Module Catalogue
for the Subject
Computer Science
as a Bachelor’s with 1 major
with the degree "Bachelor of Science"
(180 ECTS credits)

Examination regulations version: 2014
Responsible: Institute of Computer Science
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Content and Objectives of the Programme

The bachelor of science in computer science combining theoretical and practical elements is the first degree level offered by the Department of Mathematics and Computer Science at the Maximilian University of Würzburg.

The aim of this degree is to teach students the most important aspects of computer science, to understand the theory of algorithms and their application as well as to improve analytical skills, the ability to think in abstract terms and structure complex problems. With this degree the students have the skills to either continue their studies in a consecutive Master of Science program or be able to apply their knowledge in one of the many fields of computer science present outside academia. This is complemented by a specialization field in which the students become familiar with the basic techniques and ways of thinking in a subject of their choice for which methods of computer science are used.

The bachelor program focuses on well established and fundamental knowledge of facts and methods as well as on the development of thought processes necessary for computer science. Furthermore, state-of-the-art methods and their relevant applications are taught. With the bachelor thesis, students demonstrate their ability to work on a specific task and use the scientific methods learned within a defined period of time. Though guided by a mentor, they largely carry out the selected project on their own. The bachelor is an internationally acknowledged degree in the field of computer science that demonstrates the ability to work in this field or continue on to obtain a higher degree.
Module Catalogue for the Subject
Computer Science
Bachelor’s with 1 major, 180 ECTS credits

Abbreviations used

Course types: E = field trip, K = colloquium, O = conversatorium, P = placement/lab course, R = pro-
ject, S = seminar, T = tutorial, Ü = exercise, V = lecture

Term: SS = summer semester, WS = winter semester

Methods of grading: NUM = numerical grade, B/NB = (not) successfully completed

Regulations: (L)ASPO = general academic and examination regulations (for teaching-degree program-
mes), FSB = subject-specific provisions, SFB = list of modules

Other: A = thesis, LV = course(s), PL = assessment(s), TN = participants, VL = prerequisite(s)

Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered
every semester and modules are not creditable for bonus.

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree
with the module coordinator on the method of assessment to be used in the current semester by two
weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally
weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module
will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

ASPO2009

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

24-Mar-2014 (2014-8)

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevan-
ce according to the examination regulations of the degree subject. However, only the FSB (subject-spe-
cific provisions) and SFB (list of modules) in their officially published versions shall be legally binding.
In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB
shall prevail.
Thesis

(10 ECTS credits)
<table>
<thead>
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<td>Bachelor-Thesis</td>
<td>10-I-BA-141-m01</td>
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<td>Institute of Computer Science</td>
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<td>1 semester</td>
<td>undergraduate</td>
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**Contents**

Researching and writing on a defined problem within a given time frame and adhering to the principles of good scientific practice.

**Intended learning outcomes**

The students are able to research and write on a defined problem, adhering to the principles of good scientific practice.

**Courses**

C (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written thesis (approx. 50 to 100 pages)

Language of assessment: German, English

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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Compulsory Courses

(115 ECTS credits)
Subfield Computer Science
(85 ECTS credits)
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<td>Introduction to Programming</td>
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**Module coordinator**
holder of the Chair of Computer Science II

**Module offered by**
Institute of Computer Science

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</table>

**Contents**
Data types, control structures, foundations of procedural programming, selected topics of C, introduction to object orientation in Java, selected topics of C++, further Java concepts, digression: scripting languages.

**Intended learning outcomes**
The students possess a fundamental knowledge about programming languages (in particular Java, C and C++) and are able to independently develop average to high level Java programs.

**Courses**
V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

**Allocation of places**
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**Additional information**
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)
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<table>
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<td>Algorithm and data structures</td>
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</table>

**Contents**

Design and analysis of algorithms, recursion vs. iteration, sort and search methods, data structures, abstract data types, lists, trees, graphs, basic graph algorithms, programming in Java.

**Intended learning outcomes**

The students are able to independently design algorithms as well as to precisely describe and analyse them. The students are familiar with the basic paradigms of the design of algorithms and are able to apply them in practical programs. The students are able to estimate the run-time behaviour of algorithms and to prove their correctness.

**Courses**

(type, number of weekly contact hours, language — if other than German)

V (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

**Allocation of places**

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**Additional information**

--

**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

--
Module title
Tutorial Algorithm and data structures

Abbreviation
10-I-ADST-141-m01

Module coordinator
Dean of Studies Informatik (Computer Science)

Module offered by
Institute of Computer Science

ECTS
5

Method of grading
Only after succ. compl. of module(s)

Duration
1 semester

Module level
undergraduate

Other prerequisites
--

Contents
Design and analysis of algorithms, recursion vs. iteration, sort and search methods, data structures, abstract data types, lists, trees, graphs, basic graph algorithms, programming in Java.

Intended learning outcomes
The students are able to independently design algorithms as well as to precisely describe and analyse them. The students are familiar with the basic paradigms of the design of algorithms and are able to apply them in practical programs. The students are able to estimate the run-time behaviour of algorithms and to prove their correctness.

Courses
(No information on SWS (weekly contact hours) and course language available)

Method of assessment
(a) completion of approx. 11 exercise sheets with approx. 4 exercises per sheet (50% of exercises to be completed correctly) or (b) written examination (approx. 180 to 240 minutes). Method of assessment to be selected by the candidate.

Allocation of places
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Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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**Contents**

Object-oriented software development with UML, development of graphical user interfaces, foundations of databases and object-relational mapping, foundations of web programming (HTML, XML, scripting languages, web frameworks).

**Intended learning outcomes**

The students possess a fundamental theoretical and practical knowledge on the design and development of software systems, in particular for the web.

**Courses**

(no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

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**Module coordinator**

Dean of Studies Informatik (Computer Science)

**Module offered by**

Institute of Computer Science

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**Duration**

1 semester

**ECTS**

undergraduate

**Contents**

Object-oriented software development with UML, development of graphical user interfaces, foundations of databases and object-relational mapping, foundations of web programming (HTML, XML, scripting languages, web frameworks).

**Intended learning outcomes**

The students possess a fundamental theoretical and practical knowledge on the design and development of software systems, in particular for the web.

**Courses**

(No information on SWS (weekly contact hours) and course language available)

**Method of assessment**

(a) completion of approx. 11 exercise sheets with approx. 4 exercises per sheet (50% of exercises to be completed correctly) or (b) written examination (approx. 180 to 240 minutes). Method of assessment to be selected by the candidate.

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**

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**Contents**
The programming language Java. Independent creation of small to middle-sized, high-quality Java programs.

**Intended learning outcomes**
The students are able to independently develop small to middle-sized, high-quality Java programs.

**Courses**
(P no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Completion of programming exercises (approx. 240 hours) and written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes).

**Allocation of places**
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**Additional information**
Additional information on module duration: 1 to 2 semesters.

**Referred to in LPO I** (examination regulations for teaching-degree programmes)
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<td>1 semester</td>
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<td>The learning outcomes of modules 10-I-ADSV, 10-I-ADST, 10-I-SST are required. Prior completion of these modules is highly recommended.</td>
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**Contents**

Completion of a project assignment in groups, problem analysis, creation of requirements specifications, specification of solution components (e.g., UML) and milestones, user manual, programming documentation, presentation and delivery of the runnable software product in a colloquium.

**Intended learning outcomes**

The students possess the practical skills for the design, development and execution of a software project in small teams.

**Courses** (type, number of weekly contact hours, language — if other than German)

P (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Completion of a larger software project in groups (approx. 300 hours per person) and final presentation (approx. 10 minutes per group)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
<thead>
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<th>Module title</th>
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<td>Digital computer systems</td>
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<td>Institute of Computer Science</td>
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<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

### Contents

Introduction to digital technologies, Boolean algebras, combinatory circuits, synchronous and asynchronous circuit hardware description languages, structure of a simple processor, machine programming, memory hierarchy.

### Intended learning outcomes

The students possess a knowledge of the fundamentals of digital technologies up to the design and programming of easy microprocessors as well as knowledge for the application of hardware description languages for the design of digital systems.

### Courses

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<tr>
<th>type, number of weekly contact hours, language — if other than German</th>
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### Method of assessment

<table>
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<td>written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)</td>
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### Allocation of places

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### Additional information

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### Referred to in LPO I (examination regulations for teaching-degree programmes)

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### Module title
Tutorial Digital computer systems

### Abbreviation
10-I-RALT-141-m01

### Module coordinator
holder of the Chair of Computer Science V

### Module offered by
Institute of Computer Science

### ECTS
5

### Method of grading
Only after succ. compl. of module(s)

### (not) successfully completed
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### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
--

### Contents
Introduction to digital technologies, Boolean algebras, combinatory circuits, synchronous and asynchronous circuit hardware description languages, structure of a simple processor, machine programming, memory hierarchy.

### Intended learning outcomes
The students possess a knowledge of the fundamentals of digital technologies up to the design and programming of easy microprocessors as well as knowledge for the application of hardware description languages for the design of digital systems.

### Courses
(type, number of weekly contact hours, language — if other than German)

Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) completion of approx. 11 exercise sheets with approx. 4 exercises per sheet (50% of exercises to be completed correctly) or b) written examination (approx. 180 to 240 minutes). Method of assessment to be selected by the candidate.

### Allocation of places
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### Additional information
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### Referred to in LPO 1
(examination regulations for teaching-degree programmes)

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<table>
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<th>Module title</th>
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<td>Information Transmission</td>
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<tr>
<td>holder of the Chair of Computer Science III</td>
<td>Institute of Computer Science</td>
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<th>Other prerequisites</th>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

### Contents

Introduction to probability calculus, coding theory, coding for fault detection and fault correction, information theory, spectrum and Fourier transform, modulation technique, structure of digital transmission systems, introduction to the structure of computer networks, communication protocols.

### Intended learning outcomes

The students possess a technical, theoretical and practical knowledge of the structure of systems for information transmission, a knowledge that is necessary to understand these systems.

### Courses

V (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

### Allocation of places

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### Additional information

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### Referred to in LPO I

(examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Tutorial Information Transmission</td>
<td>10-I-IÜT-141-m01</td>
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**Module coordinator**

holder of the Chair of Computer Science III

**Module offered by**

Institute of Computer Science

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**Duration**

1 semester

**Module level**

undergraduate

**Contents**

Introduction to probability calculus, coding theory, coding for fault detection and fault correction, information theory, spectrum and Fourier transform, modulation technique, structure of digital transmission systems, introduction to the structure of computer networks, communication protocols.

**Intended learning outcomes**

The students possess a technical, theoretical and practical knowledge of the structure of systems for information transmission, a knowledge that is necessary to understand these systems.

**Courses**

(No information on SWS (weekly contact hours) and course language available)

**Method of assessment**

(a) completion of approx. 11 exercise sheets with approx. 4 exercises per sheet (50% of exercises to be completed correctly) or b) written examination (approx. 180 to 240 minutes). Method of assessment to be selected by the candidate.

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
<thead>
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<th>Module title</th>
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<tr>
<td>Practical course in hardware</td>
<td>10-I-HWP-141-m01</td>
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**Module coordinator**  
Dean of Studies Informatik (Computer Science)

**Module offered by**  
Institute of Computer Science

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<tr>
<td>1 semester</td>
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</table>

**Contents**
Practical experiments on hardware aspects, for example in communication technology, robots or the structure of a complete microprocessor.

**Intended learning outcomes**
The students are able to independently review, prepare and perform experiments with the help of experiment descriptions, to independently search for additional information as well as to document and evaluate experiment results.

**Courses**
(type, number of weekly contact hours, language — if other than German)

P (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Project portfolio: completion of approx. 3 to 10 project assignments (approx. 250 hours total) and presentation of results (approx. 10 minutes per project)

**Allocation of places**
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**Additional information**
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**Referred to in LPO I**
(examination regulations for teaching-degree programmes)
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### Theoretical Informatics

<table>
<thead>
<tr>
<th>Module title</th>
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<tr>
<td>Theoretical Informatics</td>
<td>10-I-TIV-141-m01</td>
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**Module coordinator**
Dean of Studies Informatik (Computer Science)

**Module offered by**
Institute of Computer Science

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**Duration**
1 semester

**Module level**
undergraduate

**Other prerequisites**
--

**Contents**
Computability, decidability, countability, finite automata, regular sets, generative grammars, context-free languages, context-sensitive languages, complexity of calculations, P-NP problem, NP completeness.

**Intended learning outcomes**
The students possess a fundamental and applicable knowledge in the areas of computability, decidability, countability, finite automata, regular sets, generative grammars, context-free languages, context-sensitive languages, complexity of computations, P-NP problem, NP completeness.

**Courses**
V (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

**Allocation of places**
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**Additional information**
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**Referred to in LPO I**
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<table>
<thead>
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**Contents**

Computability, decidability, countability, finite automata, regular sets, generative grammars, context-free languages, context-sensitive languages, complexity of calculations, P-NP problem, NP completeness.

**Intended learning outcomes**

The students possess a fundamental and applicable knowledge in the areas of computability, decidability, countability, finite automata, regular sets, generative grammars, context-free languages, context-sensitive languages, complexity of computations, P-NP problem, NP completeness.

**Courses** (type, number of weekly contact hours, language — if other than German)

Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) completion of approx. 11 exercise sheets with approx. 4 exercises per sheet (50% of exercises to be completed correctly) or b) written examination (approx. 180 to 240 minutes). Method of assessment to be selected by the candidate.

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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Subfield Mathematics
(30 ECTS credits)
### Logic for Informatics

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<td>Logic for informatics</td>
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**Module Coordinator**
Dean of Studies Informatik (Computer Science)

**Module offered by**
Institute of Computer Science

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**Duration**
1 semester

**Module level**
undergraduate

**Other prerequisites**
--

### Contents
Syntax and semantics of propositional logic, equivalence and normal forms, Horn formulas, SAT, resolution, infinite formula sets, syntax and semantics of predicate logic.

### Intended learning outcomes
The students are proficient in the following areas: syntax and semantics of propositional logic, equivalence and normal forms, Horn formulas, SAT, resolution, infinite formula sets, syntax and semantics of predicate logic.

### Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

### Allocation of places
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### Additional information
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<table>
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<td>Mathematics 1 for students in Computer Science</td>
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<td>Dean of Studies Mathematik (Mathematics)</td>
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<tr>
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</table>

**Contents**
Basics on numbers and functions, sequences and series, differential and integral calculus in one variable, vector spaces, simple differential equations.

**Intended learning outcomes**
The student gets acquainted with fundamental concepts and methods of advanced mathematics. He/She learns to apply these methods to problems in natural and engineering sciences, in particular in computer science, and is able to interpret the results.

**Courses**
(V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

**Allocation of places**
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**Additional information**
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)
--
Module title
Mathematics 2 for students in Computer Science

Abbreviation
10-M-INF2-141-m01

Module coordinator
Dean of Studies Mathematik (Mathematics)

Module offered by
Institute of Mathematics

ECTS
10

Method of grading
numerical grade

Only after succ. compl. of module(s)

Duration
1 semester

Module level
undergraduate

Other prerequisites

Contents
Linear maps and systems of linear equations, matrix calculus, eigenvalue theory, differential and integral calculus in several variables, differential equations, Fourier analysis.

Intended learning outcomes
The student gets acquainted with fundamental concepts and methods of advanced mathematics. He/She learns to apply these methods to problems in natural and engineering sciences, in particular in computer science, and is able to interpret the results.

Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)
Language of assessment: German, English

Allocation of places

Additional information

Referred to in LPO I (examination regulations for teaching-degree programmes)

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<table>
<thead>
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<td>Algorithmic Graph Theory</td>
<td>10-I-AGT-141-m01</td>
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<td>holder of the Chair of Computer Science I</td>
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**Contents**

We discuss typical graph problems: We solve round trip problems, calculate maximal flows, find matchings and colourings, work with planar graphs and find out how the ranking algorithm of Google works. Using the examples of graph problems, we also become familiar with new concepts, for example how we model problems as linear programs or how we show that they are fixed parameter computable.

**Intended learning outcomes**

The students are able to model typical problems in computer science as graph problems. In addition, the participants are able to decide which tool from the course helps solve a given graph problem algorithmically. In this course, students learn in detail how to estimate the run time of given graph algorithms.

**Courses**

(V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**

(examination regulations for teaching-degree programmes)
Compulsory Electives
(35 ECTS credits)
Subfield Computer Science
(25 ECTS credits)
**Module title**
Interactive Computer Graphics

**Abbreviation**
10-I-ICG-141-m01

**Module coordinator**
holder of the Chair of Computer Science IX

**Module offered by**
Institute of Computer Science

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**Duration**
1 semester

**Module level**
graduate

**Other prerequisites**
--

**Contents**
Computer graphics studies methods for digitally synthesising and manipulating visual content. This course specifically concentrates on interactive graphics with an additional focus on 3D graphics as a requirement for many contemporary as well as for novel human-computer interfaces and computer games. The course will cover topics about light and images, lighting models, data representations, mathematical formulations of movements, projection as well as texturing methods. Theoretical aspects of the steps involved in ray-tracing and the raster pipeline will be complemented by algorithmical approaches for interactive image syntheses using computer systems. Accompanying software solutions will utilise modern graphics packages and languages like OpenGL, GLSL and/or DirectX.

**Intended learning outcomes**
At the end of the course, the students will have a broad understanding of the underlying theoretical models of computer graphics. They will be able to implement a prominent variety of these models, to build their own interactive graphics applications and to choose the right software tool for this task.

**Courses**
(type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus

written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

**Allocation of places**
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**Additional information**
--

**Referred to in LPO I**
(examination regulations for teaching-degree programmes)

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Module title | Abbreviation
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Data Bases | 10-I-DB-141-m01

Module coordinator | Module offered by
Dean of Studies Informatik (Computer Science) | Institute of Computer Science

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<th>Duration</th>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
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Contents
Relational algebra and complex SQL statements; database planning and normal forms; transaction management.

Intended learning outcomes
The students possess knowledge about database modelling and queries in SQL as well as transactions.

Courses
(V + Ü (no information on SWS (weekly contact hours) and course language available))

Method of assessment
Written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

Allocation of places
--

Additional information
--

Referred to in LPO I (examination regulations for teaching-degree programmes)
--
### Module title
Knowledge-based Systems

### Abbreviation
10-I-WBS-141-m01

### Module coordinator
holder of the Chair of Computer Science VI

### Module offered by
Institute of Computer Science

### ECTS
5

### Method of grading
numerical grade

### Only after succ. compl. of module(s)
--

### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
--

### Contents
Foundations in the following areas: knowledge management systems, knowledge representation, solving methods, knowledge acquisition, learning, guidance dialogue, semantic web.

### Intended learning outcomes
The students possess theoretical and practical knowledge for the understanding and design of knowledge-based systems including knowledge formalisation and have acquired experience in a small project.

### Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

### Allocation of places
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### Additional information
--

### Referred to in LPO I
(examination regulations for teaching-degree programmes)

--
Module title | Abbreviation
--- | ---
Data Mining | 10-I-DM-141-m01

Module coordinator | Module offered by
holder of the Chair of Computer Science VI | Institute of Computer Science

ECTS | Method of grading | Only after succ. compl. of module(s)
5 | numerical grade | --

Duration | Module level | Other prerequisites
1 semester | undergraduate | --

Contents
Foundations in the following areas: definition of data mining and knowledge, discovery in databases, process model, relationship to data warehouse and OLAP, data preprocessing, data visualisation, unsupervised learning methods (cluster and association methods), supervised learning (e.g. Bayes classification, KNN, decision trees, SVM), learning methods for special data types, other learning paradigms.

Intended learning outcomes
The students possess a theoretical and practical knowledge of typical methods and algorithms in the area of data mining and machine learning. They are able to solve practical knowledge discovery problems with the help of the knowledge acquired in this course and by using the KDD process. They have acquired experience in the use or implementation of data mining algorithms.

Courses (type, number of weekly contact hours, language — if other than German)
V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)
Language of assessment: German, English

Allocation of places
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Additional information
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<table>
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<td>Object oriented Programming</td>
<td>10-I-OOP-141-m01</td>
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<td>Dean of Studies Informatik (Computer Science)</td>
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<tbody>
<tr>
<td>1 semester</td>
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## Contents
Polymorphism, generic programming, meta programming, web programming, templates, document management.

## Intended learning outcomes
The students are proficient in the different paradigms of object-oriented programming and have experience in their practical use.

## Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

## Method of assessment
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

## Allocation of places
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## Additional information
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## Referred to in LPO I (examination regulations for teaching-degree programmes)
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## Module Catalogue for the Subject
### Computer Science
#### Bachelor's with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tr>
<td>Computational Complexity</td>
<td>10-I-KT-141-m01</td>
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### Contents
Complexity measurements and classes, general relationships between space and time classes, memory consumption versus computation time, determinism versus indeterminism, hierarchical theorems, translation methods, P-NP problem, completeness problems, Turing reduction, interactive proof systems.

### Intended learning outcomes
The students possess a fundamental and applicable knowledge in the areas of complexity measurements and classes, general relationships between space and time classes, memory consumption versus computation time, determinism versus indeterminism, hierarchical theorems, translation methods, P-NP problem, completeness problems, Turing reduction, interactive proof systems.

### Courses
(V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

### Allocation of places
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### Additional information
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### Referred to in LPO I
(examination regulations for teaching-degree programmes)
--
Module title | Cryptography and Data Security
---|---
Abbreviation | 10-I-KD-141-m01

**Module coordinator**
Dean of Studies Informatik (Computer Science)

**Module offered by**
Institute of Computer Science

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**Duration**
1 semester

**Module level**
undergraduate

**Contents**
Private key cryptography systems, Vernam one-time pad, AES, perfect security, public key cryptography systems, RSA, Diffie-Hellman, Elgamal, Goldwasser-Micali, digital signature, challenge-response methods, secret sharing, millionaire problem, secure circuit evaluation, homomorphic encryption.

**Intended learning outcomes**
The students possess a fundamental and applicable knowledge in the areas of private key cryptography systems, Vernam one-time pad, AES, perfect security, public key cryptography, RSA, Diffie-Hellman, Elgamal, Goldwasser-Micali, digital signature, challenge-response method, secret sharing, millionaire problem, secure circuit evaluation, homomorphic encryption.

**Courses**
(V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

**Allocation of places**
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**Additional information**
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<td>3D Poiting Cloud Processing</td>
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</table>

**Contents**

Laser scanning, Kinect and camera models, basic data structures (lists, arrays, oc-trees), calculating normals, k-d trees, registration, features, segmentation, tracking, applications for airborne mapping, applications to mobile mapping.

**Intended learning outcomes**

Students understand the fundamental principles of all aspects of 3D point cloud processing and are able to communicate with engineers / surveyors / CV people / etc. Students are able to solve problems of modern sensor data processing and have experienced that real application scenarios are challenging in terms of computational requirements, in terms of memory requirements and in terms of implementation issues.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

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### Module title
Operating Systems

### Abbreviation
10-I-BS-141-m01

### Module coordinator
holder of the Chair of Computer Science II

### Module offered by
Institute of Computer Science

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### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
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### Contents
Introduction to computer systems, development of operating systems, architecture principles, interrupt processing in operating systems, processes and threads, CPU scheduling, synchronisation and communication, memory management, device and file management, operating system virtualisation.

### Intended learning outcomes
The students possess knowledge and practical skills in building and using essential parts of operating systems.

### Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

### Allocation of places
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### Additional information
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</table>

**Contents**

Instruction set architectures, command processing through pipelining, statical and dynamic instruction scheduling, caches, vector processors, multi-core processors.

**Intended learning outcomes**

The students master the most important techniques to design fast computers as well as their interaction with compilers and operating systems.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

**Allocation of places**

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**Additional information**

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### Contents


### Intended learning outcomes

The students possess an intricate knowledge of the structure of computer networks and communication systems as well as fundamental principles to rate these systems.

### Courses

(V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

### Allocation of places

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### Additional information

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<td>Selected Basics of Computer Science</td>
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**Contents**
Selected topics in computer science.

**Intended learning outcomes**
The students are able to understand solutions to fundamental problems in computer science and to transfer them to related topics.

**Courses**
V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (approx. 60 to 120 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

**Allocation of places**
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**Additional information**
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)
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Subfield Subsidiary Subject

(10 ECTS credits)
Mathematics
(max. 10 ECTS credits)
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<tr>
<td>Introducing to Discrete Mathematics for students of other subjects</td>
<td>10-M-DIMaf-141-m01</td>
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**Contents**

Techniques from combinatorics, introduction to graph theory (including applications), cryptographic methods, error-correcting codes.

**Intended learning outcomes**

The student is acquainted with the fundamental concepts and results in discrete mathematics, masters the relevant proof techniques, is able to apply methods from number theory and algebra to discrete mathematics and realises the scope of applications of discrete structures.

**Courses** *(type, number of weekly contact hours, language — if other than German)*

V + Ü *(no information on SWS (weekly contact hours) and course language available)*

**Method of assessment** *(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)*

written examination (approx. 90 to 180 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** *(examination regulations for teaching-degree programmes)*

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<table>
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<td>Numerical Mathematics 1 for students of other subjects</td>
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### Contents
Solution of systems of linear equations and curve fitting problems, nonlinear equations and systems of equations, interpolation with polynomials, splines and trigonometric functions, numerical integration.

### Intended learning outcomes
The student is acquainted with the fundamental concepts and methods in numerical mathematics, applies them to practical problems and knows about their typical fields of application.

### Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
written examination (approx. 90 to 180 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

### Allocation of places
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### Additional information
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### Referred to in LPO I
(examination regulations for teaching-degree programmes)

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### Module title
**Stochastics 1 for students of other subjects**

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### Module coordinator
Dean of Studies Mathematik (Mathematics)

### Module offered by
Institute of Mathematics

### ECTS
10

### Method of grading
Only after succ. compl. of module(s)

### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
--

### Contents
Combinatorics, Laplace models, selected discrete distributions, elementary measure and integration theory, continuous distributions: normal distribution, random variable, distribution function, product measures and stochastic independence, elementary conditional probability, characteristics of distributions: expected value and variance, limit theorems: law of large numbers, central limit theorem.

### Intended learning outcomes
The student is acquainted with fundamental concepts and methods in stochastics, applies these methods to practical problems and knows about the typical fields of application.

### Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
Written examination (approx. 90 to 180 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

### Allocation of places
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### Additional information
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### Referred to in LPO I
(examination regulations for teaching-degree programmes)

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## Introducing Into Number Theory for students of other subjects

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<td>Introducing Into Number Theory for students of other subjects</td>
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### Contents

Elementary properties of divisibility, prime numbers and prime number factorisation, modular arithmetics, prime tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quadratic forms, diophantine approximation and diophantine equations.

### Intended learning outcomes

The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to employ the basic methods and proof techniques independently.

### Courses

V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

written examination (approx. 90 to 180 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

### Allocation of places

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### Additional information

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### Referred to in LPO I

(examination regulations for teaching-degree programmes)

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<td>Ordinary Differential Equations for students of other subjects</td>
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**Contents**

Existence and uniqueness theorem; continuous dependence of solutions on initial values, systems of linear differential equations, matrix exponential series, linear differential equations of higher order.

**Intended learning outcomes**

The student is acquainted with the fundamental concepts and methods of the theory of ordinary differential equations. He/she is able to apply these methods to practical problems.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 90 to 180 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<tr>
<th>ECTS</th>
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<table>
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<tr>
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<th>Other prerequisites</th>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

**Contents**

Linear programming, duality theory, transport problems, integral linear programming, graph theoretic problems.

**Intended learning outcomes**

The student is acquainted with the fundamental methods in operations research, as required as a central tool for solving many practical problems especially in economics. He/She is able to apply these methods to practical problems, both theoretically and numerically.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 90 to 180 minutes); if announced by the lecturer at the beginning of the course, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

**Allocation of places**

--

**Additional information**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--
Physics
(max. 10 ECTS credits)
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Physics for Students of Non-physics-related Minor Subjects</td>
<td>11-EFNF-072-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing Director of the Institute of Applied Physics</td>
<td>Faculty of Physics and Astronomy</td>
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</table>

<table>
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<tr>
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<tbody>
<tr>
<td>2 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

**Contents**

Mechanics, vibration theory, thermodynamics, optics, science of electricity, Atomic and Nuclear Physics.

**Intended learning outcomes**

The students have knowledge of the principles of Physics.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + V (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 120 minutes)

**Allocation of places**

Only as part of pool of general key skills (ASQ): 10 places. Places will be allocated by lot.

**Additional information**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Practical Course Physics for Students of Non-physics-related Minor Subjects</td>
<td>11-PFNF-072-m01</td>
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**Module coordinator**  
Managing Director of the Institute of Applied Physics

**Module offered by**  
Faculty of Physics and Astronomy

<table>
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<tr>
<td>3</td>
<td>Only after succ. compl. of module(s)</td>
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</tbody>
</table>

**Duration**  
1 semester

**Module level**  
undergraduate

**Contents**  
Mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance, Atomic and Nuclear Physics.

**Intended learning outcomes**  
The students have knowledge of the principles of Physics.

**Courses**  
P (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**  
type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus

a) oral test (approx. 15 minutes) during experiment and b) ungraded written examination (approx. 90 minutes)

**Allocation of places**  
Only as part of pool of general key skills (ASQ): 10 places. Places will be allocated by lot.

**Additional information**  
--

**Referred to in LPO I**  
(examination regulations for teaching-degree programmes)

--
Business Management and Economics
(max. 10 ECTS credits)
### Module Catalogue for the Subject
Computer Science
Bachelor's with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Introduction to Business Administration - Minor</td>
<td>12-NW-EBWL-111-m01</td>
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</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>holder of the Chair of Business Management, Banking and Finance</td>
<td>Faculty of Business Management and Economics</td>
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<table>
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<table>
<thead>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

### Contents

The module will provide students with an insight into economics. The course will first discuss how markets work. The resulting market result - traded amounts and price - will be analysed and different starting points for economic policy measures (e.g. regulation of monopolies, introduction of minimum wages, environmental policy) will be discussed. Students will then acquire an overview of macroeconomic interrelationships. In this context, the course will focus on providing students with an understanding of business cycles (unemployment, inflation) and growth processes. Current issues such as monetary and fiscal policy in the euro area will also be discussed.

### Intended learning outcomes

After completing the module, students should be able to describe the modern business economics as a scientific discipline in its institutional economic expression and to master appropriate level in their problem-solving techniques used on the character of an orientation session.

### Courses

<table>
<thead>
<tr>
<th>(type, number of weekly contact hours, language — if other than German)</th>
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<tbody>
<tr>
<td>V + Ü (no information on SWS (weekly contact hours) and course language available)</td>
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### Method of assessment

<table>
<thead>
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<th>(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>written examination (approx. 60 minutes)</td>
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</tbody>
</table>

### Allocation of places

Number of places: maximum 200. Places will be allocated by lot. Modules 12-NW-EBWL and 12-NW-EVWL are not open for students of the following subjects: Wirtschaftswissenschaft (Business Management and Economics) Bachelor's (BSc with 180 ECTS credits), Wirtschaftsinformatik (Business Information Systems) Bachelor's (BSc with 180 ECTS credits) and Wirtschaftsmathematik (Mathematics for Economics) Bachelor's (BSc with 180 ECTS credits).

### Additional information

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### Referred to in LPO I

(examination regulations for teaching-degree programmes)
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Economics - Minor</td>
<td>12-NW-EVWL-111-m01</td>
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</table>

<table>
<thead>
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<th>Module coordinator</th>
<th>Module offered by</th>
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<tr>
<td>holder of the Chair of Monetary Policy and International Economics</td>
<td>Faculty of Business Management and Economics</td>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

**Contents**

The course offers basic insights into the principles of economics. We analyse how markets work, i.e. how consumers form their demand and how suppliers make production decisions. On the basis of first insights into market economies, we analyse why governments might want to intervene. In this context, we focus on monopoly, environmental issues and minimum wages in labour markets.

In addition to micro topics, we also focus on macroeconomic aspects and analyse why we observe business cycles (unemployment, inflation) and long term economic growth. We also address topics related to monetary and fiscal policy in the euro area.

**Intended learning outcomes**

The students have a basic knowledge of economics, with which they can analyze complex economic relationships. They can deal critically with current economic policy issues and make an independent judgment. In addition, elementary mathematical techniques for solving microeconomics and macroeconomic models are mediated.

**Courses**

(V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 60 minutes)

**Allocation of places**

Number of places: maximum 200. Places will be allocated by lot. Modules 12-NW-EBWL and 12-NW-EVWL are not open for students of the following subjects: Wirtschaftswissenschaft (Business Management and Economics) Bachelor’s (BSc with 180 ECTS credits), Wirtschaftsinformatik (Business Information Systems) Bachelor’s (BSc with 180 ECTS credits) and Wirtschaftsmathematik (Mathematics for Economics) Bachelor’s (BSc with 180 ECTS credits).

**Additional information**

**Referred to in LPO I**

(examination regulations for teaching-degree programmes)
<table>
<thead>
<tr>
<th>Module title</th>
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<tr>
<td>Financial Accounting</td>
<td>12-ExtUR-G-132-m01</td>
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**Module coordinator**

holder of the Chair of Business Taxation  

**Module offered by**

Faculty of Business Management and Economics

<table>
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<tr>
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<td>numerical grade</td>
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</table>

**Duration**

1 semester  

**Module level**

undergraduate  

**Other prerequisites**

--

**Contents**

This course offers an introduction to the fundamentals of financial accounting, including the technique of double-entry book-keeping as well as the fundamentals of recognition, valuation and presentation of assets, liabilities and equity according to German commercial law.

**Intended learning outcomes**

Students acquire a basic understanding of the fundamentals of financial accounting. They are able to arrange, reproduce and apply this knowledge, i.e. they are able to solve simple accounting problems.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 60 minutes)

**Allocation of places**

Number of places: 840. No restrictions with regard to available places for Bachelor’s students of Wirtschaftswissenschaft (Business Management and Economics) (BSc with 180 ECTS credits), Wirtschaftsmathematik (Mathematics for Economics) (BSc with 180 ECTS credits), Wirtschaftsinformatik (Business Information Systems) (BSc with 180 ECTS credits) as well as Bachelor’s students with the minor Wirtschaftswissenschaft (Business Management and Economics) (60 ECTS credits). The remaining places will be allocated to students of other subjects. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in the respective degree subject; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot. Applicants who already have successfully completed at least one module component of the respective module will be given preferential consideration. Places on all courses of the module component with a restricted number of places will be allocated in the same procedure. A waiting list will be maintained and places re-allocated as they become available.

**Additional information**

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**Referred to in LPO I**

(examination regulations for teaching-degree programmes)
Managerial Accounting

Abbreviation: 12-IntUR-G-132-m01

Module coordinator: holder of the Chair of Business Management and Accounting
Module offered by: Faculty of Business Management and Economics

ECTS: 5
Method of grading: numerical grade
Only after succ. compl. of module(s): --

Duration: 1 semester
Module level: undergraduate
Other prerequisites: --

Contents:
Content:
This course offers an introduction to aims and methods of managerial accounting (cost accounting).

Outline of syllabus:
1. Managerial accounting and financial accounting
2. Managerial accounting: basic terms
3. Different types of costs
4. Cost centre accounting based on total costs
5. Job costing based on total costs
6. Cost centre accounting and job costing based on direct/variable costs
7. Budgeting and cost-variance analysis
8. Cost-volume-profit analysis
9. Cost information and operating decisions

Reading:
Friedl/Hofmann/Pedell: Kostenrechnung. Eine entscheidungsorientierte Einführung.
(most recent editions)

Intended learning outcomes
After completing the course "Management Accounting and Control", the students will be able to
(i) set out the responsibilities of the company's internal accounting and control;
(ii) define the central concepts of internal enterprise computing restriction and control and assign case studies
the terms;
(iii) apply the basic methods of internal corporate accounting and control on a full and cost base to idealized ca-
se studies of medium difficulty that calculate relevant costs and benefits and take on this basis a reasoned deci-
sion.

Courses (type, number of weekly contact hours, language — if other than German)
V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether
module is creditable for bonus)
written examination (approx. 60 minutes)

Allocation of places
Number of places: 840. No restrictions with regard to available places for Bachelor’s students of Wirtschaftswis-
senschaft (Business Management and Economics) (BSc with 180 ECTS credits), Wirtschaftsmathematik (Mathe-
matics for Economics) (BSc with 180 ECTS credits), Wirtschaftsinformatik (Business Information Systems) (BSc
with 180 ECTS credits) as well as Bachelor’s students with the minor Wirtschaftswissenschaft (Business Mana-
gement and Economics) (60 ECTS credits). The remaining places will be allocated to students of other subjects.
Should the number of applications exceed the number of available places, places will be allocated in a standar-
dised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1
(50% of places): total number of ECTS credits already achieved in the respective degree subject; among appli-

cants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot. Applicants who already have successfully completed at least one module component of the respective module will be given preferential consideration. Places on all courses of the module component with a restricted number of places will be allocated in the same procedure. A waiting list will be maintained and places re-allocated as they become available.

**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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Supply, Production and Operations Management. An Introduction

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Supply, Production and Operations Management. An Introduction</td>
<td>12-BPL-G-132-m01</td>
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</table>

Module coordinator

holder of the Chair of Business Management and Industrial Management

Module offered by

Faculty of Business Management and Economics

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<td>5</td>
<td>numerical grade</td>
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</table>

Duration

1 semester

Module level

undergraduate

Contents

This course will provide students with an overview of fundamental processes in procurement, production and logistics and the related corporate functions as well as a model-based introduction to related planning procedures.

Intended learning outcomes

The students will be able to describe and discuss the objectives and major processes in the domains of corporate procurement, production and logistics as well as their interdependencies. Furthermore, they are capable of developing and applying basic planning models in these fields.

Courses

V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment

written examination (approx. 60 minutes)

Allocation of places

Number of places: 620. No restrictions with regard to available places for Bachelor’s students of Wirtschaftswissenschaft (Business Management and Economics) (BSc with 180 ECTS credits), Wirtschaftsmathematik (Mathematics for Economics) (BSc with 180 ECTS credits), Wirtschaftsinformatik (Business Information Systems) (BSc with 180 ECTS credits) as well as Bachelor’s students with the minor Wirtschaftswissenschaft (Business Management and Economics) (60 ECTS credits). The remaining places will be allocated to students of other subjects. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in the respective degree subject; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot. Applicants who already have successfully completed at least one module component of the respective module will be given preferential consideration. Places on all courses of the module component with a restricted number of places will be allocated in the same procedure. A waiting list will be maintained and places re-allocated as they become available.

Additional information

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title: Investment and Finance. An Introduction
Abbreviation: 12-I&F-G-132-m01

Module coordinator: holder of the Chair of Business Management, Banking and Finance
Module offered by: Faculty of Business Management and Economics

ECTS: 5
Method of grading: numerical grade
Only after succ. compl. of module(s): --

Duration: 1 semester
Module level: undergraduate
Other prerequisites: --

Contents:
Content:
This course offers an introduction to principles of financial mathematics, several methods of capital budgeting and principles of financial economics.

Outline of syllabus:
1. Principles of financial mathematics
2. Fundamental concepts
3. Problems of investment and finance in one commodity world under certainty
4. Problems of investment and finance in one commodity world under uncertainty
5. Problems of investment and finance in many commodities world under uncertainty
6. Capital market and corporate financing in Germany

Intended learning outcomes:
After completing the course "Principles of Investments and Finance", the students will be able
(i) to understand the fundamentals in financial mathematics and solve several problems, e.g. via the PV approach;
(ii) to address the central problems in intertemporal allocation given different capital market scenarios;
(iii) to budget and calculate the optimal useful life given static and dynamic investment approaches under the consideration of several other investment opportunities and the capital market scenario, especially the influence of taxes.

Courses:
(type, number of weekly contact hours, language — if other than German)
V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment:
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
written examination (approx. 60 minutes)

Allocation of places:
Number of places: 620. No restrictions with regard to available places for Bachelor's students of Wirtschaftswissenschaft (Business Management and Economics) (BSc with 180 ECTS credits), Wirtschaftsmathematik (Mathematics for Economics) (BSc with 180 ECTS credits), Wirtschaftsinformatik (Business Information Systems) (BSc with 180 ECTS credits) as well as Bachelor's students with the minor Wirtschaftswissenschaft (Business Management and Economics) (60 ECTS credits). The remaining places will be allocated to students of other subjects. Should the number of applications exceed the number of available places, places will be allocated in a standardized procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in the respective degree subject; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot. Applicants who already have successfully completed at least one module component of the respective module will be given preferential consideration. Places on all courses of the module component with a restricted number of places will be allocated in the same procedure. A waiting list will be maintained and places re-allocated as they become available.
## Additional information

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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Module title
Introduction to Business Informatics

Abbreviation
12-EWiinf-G-132-m01

Module holder
holder of the Chair of Business Management and Business Information Systems

Module offered by
Faculty of Business Management and Economics

ECTS
5

Method of grading
numerical grade

Only after succ. compl. of module(s)
--

Duration
1 semester

Module level
undergraduate

Other prerequisites
--

Contents

Content:
This course offers an introduction to the essential aspects of business information systems.

Outline of syllabus:
1. Integration of IT systems
2. From data processing to information processing
3. eCommerce and eGovernment
4. Functionality of IT technology
5. Application development principles
6. Intercommunication

Reading:
Thome: Grundzüge der Wirtschaftsinformatik.

Intended learning outcomes

The course "Einführung in die Wirtschaftsinformatik" communicates
(i) an overview of the different task fields of the business informations systems discipline;
(ii) an understanding for recent developments in the discipline and related technologies.

Courses

V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment

a) written examination (approx. 60 minutes) or b) written examination consisting entirely or partly of multiple/single choice questions (approx. 60 minutes)

Allocation of places

Number of places: 840. No restrictions with regard to available places for Bachelor's students of Wirtschaftswissenschaft (Business Management and Economics) (BSc with 180 ECTS credits), Wirtschaftsmathematik (Mathematics for Economics) (BSc with 180 ECTS credits), Wirtschaftsinformatik (Business Information Systems) (BSc with 180 ECTS credits) as well as Bachelor's students with the minor Wirtschaftswissenschaft (Business Management and Economics) (60 ECTS credits). The remaining places will be allocated to students of other subjects. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in the respective degree subject; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot. Applicants who already have successfully completed at least one module component of the respective module will be given preferential consideration. Places on all courses of the module component with a restricted number of places will be allocated in the same procedure. A waiting list will be maintained and places re-allocated as they become available.
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<tr>
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<tbody>
<tr>
<td>Referred to in LPO I</td>
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<tr>
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## Module Catalogue for the Subject
### Computer Science
#### Bachelor's with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tr>
<td>Integrated Business Processes</td>
<td>12-GP-G-132-m01</td>
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<tr>
<th>Duration</th>
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<th>Other prerequisites</th>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

### Contents

This course is aimed at students of Wirtschaftsinformatik (Business Information Systems) and Wirtschaftswissenschaft (Business Management and Economics) interested in the topic. The course is divided up into two parts. In the theoretical part, students will acquire the necessary theoretical knowledge that will serve as a basis for the practical part. The practical exercise will present students with an opportunity to apply their newly acquired knowledge by working with an SAP Business ByDesign system on case studies on the model company Almika. In this context, the human resources, purchasing, sales, service, project management and finance departments will be dealt with.

The course will introduce students to business processes of an ERP system (Enterprise Resource Planning) using the example of SAP Business ByDesign. In addition to the basic principles, students will also become familiar with the processes and functionalities.

### Intended learning outcomes

After completing the course, the students will be able to

1. reflect technical principles and operational models of ERP systems,
2. understand the functionality of ERP systems and
3. perform and understand business processes within the ERP system SAP Business ByDesign.

### Courses

V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

a) written examination (approx. 60 minutes) or b) term paper (approx. 15 pages) or c) term paper (approx. 10 to 15 pages) and presentation (approx. 10 minutes), weighted 2:1

### Allocation of places

Wirtschaftsinformatik (Business Information Systems) Bachelor’s (180 ECTS): no restrictions. Other degree programmes: minimum 15 places. More places will be available provided there is enough capacity. Should the number of applications from students of other subjects exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in the respective subject; among applicants with the same number of ECTS credits, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot; applicants who already have successfully completed at least one module component of the respective module will be given preferential consideration. Places on all courses of the module component with a restricted number of places will be allocated in the same procedure. A waiting list will be maintained and places re-allocated as they become available.

### Additional information

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title: Forward and Reverse Business Engineering

Abbreviation: 12-FRBE-F-132-m01

Module coordinator: Business Integration Prof. Thome

Module offered by: Faculty of Business Management and Economics

ECTS: 5

Method of grading: Only after succ. compl. of module(s)

Duration: 1 semester

Module level: undergraduate

Contents:

"Business Engineering" refers to the method and model-based design theory for companies in the information age. "Forward" refers to design methods (such as situation analysis, requirements analysis and business process modelling) that help implement a new solution. "Reverse" refers to approaches (such as the use and process analysis) that make it possible to improve or re-design existing structures and processes. Market requirements and technological innovation potential are typical reasons for the continuous transformation of a company. The resulting change needs to be implemented into the organisational structure, business processes and information systems.

The course traces the implementation cycle of enterprise software from the point of view of a member of a project team. In addition to acquainting students with the theoretical basis of adaptation, the course will also discuss examples from practical projects.

Intended learning outcomes:

The students know in detail the process of adaptation of business software libraries. They master the methods of Forward Engineering (such as situation analysis, requirement analysis, process modeling and business blueprint) and Reverse Engineering (Reverse Business Engineering) and their implementation in tools.

Courses:

V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment:

a) written examination (approx. 60 minutes) or b) term paper (approx. 15 pages) or c) term paper (approx. 10 to 15 pages) and presentation (approx. 10 minutes), weighted 2:1

Allocation of places:

Number of places: 50. Should the number of applications exceed the number of available places, places will be allocated as follows: (1) Bachelor’s students of Wirtschaftsinformatik (Business Information Systems) (BSc with 180 ECTS credits) will be given preferential consideration. (2) The remaining places will be allocated to students of other subjects. (3) When places are allocated in accordance with (1) and the number of applications from Bachelor’s students of Wirtschaftsinformatik (Business Information Systems) (BSc with 180 ECTS credits) exceeds the number of available places, places will be allocated among applicants from this group according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in the respective degree subject; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot. (4) When places are allocated in accordance with (2) and the number of applications from students of other subjects exceeds the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in the respective degree subject; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot. (5) Within the groups according to (1) and (2), applicants who already have successfully completed at least one module component of the respective module will be given preferential consideration. (6) Places on all courses of the module component with a restricted number of places will
be allocated in the same procedure. (7) A waiting list will be maintained and places re-allocated as they become available.

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Linguistics
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<td>Level One Module Introduction to German Linguistics</td>
<td>04-DtLA-BM-SW-141-m01</td>
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**Contents**

Within the lecture, this module aims to provide an overview and first introduction to the important parts of German linguistics. At the same time, the seminar that is a part of the module, provides students with analytical and description methods up to the word level, for example morphological segmentation and classification of individual word forms into basic morphemes, morphology and inflectional morphemes, morphological and semantic analysis of word formation structures, phonetic and phonological transcription in International Phonetic Alphabet (IPA)-phonetics, graphical realisation of phonemes and associated with orthography principles. The associated tutorial helps to practise further and to become more confident with the analytical and description methods, acquired in the seminar.

**Intended learning outcomes**

Students possess an overview of the discipline German linguistics and its individual subdisciplines. They are able to describe and analyse linguistic units up to the word level assuredly. Thanks to the module, students are familiar with the basic analytical and description techniques of linguistics, which will be extended and consolidated in the following modules.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + S + T (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 minutes)

**Allocation of places**

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**Additional information**

Additional information on module duration: 1 to 2 semesters.

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Contents**

Within the lecture, this module aims to provide an overview of the German syntax with focus on the valency grammatical sentence analysis, e.g. determining clauses by the use of grammatical samples, determining valency depending and non-depending clauses, syntactical function and semantics of relative clauses, formal description of the structure of complex sentences. During this module, which is a part of the seminar, students will practice the analytical and description methods, covered during the lecture, by authentic sentences. This module will start with the analysis of simple sentences, then goes over to levels of clauses and will continue with the analysis of difficult sentences up to sub-levels. The tutorial, which is a part of the module, provides further practice and students will be confident with the covered description and analytical methods.

**Intended learning outcomes**

Students possess solid knowledge of the sub-area syntax with focus on valency grammar, they are able to identify and determine syntactic structures and are acquainted with the description and analysis of linguistic units up to the sentence level assuredly.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + S + T (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (approx. 60 minutes)

**Allocation of places**

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**Additional information**

Additional information on module duration: 1 to 2 semesters.

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Contents**

No information on contents available.

**Intended learning outcomes**

No information on intended learning outcomes available.

**Courses**

P (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 60 to 90 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**
(examination regulations for teaching-degree programmes)

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**Contents**
No information on contents available.

**Intended learning outcomes**
No information on intended learning outcomes available.

**Courses (type, number of weekly contact hours, language — if other than German)**
V (no information on SWS (weekly contact hours) and course language available)

**Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)**
oral examination (one candidate each: approx. 15 minutes, groups of 2: approx. 20 minutes, groups of 3: approx. 25 minutes); assessment will usually have reference to one of the sub-specialities of internal medicine, e.g. cardiology, pulmonology, nephrology, endocrinology, oncology, gastroenterology, rheumatology, infectious disease

**Allocation of places**
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**Additional information**
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)
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<tr>
<td>holder of the Professorship of Zoology at the Department of Electronmicroscopy</td>
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**Contents**

This module will address one of the central issues of biology: evolution. Fundamental mechanisms and hypotheses will be discussed, and students will be introduced to major phylogenetic reconstruction methods. Using the example of animals, students will be introduced to the phylogenetic diversity of eukaryotes. At the level of groups in the animal kingdom, students will acquire the fundamental knowledge necessary to understand the forms and functions of animal organisms, with morphology and cytology being discussed in an evolutionary and ecological context.

**Intended learning outcomes**

- Ability to recognise evolution as the driving force behind the phylogeny of species. - Familiarity with the concepts of phylogenetic relationships between plants/animals. - Familiarity with the distinguishing characteristics and major representatives of groups in the animal kingdom. - Ability to select those animal organisms that are most suitable for investigating particular scientific issues. - Familiarity with the components and functioning of microscopes. - Fundamental skills in the interpretation of macroscopic and histological preparations by light microscopy. - Fundamental preparation skills.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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</table>

**Contents**

Fundamental principles of genetics, neurobiology and behavioural biology.

**Intended learning outcomes**

Students will understand that there are molecular, cellular and system biological mechanisms and processes involved in animal behaviour.

<table>
<thead>
<tr>
<th>Courses</th>
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**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 to 90 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Contents**

Fundamental principles of the most important mathematical and statistical methods in biology.

**Intended learning outcomes**

Students will have acquired fundamental skills in the evaluation of experiments, the interpretation of readings and numbers as well as the mathematical description of biological processes.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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Module title | Abbreviation
--- | ---
Plant and Animal Ecology | 07-3A3OEKO-132-m01

Module coordinator | Module offered by
Dean of Studies Biologie (Biology) | Faculty of Biology

ECTS | Method of grading | Only after succ. compl. of module(s)
--- | --- | ---
6 | numerical grade | --

Duration | Module level | Other prerequisites
--- | --- | ---
1 semester | undergraduate | --

Contents
This module will provide students with an overview of the interactions of plants and animals with their abiotic and biotic environments. The module will focus on the functional adaptation to environmental conditions as well as on the structure and dynamics of populations, communities and ecosystems. Students will be introduced to fundamental model concepts of ecology, will become familiar with examples of research findings and will acquire the fundamental knowledge necessary to develop an understanding of current ecological problems.

Intended learning outcomes
Students are familiar with the fundamental principles of research in the field of ecology and with the most important abiotic and biotic factors that influence the distribution and frequency of occurrence of organisms in their environment. In addition, they understand the scientific relevance ecology has to the assessment of environmental issues.

Courses (type, number of weekly contact hours, language — if other than German)
V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
written examination (approx. 90 minutes)

Allocation of places
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Additional information
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### Contents

The module *Gene, Moleküle, Technologien (Genes, Molecules, Technologies)* will include lectures on the following topics: The section *Spezielle Genetik (Special Genetics)* will build on *Einführung in die Genetik (Introduction to Genetics)* and will deepen the students' knowledge of topics from the following areas: structure and evolution of the eukaryotic genome, regulatory RNA, epigenetically and evolutionarily significant genetic mechanisms. The section will also focus on methods of gene expression profiling, reverse genetics and modern methods of gene function and gene sequence analysis. In the lecture *Einführung in die Bioinformatik (Introduction to Bioinformatics)*, students will acquire an overview of major areas in the field of bioinformatics: protein sequence and protein domain analysis, phylogeny and evolution of sequences, protein structure, RNA/DNA sequences and structures, cellular networks (regulation, metabolism) and systems biology. During the section *Einführung in die Biotechnologie (Introduction to Biotechnology)*, students will acquire an overview of the following topics: history of biotechnology, DNA and RNA technologies, recombinant antibodies, molecular diagnostics, nanobiotechnology, biomaterials, bioprocess engineering, microbial biotechnology, transgenic animals and plants, microfluidics. The lecture *Einführung in die Pharmakokinetik (Introduction to Pharmacokinetics)* will provide students with an overview of the rational development of drugs and active agents. The module component will discuss an important aspect for biologists in more detail: the optimisation of the pharmacokinetics of small molecules and proteins. Pharmacokinetics describes the uptake, distribution, metabolism and elimination of a drug or xenobiotic in an organism.

### Intended learning outcomes

Students possess an advanced knowledge on genome evolution and the regulation of gene expression and are familiar with current methods in genetics as well as methods for the analysis of DNA and protein databases. They have acquired an overview of both traditional and modern methods in biotechnology and are familiar with fundamental topics in biotechnology. Students have acquired an overview of the fundamental principles of the development and review of active agents in research, clinical practice and the pharmaceutical industry. They are familiar with methods and technologies in biology and are able to evaluate potential applications of these in research and industry.

### Courses

(V no information on SWS (weekly contact hours) and course language available)

### Method of assessment

Written examination (approx. 90 minutes)

### Allocation of places

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### Additional information

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### Referred to in LPO I (examination regulations for teaching-degree programmes)

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Law

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</table>

**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 120 minutes)

**Allocation of places**

Number of places: maximum 80. Students applying after not having successfully completed assessment in the past two semesters will be given preferential consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available. Places on all courses of the module component with a restricted number of places will be allocated in the same procedure.

**Additional information**

Referred to in LPO I (examination regulations for teaching-degree programmes)
Module title | Employment Law
---|---
Abbreviation | 02-J6-121-m01

Module coordinator | holder of the Chair of Civil Law, Employment and Labour Law and Civil Procedure
Module offered by | Faculty of Law

ECTS | 5
Method of grading | numerical grade
Only after succ. compl. of module(s) | --

Duration | 2 semester
Module level | undergraduate
Other prerequisites | --

Contents
German contents available but not translated yet.

Grundlagen des Arbeitsrechts als Voraussetzung für berufliche Kontexte, die auch juristisches Hintergrundwissen benötigen.

Intended learning outcomes
German intended learning outcomes available but not translated yet.

Die Studierenden haben gelernt, arbeitsrechtliche Grundlagen auf ein späteres berufliches Handlungsfeld zu applizieren.

Courses (type, number of weekly contact hours, language — if other than German)
V + S (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
methods of assessment: a) written examination (approx. 120 minutes), b) talk (approx. 30 minutes), c) presentation (approx. 15 minutes), d) written elaboration of presentation (approx. 10 pages); options a) and b) weighting: 3:2 or options a) and c) and d) weighting: 3:1:1

Allocation of places
Students of the degree programme Rechtswissenschaften (Law) with the degree Erste Juristische Staatsprüfung (first state examination in law) and students of the Bachelor’s degree programme Öffentliches Recht (Public Law) (minor with 60 ECTS credits): no restrictions. Students of other degree programmes: 30 places. Places will be allocated as follows: Students applying after not having successfully completed assessment in the past two semesters will be given preferential consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available. Places on all courses of the module component with a restricted number of places will be allocated in the same procedure.

Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Geography
(max. 10 ECTS credits)
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Remote Sensing 1</td>
<td>09-FERN1-102-m01</td>
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<tbody>
<tr>
<td>holder of the Chair of Remote Sensing</td>
<td>Institute of Geography and Geology</td>
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<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

**Contents**

Introduction to "Geographical Remote Sensing".

**Intended learning outcomes**

Students possess the following skills: Theoretical basics of the Remote Sensing System, Remote Sensing against the background of different sensor and platform specifications.

**Courses**

(V + T (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 45 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

§ 66 (1) 2. Geographie Methoden der Geographie
<table>
<thead>
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<th>Module title</th>
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<td>Remote Sensing 2</td>
<td>09-FERN2-102-m01</td>
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</table>

Contents

Application of Remote Sensing to Geography.

Intended learning outcomes

Students have skills of current geographical fields of application concerning the cross-sectional methodology, consolidation of application possibilities of different sensor and platform specifications.

Courses (type, number of weekly contact hours, language — if other than German)

V + T (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 45 minutes)

Allocation of places

--

Additional information

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Subject-specific Key Skills

(15 ECTS credits)
### Module Catalogue for the Subject
Computer Science
Bachelor's with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
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<tr>
<td>Seminar 1</td>
<td>10-I-SEM1-141-m01</td>
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<td>Dean of Studies Informatik (Computer Science)</td>
<td>Institute of Computer Science</td>
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**Contents**

Independent review of a current topic in computer science on the basis of literature and, where applicable, software with written and oral presentation. The topics in modules 10-I-SEM1 and 10-I-SEM2 must come from different areas (this usually means that they are assigned by different lecturers).

**Intended learning outcomes**

The students are able to independently review a current topic in computer science, to summarise the main aspects in written form and to orally present these in an appropriate way.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written elaboration (approx. 10 to 15 pages) and oral presentation (approx. 30 to 45 minutes) with subsequent discussion on a topic from the field of computer science

Language of assessment: German, English

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
<thead>
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<td>Seminar 2</td>
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**Contents**

Independent review of a current topic in computer science on the basis of literature and, where applicable, software with written and oral presentation. The topics in modules 10-I-SEM1 and 10-I-SEM2 must come from different areas (this usually means that they are assigned by different lecturers).

**Intended learning outcomes**

The students are able to independently review a current topic in computer science, to summarise the main aspects in written form and to orally present these in an appropriate way.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

- written elaboration (approx. 10 to 15 pages) and oral presentation (approx. 30 to 45 minutes) with subsequent discussion on a topic from the field of computer science
- Language of assessment: German, English

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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Module title
Project Presentation

Abbreviation
10-I-PV-141-m01

Module coordinator
Dean of Studies Informatik (Computer Science)

Module offered by
Institute of Computer Science

ECTS
5

Method of grading
numerical grade

Duration
1 semester

Module level
undergraduate

Other prerequisites
--

Contents
Presentation of a project developed by the student (e.g. Bachelor’s thesis, software project) analogous to a presentation for laypersons with a knowledge of computer science at a trade fair. The project, which may also be work-in-progress, is presented with the help of a poster, a short talk and optionally a live demonstration.

Intended learning outcomes
The students are able to present a project they developed and to create the required media.

Courses
S (no information on SWS (weekly contact hours) and course language available)

Method of assessment
presentation of a project developed by the candidate analogous to a presentation for laypersons with a knowledge of computer science at a trade fair, including poster, handout, animation (where applicable) and good performance during discussion (approx. 10 to 15 minutes total)

Language of assessment: German, English

Allocation of places
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Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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