinations

Assessment will consist of a written exam following §4, Abs. 2, 1 of the examination regulation.

#### Prerequisites

Required 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 Management

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

##### Identification Technologies

#### Media

Blackboard, Beramer, In Exercises also PCs

#### Complementary literature

- Arnold/Isermann/Kuhn/Tempelmeier. Handbuch Logistik, Springer Verlag, 2002 (Neuaufage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren, Oldenbourg Verlag, 1982
- Domschke/Drexel. 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

**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. [52](#))**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. Organisational 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**

Will 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. [52](#))**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 sanctions 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 on the basis of the principle of territoriality will be explained. Following, the different IP rights will be discussed with regard to their respective conditions and scope of protection. An overview of licensing and of the sanctions in case of infringement of IP rights will be given.

**Media**

Slides.

**Basic literature**

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

**Complementary literature**

Additional literature tba

## Course: Public Key Cryptography

Course key: [24072]

**Lecturers:** Willi Geiselmann

**Credit points (CP):** 5 **Hours per week:** 2/1

**Term:** Wintersemester **Level:** 3

**Teaching language:** Deutsch

**Part of the modules:** Algorithm Design [IW3INALG0] (S. 28), Information Services in Networks [IW3INIDL0] (S. 31), Infrastructures [IW3INNET0] (S. 33)

### Learning Control / Examinations

The assessment will consist of a written 1 hour exam according to § 4 Abs. 2 Nr. 1 SPO.

### Prerequisites

None.

### Conditions

None.

### Learning Outcomes

The student gets acquainted with practical methods and mechanisms of IT-security, as well as with the theoretical background of IT-security.

### Content

First, the basic concepts of cryptography are presented, e.g. one-way function, hash function, and digital signatures. Then some of the most important cryptographic algorithms will be discussed, pointing out its strengths and weaknesses. In particular, public-key encryption, digital signatures (RSA, ElGamal, Knapsack and McEliece), and key exchange (Diffie-Hellman) will be presented. The security of public-key systems, is based almost exclusively on number theoretical problems like prime tests, factoring large numbers and calculate discrete logarithms in finite groups. To understand the choice of parameters of cryptographic systems and to evaluate the security of them, some of the algorithms for solving these number theoretical problems are presented. Finally, current protocols such as Secure Shell (SSH), Transport Layer Security (TLS) and anonymous digital cash will be discussed. These protocols make use of the basic cryptographic algorithms to solve tasks such as authentication and key exchange.

### Media

lecture notes

### Basic literature

- lecture notes, available at <http://iaks-www.ira.uka.de/lehre/pubkey/index.html> (username and password will be announced in the lecture)
- J. Buchmann, Introduction to Cryptography, Springer, Heidelberg, 2003.

### Complementary literature

- W. Stallings, Cryptography and Network Security, Prentice Hall, New Jersey, 1999.
- M. Bishop, Introduction to Computer Security, Addison-Wesley, Boston, 2005.
- W. Trappe, L. Washington, Introduction to Cryptography with Coding Theory, Prentice Hall, New Jersey, 2002.

**Course: Telematics for Information Management and Engineering****Course key: [24074]****Lecturers:** Wilfried Juling**Credit points (CP):** 4 **Hours per week:** 2/1**Term:** Wintersemester **Level:** 4**Teaching language:** Deutsch**Part of the modules:** Algorithm Design [IW3INALG0] (S. 28), 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**

Goal of this lecture is to introduce the basic descriptions and methodologies of computer networks.

**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 controlled medium access or error processing. Further topics deal with the realization of worldwide networks regarding protocols, technologies and algorithms 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: Practical Course in Telematics****Course key: [24074p]****Lecturers:** Martina Zitterbart, Hannes Hartenstein**Credit points (CP):** 5 **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 a practical work (assignments and an implementation) and a presentation of the same.

Presentations and practical work are weighted in equal shares.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes**

Students have the opportunity

- to understand and master a specific protocol or application of Telematics thoroughly.
- to implement protocols and applications of the computer network domain in a prevalent programming language.
- to work goal-oriented, independently, but also in a team, within a given topic and on a given assignment.

**Content**

The practical course specifies topics that were partly introduced in the respective lectures. A prior attendance of these lectures is helpful but not a prerequisite.

In the winter term, the following topic is covered:

- Mobile Communications (Presentations, configuration and programming tasks, covering the following topics: Wireless LAN, Mobile IP, Bluetooth and Mobile Ad hoc Networks)

In the summer term, following topics will be covered:

- Practical project "Wireless sensor network" (Work on a project of wireless sensor-aktor-networks)
- Practical project "Technologies of the future internet"
- Simulation of computer networks

**Basic literature**

Literature will be presented in each practical course.

## 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, communication technologies, spezial routing procedures, data aggregation, safety and algorithms in sensor networks etc.
- Design, evaluation and simulation of identity-related services in highly distributed environments. Personalized and authorized access on services in highly distributed environments demands a basic analysis and evaluation of the architectural design of the used security mechanisms. This seminar will clarify conceptual possibilities of identity and access management systems, evaluate authentication and authorization infrastructures and analyze how simulations can be used to quantify potential risks of newly developed services.

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: Algorithm Design****Course key: [24079]****Lecturers:** Dorothea Wagner, 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. 28), Infrastructures [IW3INNET0] (S. 33)**Learning Control / Examinations**

Assessment will consist of a written exam (1h) according to § 4 Abs. 2 Nr. 1 SPO.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes**

The students

- get a deep insight into the most important subareas of algorithmics,
- get a broad algorithmic understanding,
- get the ability to understand and determine the running times of algorithms,
- get the knowledge of fundamental algorithms and data structures, as well as the ability to apply them to new problems.

**Content**

The Lecture "Algorithm Design" (german name is "Algorithmentechnik") deepens the most important subareas of algorithmics. This, for example, includes graph algorithms, advanced data structures, design principles for algorithms, algorithmic geometry, and combinatorial optimization. Moreover, different methodic approaches are deepened. For Example, randomized algorithms, approximation algorithms, parallel algorithms, online algorithms, and algorithm engineering.

**Basic literature**

None

**Complementary literature**

- K. Mehlhorn, P. Sanders. Algorithms and Data Structures – The Basic Toolbox. Springer, 2008, to appear.
- T. H. Cormen, C. E. Leiserson, R. L. Rivest u.a. Introduction to Algorithms / Algorithmen – eine Einführung. MIT Press, 1990-2001 / Oldenburg 2004.
- Thomas Ottmann und Peter Widmayer. Algorithmen und Datenstrukturen. Spektrum, Akad. Verl., 1990-2002.
- Uwe Schöning. Algorithmik. Spektrum Akademischer Verlag, 2001.
- Reinhard Diestel. Graph Theory. Springer-Verlag, 2005.
- D. Jungnickel. Graphen, Netzwerke und Algorithmen. BI-Wissenschaftsverlag, 1994.
- J. D. Horton A polynomial-time algorithm to find the shortest cycle basis of a graph. SIAM Journal on Computing Vol. 16, Issue 12, 1987.
- Leon Peeters. Cyclic Railway Timetable Optimization. Dissertation, 2003.
- R. G. Downey, M. R. Fellows, Parameterized Complexity. Springer, 1999.

**Course: Practical Course in Algorithm Design****Course key: [24079p]****Lecturers:** Peter Sanders, Dorothea Wagner**Credit points (CP):** 5 **Hours per week:** 4**Term:** Winter-/Sommersemester **Level:** 4**Teaching language:** Deutsch**Part of the modules:** Algorithm Design [IW3INALG0] (S. [28](#))**Learning Control / Examinations****Prerequisites**Lecture *Algorithmtechnik***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 example, 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 miscellaneous 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. [28](#))**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 scientific 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 resources wrt/ computational power, memory and communication capacity, which is due to the node's scarce energy resources. 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 &amp; 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: Workflow Management 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. 32)

### 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".

### 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. 32)

### 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".

### Conditions

None.

### 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:** 2/1

**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

The goal of this course is to introduce the foundations, the methods and the techniques of web engineering. After this course, students have gained knowledge and insights of existing methods, technologies and system approaches and are enabled to design and evaluate such webbased systems.

### Content

This course is designed as an introduction to the discipline of Web Engineering. This course will discuss the systematic production of Web-based applications and systems by focusing on the different phases and aspects of the Web application lifecycle. It will help you look at Web application phenomena, requirements, Web design and architecture, development and management from different perspectives - as Web designer, analyst, architect, component engineer, program manager, product manager or CIO for example. You will learn how to produce Web applications and agile systems from requirements engineering, concept, design, development, testing, deployment and up to operation, marketing, and evolution. Many examples will be shown and discussed - showing the need for expecting change and staying agile. This is not a programming course, you will only be introduced to the core technology aspects and are encouraged to consolidate the details.

### Media

Slides

### Basic literature

Gerti Kappel, Birgit Pröll, Siegfried Reich, Werner Retschitzegger (Hrsg.), Web Engineering - Systematische Entwicklung von Web- Anwendungen. dpunkt.verlag, ISBN:3-89864-234-8.

Thomas A. Powell, Web Site Engineering. Prentice Hall 1998.

**Course: Telematics****Course key: [24128]****Lecturers:** Martina Zitterbart**Credit points (CP):** 4 **Hours per week:** 2/1**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, 1997J.F. Kurose, K.W. Ross. *Computer Networking: A Top-Down Approach Featuring the Internet*. 4rd Edition, Addison-Wesley, 2007W. 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 articles

## Course: Multimedia Communication

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, protocols, 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, Chapters 7.1–7.4.

### 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

Ulrich Trick, Frank Weber: *SIP, TPC/IP und Telekommunikationsnetze*, 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 *Telematik für Informationswirte* [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 be 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 Grundsatz. Additional topics are access and identity management as well as firewalls, intrusion detection and prevention. Besides theoretical methods 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. [28](#))

### 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 become acquainted with the basic important approaches to and techniques for applying randomization in algorithms and the tools for their analysis.

Students are able to identify and assess typical weak points in deterministic algorithms and to develop randomized alternatives to eliminate them.

### Content

Randomized algorithms are not deterministic. Their behavior depends on the outcome of random experiments. This idea first became generally known due to Rabin's randomized primality test. Meanwhile randomized algorithms have been developed for quite a number of problems, and often they are faster (in one sense or another). Furthermore randomized algorithms sometimes are easier to understand and to implement than deterministic algorithms.

In the course not only different types of randomized algorithms (Las Vegas, Monte Carlo, ...) are present. In addition foundations and tools from probability theory are introduced as far as they are necessary for the analysis of the algorithms, and attention is given to further important concepts like Markov chains. Since stochastic methods are of importance in more and more fields in informatics, the usefulness of the course extends beyond the scope of randomized algorithms.

Contents:

- 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: Software Engineering I****Course key: [24518]****Lecturers:** Walter F. Tichy**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. 28), Design and Implementation of Complex Systems [IW3INCS0] (S. 29), Business Process Engineering [IW3INGP0] (S. 30), Information Services in Networks [IW3INIDL0] (S. 31), 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: Communication and Database Systems

Course key: [24574]

**Lecturers:** Klemens Böhm, Martina Zitterbart

**Credit points (CP):** 4/8 **Hours per week:** 4/2

**Term:** Sommersemester **Level:** 4

**Teaching language:** Deutsch

**Part of the modules:** Algorithm Design [IW3INALG0] (S. 28), Design and Implementation of Complex Systems [IW3INCS0] (S. 29), Information and Knowledge Systems [IW3INISW0] (S. 32), Infrastructures [IW3INNET0] (S. 33)

### Learning Control / Examinations

#### Prerequisites

None.

#### Conditions

Lectures about system architecture and software engineering are recommended but not mandatory.

#### Learning Outcomes

The student

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

#### Content

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

#### Media

Slides.

#### Basic literature

- W. Stallings: Data and Computer Communications. Prentice Hall, 2006.
- S. Abeck, P.C. Lockemann, J. Schiller, J. Seitz: Verteilte Informationssysteme. dpunkt-Verlag, 2003.
- Andreas Heuer, Kai-Uwe Sattler, Gunther Saake: Datenbanken — Konzepte und Sprachen, 3. Aufl., mitp-Verlag, Bonn, 2007
- Alfons Kemper, André Eickler: Datenbanksysteme. Eine Einführung, 6. Aufl., Oldenbourg Verlag, 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.
- 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.
- J.F. Kurose, K.W. Ross: Computer Networking - A Top-Down Approach featuring the Internet, Addison-Wesley, 2007.

**Course: Network Security: Architectures and Protocols****Course key: [24601]****Lecturers:** Martina Zitterbart, Lars Völker, 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 "Networksafety: 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 safety 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 safety 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 Oppiger. Secure Messaging with PGP and S/MIME. Artech House, Norwood, 2001.
- Sheila Frankel. Demystifying 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: The Digital Library

Course key: [24603]

**Lecturers:** Christoph-Hubert Schütte

**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. [32](#))

### Learning Control / Examinations

Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

### Prerequisites

None.

### Conditions

None.

### Learning Outcomes

The overall aim of the lecture is to develop an awareness of the problems involved in organising information, for individual scientists as well for institutions like libraries. The participants should be able to comprehend the development of methods of resolution in these particular fields and about the state of the art regarding research in the field of information science.

### Content

The lecture *The Digital Library* gives an insight into modern methods of information supply for research, teaching, studies and job. The lecture shows the changes of the information structures and services on their way to a digital library. One part of the lecture is an insight into the work of the department of media and the department of document delivery for print and non-print media of the University Library. The lecture further shows how those media are indexed. The focus lies on the automation of the processes. The usage of information databases and the potentialities of Multimedia are very intensely discussed. The lecture shows the actual change in the field of information services, it presents new services and gives an insight into the actual research work of the University Library in cooperation with the faculties of the University.

### Media

Slides.

### Basic literature

None.

### Complementary literature

Relevant publications will be mentioned in the lecture.

**Course: Component Based Software Engineering****Course key: [24626]****Lecturers:** Ralf Reussner**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. 29)**Learning Control / Examinations****Prerequisites**

None.

**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: Mobile Communication

Course key: [24643]

**Lecturers:** Martina Zitterbart, 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 Communication" 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 dispersion, 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 Standard 802.16: A Technical Overview of the WirelessMAN™ 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: Software Development for modern, parallel platforms****Course key: [24660]****Lecturers:** Walter F. Tichy, Pankratius**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. 29)**Learning Control / Examinations**

The assessment consists of an oral exam (20 min) following §4, Abs. 2, 2 of the SPO.

**Prerequisites**

Basic knowledge in the fields of software engineering and programming languages as for example taught in the lecture *Multikern-Rechner und Rechnerbündel* [24112] in the winter term is necessary.

**Conditions**

None.

**Learning Outcomes****Content**

## 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-to-peer 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: 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. [42](#))**Learning Control / Examinations**

Assessment will consist of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

**Prerequisites**

Statistics I + II

**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. [47](#))**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.

**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. [47](#))**Learning Control / Examinations****Prerequisites**

Basic knowledge of statistics.

**Conditions**

None.

**Learning Outcomes****Content**

**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. [47](#))**Learning Control / Examinations****Prerequisites**

Basics of Operations Research are required.

**Conditions**

None.

**Learning Outcomes****Content**

**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. [34](#)), Analytical CRM [IW3WWCRM1] (S. [35](#)), Operative CRM [IW3WWCRM2] (S. [36](#))**Learning Control / Examinations****Prerequisites**

Basics of operations research are assumed.

**Conditions**

None.

**Learning Outcomes****Content**

## Course: Brand Management

Course key: [25177]

**Lecturers:** Bruno Neibecker

**Credit points (CP):** 3,5 **Hours per week:** 2

**Term:** Wintersemester **Level:** 3

**Teaching language:** Deutsch

**Part of the modules:** Foundations of Marketing [IW3WWMAR1] (S. [47](#))

### 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? Gräfe und Unzer: 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: Bachelor Seminar in Foundations of Marketing****Course key: [25191]****Lecturers:** Wolfgang Gaul**Credit points (CP):** 2 **Hours per week:** 2**Term:** Winter-/Sommersemester **Level:** 3**Teaching language:** Deutsch**Part of the modules:** Foundations of Marketing [IW3WWMAR1] (S. [47](#))**Learning Control / Examinations****Prerequisites**Knowledge like it is provided in the course *Foundations of Marketing* [WI3BWLMAR] is assumed.**Conditions**

None.

**Learning Outcomes****Content**

**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. 41), Financial Markets [IW3WWFIN3] (S. 46)**Learning Control / Examinations**

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

**Prerequisites**

None.

**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 inventory and/or asymmetric information affect market prices and the pricing of securities. Theoretical models are shown to provide predictions which are consistent with empirical 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**

Folien.

**Basic literature**

keine

**Complementary literature**

Siehe 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. [42](#))**Learning Control / Examinations**

Assessment consists of

- a written examination, 30 min. and
- an oral examination, 20 min.

**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

**Complementary literature**

See reading list

## Course: Economics of Uncertainty

Course key: [25365]

**Lecturers:** Martin Barbie, 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. 37), Applied Finance [IW3WWFIN0] (S. 42), Financial Economics [IW3WWFIN1] (S. 44)

### Learning Control / Examinations

Written exam, possible further requirements.

### Prerequisites

None.

### 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. [37](#))**Learning Control / Examinations**

Written exam (80 minutes).

**Prerequisites**

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 amplifying 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, Bleich

**Credit points (CP):** 5 **Hours per week:** 2/1

**Term:** Sommersemester **Level:** 3

**Teaching language:** Deutsch

**Part of the modules:** Decision Theory [IW3WWDEC0] (S. 37)

### 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

None.

### 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 empirical validation, this method is applied in political and strategic consulting. The lecture gives an introduction 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.

### Remarks

The lecture is held for the last time in summer 2009. Last exams in October 2009 and April 2010.

**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. 37), Strategy and Managerial Economics [IW3WWORG0] (S. 48), Strategy and Interaction [IW3WWORG1] (S. 49)**Learning Control / Examinations**

Written exam (80 minutes).

**Prerequisites**

Basic knowledge of mathematics and statistics is assumed.

**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: Operations Management

Course key: [25598]

**Lecturers:** Cornelia Schön

**Credit points (CP):** 5 **Hours per week:** 3

**Term:** Wintersemester **Level:** 3

**Teaching language:** Englisch

**Part of the modules:** eBusiness Management [IW3WWEBM0] (S. 38), Supply Chain Management [IW3WWEBM1] (S. 40)

### Learning Control / Examinations

The assessment of this course consists of a written examination (60 min) (following §4(2), 1 SPO).

### Prerequisites

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

### Conditions

None.

### Learning Outcomes

Provide a general introduction to the language, concepts, techniques, tools, and actual developments of operations management.

### Content

This course will provide a general introduction to the concepts and techniques of operations management, i.e. the design, planning, control, and improvement of manufacturing and service operations. The course begins with a strategic view of the operations function within a firm at the interface to other business functions such as finance, marketing, and human resources. We stress the role of operations for gaining competitive advantage, and discuss how to coordinate three tiers of operations, namely product development, process management, and supply chain management. As we proceed, we will investigate various problems of operations management at the tactical level in detail.

Particular attention is paid to services which are the largest and fastest growing segment of our economy and which play also an increasing role for manufacturing firms to remain competitive. Services pose particular challenges to managers due to their intangible and experiential nature, perishability and high levels of customer involvement. For services, "process is the product" and the customer often participates in the service delivery process as an external input factor. Accordingly, managing services requires tight integration between operations, strategy, marketing, technology, and organizational issues from an integrated viewpoint with a focus on the customer. Therefore, approaches from manufacturing operations management may not be applied directly to the service context without modifications.

We will cover selected topics in the areas of

- The Process View of the Organization
- Operations Strategy and Management
- Forecasting and Modelling Demand
- Process Analysis and Design
- Product and Service Design
- Logistics and Supply Chain Management
- Inventory Management and Replenishment (EOQ, Newsvendor, Order-up-to Inventory Model, Lot Sizing)
- Capacity Management, Queueing Analysis
- Revenue Management with Capacity Controls
- Project Management and Operations Scheduling
- Layout and Flows
- Push and Pull Production: MRP and JIT
- APS and ERP Systems
- Process Improvement and Quality

The course strives to provide a balance between qualitative (more strategic) concepts and a more quantitative approach at the tactical level drawing on models and methods from Operations Research. In addition to the fundamentals of operations management, we will discuss recent research results from scientific publications and actual case study applications.

### Media

Lecture slides.

**Course: Simulation I****Course key: [25662]****Lecturers:** Karl-Heinz Waldmann**Credit points (CP):** 5 **Hours per week:** 2/1/2**Term:** Winter-/Sommersemester **Level:** 4**Teaching language:** Deutsch**Part of the modules:** Decision Theory [IW3WWDEC0] (S. 37), Applied Finance [IW3WWFIN0] (S. 42), Quantitative Finance [IW3WWFIN2] (S. 45)**Learning Control / Examinations**

The assessment consists of an 1h written exam following §4, Abs. 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 continuous random variables, statistical analysis of simulated data, variance reduction techniques, case studies.

**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. 28)

### Learning Control / Examinations

The assessment of this course is a written examination (60 min) in the first week after the end of the lecturing period. If the exam gets a mark between 1,3 and 4,0, it can be improved by one mark level (i.e. by 0,3 or 0,4) by a tutorial bonus, which is awarded for a minimum number of points on the assignments or for passing an additional "bonus exam".

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 efficient algorithms and how to demonstrate adequate innovative capabilities with respect to the used methods.

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

### Content

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

### Media

- powerpoint slides with annotations using a tablet pc
- access to applets and Internet resources
- 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 of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation of the Bachelor of Science programme in Information Engineering and Management and an additional written examination (called "bonus exam", 60 min) according to §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

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

### 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. 30)

### 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. 30)**Learning Control / Examinations**

The assessment of this course is a written examination (1h) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Prerequisites**

Programming I: Java, Computer Science I and II is 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 assess 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. 30)**Learning Control / Examinations**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation of the Bachelor of Science programme in Information Engineering and Management 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 models 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. 30), Information and Knowledge Systems [IW3INISW0] (S. 32)

### Learning Control / Examinations

The assessment is a written examination of 1 hour according to §4, Abs. 2, 1 of the examination regulations.

### 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 fulfilling central tasks (amelioration of business processes, increasing innovation, increasing customer satisfaction, strategic planning and the like). Therefore, knowledge management has become a determining factor of success.

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.

### 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-Lsberner: 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, Pascal Hitzler, Sebastian Rudolph, Rudolph

**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. 30), Information Services in Networks [IW3INIDL0] (S. 31)

### Learning Control / Examinations

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft or of an oral exam (20 min) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

### 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. 32), eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 41)

### 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 chosen 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 kernel-based learning methods. Cambridge University Press 2003.
- G. Klir, B. Yuan. Fuzzy Sets and Fuzzy Logic: Theory and Applications. Prentice-Hall, 1995.
- F. Schlotmann, D. Seese. Modern Heuristics for Finance Problems: A Survey of Selected Methods and Applications. In S. T. Rachev (Ed.) Handbook of Computational and Numerical Methods 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 content and schedule.

## 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 A1/2 [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. In addition, software-as-a-service models and emerging trends (incl. Cloud Computing) will be presented and discussed. 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), introducing increased agility and flexibility 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)
- Software-as-a-Service models
- Service intermediaries (markets)
- Mashups and situational applications
- Cloud computing

### Media

Slides, access to internet resources.

### Basic literature

Will be given in the course.

**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. 30)**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. 30)**Learning Control / Examinations**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation of the Bachelor of Science programme in Information Engineering and Management 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 to CMMI
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. 48), Strategy and Interaction [IW3WWORG1] (S. 49)

### Learning Control / Examinations

#### 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. [48](#))**Learning Control / Examinations**

Written exam 100%.

**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. 48), Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] (S. 50)

### 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.

### Content

- Principles of strategic management decisions
- Basic economic decision models
- Economic assessment of information
- 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 2002.
- Laux, H.: *Entscheidungstheorie*. Springer, 5. Aufl. Berlin 2003.
- Lindstädt, H.: *Entscheidungskalküle jenseits des subjektiven Erwartungsnutzens*. In: Zeitschrift für betriebswirtschaftliche Forschung 56 (September 2004), S. 495– 519.

**Course: Seminar: Management and Organization****Course key: [25915]****Lecturers:** Hagen Lindstädt**Credit points (CP): 4 Hours per week: 2****Term:** Sommersemester **Level:** 4**Teaching language:** Deutsch**Part of the modules:** Strategy and Managerial Economics [IW3WWORG0] (S. [48](#)), Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] (S. [50](#))**Learning Control / Examinations**

Term paper (50%) and presentation (50%).

Completion of all 1st and 2nd year modules of the Bachelor Program or Admission to the Master Program.

**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: Seminar: Management and Organization****Course key: [25916]****Lecturers:** Hagen Lindstädt**Credit points (CP): 4 Hours per week: 2****Term:** Wintersemester **Level:** 4**Teaching language:** Deutsch**Part of the modules:** Strategy and Managerial Economics [IW3WWORG0] (S. [48](#)), Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] (S. [50](#))**Learning Control / Examinations**

Term paper (50%) and presentation (50%).

**Prerequisites**

Completion of all 1st and 2nd year modules of the Bachelor Program or Admission to the Master Program.

**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: Fundamentals of Production Management****Course key: [25950]****Lecturers:** Frank Schultmann**Credit points (CP):** 7,5 **Hours per week:** 2/2**Term:** Sommersemester **Level:** 3**Teaching language:** Deutsch**Part of the modules:** Industrial Production [IW3WWPRO0] (S. 51)**Learning Control / Examinations**

See module description.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes**

Formulation of basic problems and development of solutions in the framework of production management.

**Content**

This lecture is designed as an introduction to Industrial Production. It focusses on among others on strategic production management and ecological aspects. After an introduction in production management and system theory, topics treated cover industrial R&D, siting, industrial logistics as well as reverse logistics and finally transport and stockkeeping. The topics presented are additionally illustrated by several case studies from industry.

**Media**

Media will be provided on learning platform ILIAS.

**Basic literature**

Dietger Hahn and Gert Laßmann. Produktionswirtschaft. Bd. 1, Physica-Verlag, Heidelberg, 3. Aufl., 1999.

Christoph A. Schneeweiß. Einführung in die Produktionswirtschaft. Springer-Verlag, 8. Auflage, 2002.

Klaus Brockhoff. Forschung und Entwicklung: Planung und Kontrolle. Oldenbourg, München, 5. Auflage, 1999.

Jürgen Weber and Sebastian Kummer. Logistikmanagement. Schäfer-Poeschel, Stuttgart, 2. Auflage, 1998.

**Complementary literature**

Dietger Hahn and Gert Laßmann. Produktionswirtschaft. Bd. 1, Physica-Verlag, Heidelberg, 3. Aufl., 1999.

Christoph A. Schneeweiß. Einführung in die Produktionswirtschaft. Springer-Verlag, 8. Auflage, 2002.

Klaus Brockhoff. Forschung und Entwicklung: Planung und Kontrolle. Oldenbourg, München, 5. Auflage, 1999.

Jürgen Weber and Sebastian Kummer. Logistikmanagement. Schäfer-Poeschel, Stuttgart, 2. Auflage, 1998.

**Course: Planning and Management of Industrial Plants****Course key: [25952]****Lecturers:** Frank Schultmann, n.n.**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. [51](#))**Learning Control / Examinations**

See module description.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content**

The course covers all steps from the Planning of industrial production plants, the estimation of investments and costs for plants and equipment and the factory's layout planning. Further topics are the determination of the optimal capacity under economic and technical aspects and with regard to the maintenance and control of the plant and the equipment. Ecological aspects are covered throughout the lecture, but especially with regard to the retirement and disposal of plants and equipment. The aim of the course is to give a broad overview on the practical problems encountered in nowadays industrial production planning on a strategic-tactic level. Special emphasis is put on the various interdependencies between the different disciplines and planning objectives. In order to show the practical relevance of the covered topics, a voluntary study trip will be offered.

**Media**

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

**Basic literature**

Will be announced in the lecture.

**Course: Production an 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. [51](#))**Learning Control / Examinations**

See module description.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content**

Within this lecture the main topics of operational production and logistics planning are presented. This comprises structure and functions of of production planning and control systems (PPC systems) as well as enterprise resource planning systems (ERP systems) and Advanced Planning Systems (APS). Planning tasks and exemplary methods, e.g. for master production scheduling (MPS), material requirements planning (MRP I) (demand planning, lot sizing), as well as sequencing, scheduling and capacity planning are discussed. Based on the MRP II concept also integrated approaches for PPC are introduced. Finally an overview on PPC and Enterprise Resource Planning and Advanced Planning Systems that are available on the market are given.

**Media**

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

**Basic literature**

Will be announced in the lecture.

## Course: Energy Policy

Course key: [25959]

**Lecturers:** Martin Wietschel

**Credit points (CP):** 3.5 **Hours per week:** 2/0

**Term:** Sommersemester **Level:** 3

**Teaching language:** Deutsch

**Part of the modules:** Industrial Production [IW3WWPRO0] (S. 51)

### Learning Control / Examinations

See module description.

### Prerequisites

Keine.

### Conditions

Keine.

### Learning Outcomes

#### Content

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

#### Basic literature

Will be announced in the lecture.

**Course: Material and Energy Flows in the Economy****Course key: [25960]****Lecturers:** Michael Hiete, 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. 51)**Learning Control / Examinations**

See module description.

**Prerequisites**The successful completion of the courses *Business Administration and Management Science* B [25024/25025] / C [25026/25027] is required.**Conditions**

None.

**Learning Outcomes****Content**

**Course: Exhaust Emissions (VWL), Emissions into the Environment (ING) 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. 51)**Learning Control / Examinations**

See module description.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content**

**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. 51)**Learning Control / Examinations**

See module description.

**Prerequisites**

None.

**Conditions**

None

**Learning Outcomes****Content**

- Problems concerning the measurement of the productivity of the R&D system
- Methods for improving the productivity of the R&D system
- Planning of R&D projects with the help of the Communication Matrix-Methods for controlling R&D projects' progress
- The marketing of scientific competencies
- The Communication Matrix as tool for the implementation of simultaneous engineering
- The communication between R&D, Production and Marketing
- Case studies

**Basic literature**

Helwig Schmied. R&D Management in Europe, Productivity, Performance, International Co-operation. Gabler Verlag, Wiesbaden, 1995.

Axel Gerhardt and Helwig Schmied. Externes Simultanes Engineering, Der neue Dialog zwischen Kunden und Lieferant. Springer-Verlag, Berlin, 1996.

Philip A. Rousel and Kamal N. Saad and Tamara J. Erickson. Third Generation R&D. Managing the Link to Corporate Strategy. Harvard Business School Press, Boston, Mass., 1991.

## Course: Computer-assisted Planning and Control of Production and Simulation of Processes [25975] Course key:

**Lecturers:** Dominik Möst, Magnus Fröhling

**Credit points (CP):** 3.5 **Hours per week:** 2/0

**Term:** Sommersemester **Level:** 3

**Teaching language:** Deutsch

**Part of the modules:** Industrial Production [IW3WWPRO0] (S. [51](#))

### Learning Control / Examinations

See module description.

### Prerequisites

None.

### Conditions

None.

### Learning Outcomes

#### Content

After an introduction into the structure, the history and still existent 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 described, focussing on the modules for production planning (PP) and materials management (MM) out of the R/3 system from SAP. In this context the lecture is completed by computer-assisted courses in production planning and materials management with the help of the R/3 system from SAP.

#### Media

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

#### Basic literature

André Maassen, Markus Schoenen, and Ina Werr. Grundkurs SAP R/3®. Viewg Verlag, Wiesbaden, 2005.

Knut Hildebrandt and Michael Rebstock. Betriebswirtschaftliche Einführung in SAP R/3. Oldenbourg, München, 2000.

Klaus Pohl. Produktionsmanagement mit SAP R/3. Springer-Verlag, Berlin, 2002.

Anthony Brooke, David Kendrick, and Alexander Meeraus. GAMS: release 2.50 release a user's guide. GAMS Development Corp., Washington D.C., 1998.

**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. [51](#))**Learning Control / Examinations**

See module description.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****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.

**Course: Competition in Networks****Course key: [26240]****Lecturers:** Kay Mitusch**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. 34), Analytical CRM [IW3WWCRM1] (S. 35), Operative CRM [IW3WWCRM2] (S. 36), eBusiness Management [IW3WWEBM0] (S. 38)**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, principal agent theory, and contract theory.

**Conditions**

None.

**Learning Outcomes**

The Student should ...

**Content**

**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. [48](#)), Modeling Strategic Decision Making and Economic Incentives [IW3WWORG2] (S. [50](#))**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. 38), Supply Chain Management [IW3WWEBM1] (S. 40)

### 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 Trading Course 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. 38), eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 41)

**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 made 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 founded 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. 38)**Learning Control / Examinations**

The assessment of this course is a written examination (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4(2), 3 SPO). The total grade for this lecture will consist to 70% of the grade achieved in the written examination and to 30% of the assignments during the exercises.

**Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes**

This lecture presents concepts, methods and application examples for the engineering and management of eServices. The students will get to know the basic principles and elements of eServices and their specific properties compared to physical goods. Creating eServices needs an overall view of information technology with regards to flexibility, safety, data security, measurability and cost allocation.

In addition, problems and solutions in designing and providing eServices are discussed; the elementary relationship to information management will also be treated. Application examples from industry stress the concepts' application in the economy.

**Content**

So far, management studies usually focused on physical goods. However, due to the increasing development of information and communication technology, distribution of electronic services is becoming more important. Electronic services are characterized by an increasing degree of intangibility, interactivity and individuality. Traditional, goods-oriented models, methods and tools for are often found to be inadequate for service engineering and management.

Building on a systematic categorization of (e)Services, we cover concepts and foundations for engineering and managing IT-based services, allowing further specialization in subsequent courses. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services. In addition, application examples, guest lectures (e.g. business model changes driven by the advent of eServices) and a number of hands-on exercises will illustrate the applicability of the concepts.

**Media**

PowerPoint slides;

## Course: Practical seminar Information Engineering and Management Course key: [26478]

**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. 38), Supply Chain Management [IW3WWEBM1] (S. 40), eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 41)

### 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].

### 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: 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. 34), Analytical CRM [IW3WWCRM1] (S. 35), Operative CRM [IW3WWCRM2] (S. 36)

### 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(2), 3 SPO). The total grade for this lecture will consist to about 90% of the grade achieved in the written exam (maximum 100 points) and to about 10% of the written papers for the exercise (maximum 12 points). The written exam is considered successfully taken if at least 50 points are acquired.

The grades of this lecture are assigned following the table below. At least 50 points have to be acquired to pass the written exam. All additional points from excersise work will be added to the exam points once 50 points have been achieved:

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 objective of this course is to make students aware of the goals and different aspects of Service Management. Furthermore it is intended to embed Service Management and its different aspects in the concepts of business administration. The students should acquire the theoretical and practical knowledge as well as tools to implement projects in this area sucessfully. The link between Service Managemetn and CRM is also to be taught within this course.

### Content

Course: 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. 34), Operative CRM [IW3WWCRM2] (S. 36)

### Learning Control / Examinations

Assessment consists of a written exam of 1 hour length following §4, Abs. 2, 1 of the Prüfungsordnungen für Informationswirtschaft and by submitting written papers as part of the exercise following §4, Abs. 2, 3 Prüfungsordnungen für Informationswirtschaft. The total grade for this lecture will consist to about 90% of the grade achieved in the written exam (maximum 100 points) and to about 10% of the written papers for the exercise (maximum 12 points). The written exam is considered successfully taken if at least 50 points are acquired.

The grades of this lecture are assigned following the table below. At least 50 points have to be acquired to pass the written exam. All additional points from excercise work will be added to the exam points once 50 points have been achieved:

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 26508 (CRM) and 26522 (Analytical CRM) is advised.

### Learning Outcomes

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.

### 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 Enterprises, 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. 34), Analytical CRM [IW3WWCRM1] (S. 35)**Learning Control / Examinations**

Assessment consists of a written exam of 1 hour length following §4, Abs. 2, 1 of the Prüfungsordnungen für Informationswirtschaft and by submitting written papers as part of the exercise following §4, Abs. 2, 3 Prüfungsordnungen für Informationswirtschaft. The total grade for this lecture will consist to about 90% of the grade achieved in the written exam (maximum 100 points) and to about 10% of the written papers for the exercise (maximum 12 points). The written exam is considered successfully taken if at least 50 points are acquired.

The grades of this lecture are assigned following the table below. At least 50 points have to be acquired to pass the written exam. All additional points from excercise work will be added to the exam points once 50 points have been achieved:

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 business 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 improvement of customer relationships. Knowledge about customers is aggregated and used for enterprise decision problems like product line planning, customer loyalty, 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 segmentation).

**Media**

slides

**Basic literature**

Swift, Ronald S. Accelerating Customer Relationships: Using CRM and Relationship Technologies. Prentice Hall, Upper Saddle River, 2001

Silverston, Len The Data Model Resource Book: A Library of Universal Data Models for All Enterprises. John Wiley & Sons, 1 edition, 2001.

Hoppe, Daniel Customer Lifetime Value. Diplomarbeit, Universität Karlsruhe (TH), 2003.

Duda, Richard O. und Hart, Peter E. und Stork, David G. Pattern Classification. Wiley-Interscience, New York, 2 edition, 2001.  
Berson, Alex und Thearling, Kurt und Smith, Stephen J. Building Data Mining Applications for CRM. Mc Graw-Hill, New York, 2000.

**Complementary literature**

Greenberg, Paul. CRM at the Speed of Light: Capturing and Keeping Customers in Internet Real Time. Osborne/McGraw-Hill, 3 edition, 2004.

Sharp, Duane E. Customer Relationship Management Systems Handbook. Auerbach, 2002.

Todman, Chris. Designing a Data Warehouse : Supporting Customer Relationship Management. Prentice Hall, Upper Saddle River, 1 edition, 2001.

Teorey, Toby J. Database Modeling and Design. Morgan Kaufmann, San Francisco, 3 edition, 1999.

Silverston, Len. The Data Model Resource Book: A Library of Universal Data Models by Industry Types. John Wiley & Sons, 2 revised edition, 2001.

**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. 34), Analytical CRM [IW3WWCRM1] (S. 35), Operative CRM [IW3WWCRM2] (S. 36)**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 information.

**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 scientific 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:** Applied Finance [IW3WWFIN0] (S. [42](#)), Quantitative Finance [IW3WWFIN2] (S. [45](#))**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: Asset Pricing****Course key: [26555]****Lecturers:** Marliese Uhrig-Homburg**Credit points (CP): 5 Hours per week:** 2/1**Term:** Sommersemester **Level:** 3**Teaching language:** Deutsch**Part of the modules:** eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. [41](#)), Applied Finance [IW3WWFIN0] (S. [42](#)), Financial Economics [IW3WWFIN1] (S. [44](#)), Financial Markets [IW3WWFIN3] (S. [46](#))**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 this course is to become familiar with the basics of investment decisions on stock and bond markets. Therefore first of all basic economic concepts underlying these decisions are introduced. Thereafter specific models that allow well-founded investment decisions are introduced and applied. The evaluation of those decisions using risk and performance measures will also be discussed in this context.

**Content**

The lecture deals with investment decisions under uncertainty, where the main emphasis is on investment decisions on stock markets. At first, fundamental concepts of decision making under uncertainty are introduced. Then, after a discussion of the basic questions of corporate valuation, the lecture focuses on portfolio theory. After that, risk and return in equilibrium are derived using the Capital Asset Pricing Model and the Arbitrage Pricing Theory. The lecture concludes with investments on bond markets.

**Media**

Slides, exercise sheets.

**Basic literature**

None.

**Complementary literature**

- Franke/Hax (2003): Finanzwirtschaft des Unternehmens und Kapitalmarkt, Springer Verlag
- Elton/Gruber/Brown/Goetzmann (2003): Modern portfolio theory and investment analysis, Wiley

**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. [42](#)), Financial Markets [IW3WWFIN3] (S. [46](#))**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: 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. [30](#))**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 examination of the written abstract but can be upgraded or downgraded according to the quality of the presentation.

**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 learn 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 topics 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 chosen scientific topic. First, a thorough 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.

**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. 30)**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 learned during the course.
- present results of the research in written form generally found in scientific publications.

**Content**

The lab intensifies and extends specific topics which are discussed within corresponding lectures. Knowledge of these lecture topics is an advantage but not a precondition.

**Media**

Slides, Access to internet resources

**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: Seminar in Software Engineering****Course key: [SWTSem]****Lecturers:** Walter F. Tichy, Ralf Reussner, Gregor Snelting**Credit points (CP):** 3 **Hours per week:** 2**Term:** Winter-/Sommersemester **Level:** 4**Teaching language:** Deutsch**Part of the modules:** Design and Implementation of Complex Systems [IW3INCS0] (S. 29)**Learning Control / Examinations****Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content**

**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. 30)**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 topics 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. 32)**Learning Control / Examinations**

The assessment will be an "Erfolgskontrolle anderer Art", usually a talk and a written seminar paper.

**Prerequisites**

Mandatory lectures from the module.

**Conditions**

None.

**Learning Outcomes**

Autonomously deal with a special topic in the knowledge management field.

**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 Social 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.

**Course: Seminar in Industrial Production****Course key: [SemIIIP2]****Lecturers:** Frank Schultmann**Credit points (CP):** 4 **Hours per week:** 2**Term:** Winter-/Sommersemester **Level:** 4**Teaching language:** Deutsch**Part of the modules:** Industrial Production [IW3WWPRO0] (S. [51](#))**Learning Control / Examinations****Prerequisites**

None.

**Conditions**

None.

**Learning Outcomes****Content**

**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. 38), Supply Chain Management [IW3WWEBM1] (S. 40), eFinance: Information Engineering and Management in Finance [IW3WWEBM2] (S. 41)**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. 48)**Learning Control / Examinations**

Term paper and presentation.

**Prerequisites**

See corresponding module information.

The course Experimental Economics [25373] or an other 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 rhetoric 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/](http://www.wior.uni-karlsruhe.de/LS_Berninghaus/Studium/)).**Media**

Slides.

**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. 48)**Learning Control / Examinations**

Term paper and presentation.

**Prerequisites**

Completion of all 1st and 2nd year modules of the Bachelor Program.

**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 argue scientifically. Also rhetoric 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/](http://www.wior.uni-karlsruhe.de/LS_Berninghaus/Studium/)).**Media**

Slides.

**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. [32](#))**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. [52](#))**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 courses, 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. 28)

### 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 (cache 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

### Remarks

The lecture will be offered again in the winter term 09/10.

**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 be offered by any of the lecturers participating in this module

**Learning Outcomes****Content**

**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****Content**



## **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.

(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.

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 Urlaubsssemester 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).

(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 Werktagen 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 schwerwiegenderen 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

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 Informatikswirtschaft 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.

## § 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.

## **§ 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.

### 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.

## § 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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