Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

# Subdivided 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: 2017
Responsible: Faculty of Mathematics and Computer Science
Responsible: Institute of Computer Science

# Learning Outcomes

German contents and learning outcome available but not translated yet.

**Wissenschaftliche Befähigung**

- Die Absolventinnen und Absolventen können die mathematischen, technischen, theoretischen und praktischen Grundlagen der Informatik anwenden.
- Die Absolventinnen und Absolventen verstehen die wesentlichen Zusammenhänge und Konzepte der einzelnen Teilgebiete der Informatik.
- Die Absolventinnen und Absolventen können tiefergehende Kenntnisse in mindestens einem Teilgebiet abrufen.
- Die Absolventinnen und Absolventen können unter Anleitung hard- und/oder softwaregetriebene Experimente durchführen, analysieren, auswerten und die erhaltenen Ergebnisse darstellen.
- Die Absolventinnen und Absolventen sind in der Lage, sich mit Hilfe von Fachliteratur in neue Aufgabengebiete einzuarbeiten und die Ergebnisse zu interpretieren und zu bewerten.
- Die Absolventinnen und Absolventen besitzen Abstraktionsvermögen, analytisches Denken, Problemlösungskompetenz und die Fähigkeit, Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen sind in der Lage, Methoden der Informatik unter Anleitung auf konkrete praktische oder theoretische Aufgabenstellungen anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.
- Die Absolventinnen und Absolventen setzen die erlernten theoretischen und praktischen Methoden in geschlossener Form unter Anleitung ein, um zu zeigen, dass sie zur Anwendung der Grundlagen wissenschaftlichen Arbeitens befähigt sind.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.

**Befähigung zur Aufnahme einer Erwerbstätigkeit**

- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.
- Die Absolventinnen und Absolventen sind in der Lage, konstruktiv und zielorientiert in einem Team zusammenzuarbeiten und auftretende Konflikte zu lösen (Teamfähigkeit).
- Die Absolventinnen und Absolventen können ihre erworbenen Kompetenzen in unterschiedlichen interkulturellen Kontexten und in international zusammengesetzten Teams anwenden.
- Die Absolventinnen und Absolventen kennen wichtige Anforderungen und Arbeitsweisen im gewerblichen Umfeld sowie in Forschung und Entwicklung.
- Die Absolventinnen und Absolventen sind befähigt, Probleme zu analysieren und zu lösen und sich in weniger vertraute Themenkomplexe einzuarbeiten.

**Persönlichkeitsentwicklung**

- Eigenverantwortlichkeit, Selbstständigkeit, Zeitmanagement, Teamfähigkeit
- Die Absolventinnen und Absolventen kennen die Regeln guter wissenschaftlicher Praxis und beachten sie.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.

**Befähigung zum gesellschaftlichen Engagement**

- Die Absolventinnen und Absolventen können naturwissenschaftliche Entwicklungen kritisch reflektieren und deren Auswirkungen auf die Wirtschaft, Gesellschaft und die Umwelt in Ansätzen erfassen, zum Beispiel Technikfolgenabschätzung, Ethik, IT-Recht oder Datenschutz.
- Die Absolventinnen und Absolventen haben ihr Wissen bezüglich wirtschaftlicher, gesellschaftlicher, naturwissenschaftlicher, kultureller etc. Fragestellungen erweitert und können begründet Position beziehen.

- Die Absolventinnen und Absolventen entwickeln die Bereitschaft und Fähigkeit, ihre Kompetenzen in partizipative Prozesse einzubringen und aktiv an Entscheidungen mitzuwirken.

# Abbreviations used

Course types: **E** = field trip, **K** = colloquium, **O** = conversatorium, **P** = placement/lab course, **R** = project, **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 programmes), **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:

**ASPO2015**

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

**09-Aug-2017 (2017-54)**

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific 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.

# The subject is divided into

| Abbreviation | Module title | ECTS credits | Method of grading | page |
|---|---|---|---|---|
| **Compulsory Courses (115 ECTS credits)** | | | | |
| **Computer Science (75 ECTS credits)** | | | | |
| 10-I-GdP-172-m01 | Fundamentals of Programming | 5 | NUM | 47 |
| 10-I-ADS-152-m01 | Algorithms and data structures | 10 | NUM | 35 |
| 10-I-ST-152-m01 | Software Technology | 10 | NUM | 68 |
| 10-I-PP-152-m01 | Practical Course in Programming | 10 | B/NB | 57 |
| 10-I-SWP-152-m01 | Practical course in software | 10 | B/NB | 70 |
| 10-I-RAL-152-m01 | Digital computer systems | 10 | NUM | 61 |
| 10-I-IÜ-152-m01 | Information Transmission | 10 | NUM | 52 |
| 10-I-HWP-152-m01 | Practical course in hardware | 10 | B/NB | 50 |
| **Theoretical Informatics (10 ECTS credits)** | | | | |
| 10-I-TIV-152-m01 | Theoretical Informatics | 5 | NUM | 72 |
| 10-I-TIT-172-m01 | Tutorial Theoretical Informatics | 5 | B/NB | 71 |
| **Mathematics (30 ECTS credits)** | | | | |
| 10-I-LOG-152-m01 | Logic for informatics | 5 | NUM | 55 |
| 10-M-INF1-152-m01 | Mathematics 1 for students in Computer Science | 10 | NUM | 81 |
| 10-M-INF2-152-m01 | Mathematics 2 for students in Computer Science | 10 | NUM | 82 |
| 10-I-AGT-152-m01 | Algorithmic Graph Theory | 5 | NUM | 37 |
| **Compulsory Electives (35 ECTS credits)** | | | | |
| **Computer Science (25 ECTS credits)** | | | | |
| 10-I=ICG-152-m01 | Interactive Computer Graphics | 5 | NUM | 31 |
| 10-I-DB-152-m01 | Databases | 5 | NUM | 43 |
| 10-I-WBS-152-m01 | Knowledge-based Systems | 5 | NUM | 77 |
| 10-I-DM-152-m01 | Data Mining | 5 | NUM | 45 |
| 10-I-APR-172-m01 | Advanced Programming | 5 | NUM | 39 |
| 10-I-KT-152-m01 | Computational Complexity | 5 | NUM | 54 |
| 10-I-KD-152-m01 | Cryptography and Data Security | 5 | NUM | 53 |
| 10-I-3D-152-m01 | 3D Point Cloud Processing | 5 | NUM | 33 |
| 10-I-BS-152-m01 | Operating Systems | 5 | NUM | 42 |
| 10-I-RAK-152-m01 | Computer Architecture | 5 | NUM | 59 |
| 10-I-RK-152-m01 | Computer Networks and Communication Systems | 8 | NUM | 63 |
| 10-I-GI-152-m01 | Selected Basics of Computer Science | 5 | NUM | 49 |
| **subsidiary subject (10 ECTS credits)**<br>Students must select one of the minors offered and must achieve the required number of ECTS credits in this minor. | | | | |
| **Mathematics (10 ECTS credits)** | | | | |
| 10-M-DIMaf-152-m01 | Introduction to Discrete Mathematics for students of other subjects | 10 | NUM | 80 |
| 10-M-NUM1af-152-m01 | Numerical Mathematics 1 for students of other subjects | 10 | NUM | 83 |
| 10-M-STO-1af-152-m01 | Stochastics 1 for students of other subjects | 10 | NUM | 86 |
| 10-M-ZTHaf-152-m01 | Introduction Into Number Theory for students of other subjects | 10 | NUM | 87 |
| 10-M-DGLaf-152-m01 | Ordinary Differential Equations for students of other subjects | 10 | NUM | 79 |
| 10-M-ORSaf-152-m01 | Operations Research for students of other subjects | 10 | NUM | 85 |
| **Physics (10 ECTS credits)** | | | | |

| | | | | |
|---|---|---|---|---|
| 11-EFNF-152-m01 | Introduction to Physics for Students of other Disciplines | 7 | NUM | 88 |
| 11-PFNF-152-m01 | Laboratory Course Physics for Students of other Disciplines | 3 | B/NB | 94 |
| **Economics (10 ECTS credits)** | | | | |
| 12-NW-EBWL-152-m01 | Introduction to Business Administration - Minor | 5 | NUM | 114 |
| 12-NW-EVWL-152-m01 | Introduction to Economics - Minor | 5 | NUM | 116 |
| 12-ExtUR-G-152-m01 | Financial Accounting | 5 | NUM | 104 |
| 12-IntUR-G-152-m01 | Managerial Accounting | 5 | NUM | 112 |
| 12-BPL-G-152-m01 | Supply, Production and Operations Management. An Introduction | 5 | NUM | 100 |
| 12-I&F-G-152-m01 | Investment and Finance. An Introduction | 5 | NUM | 110 |
| 12-Ewiinf-G-152-m01 | Introduction to Business Informatics | 5 | NUM | 102 |
| 12-GP-G-152-m01 | Integrated Business Processes | 5 | NUM | 108 |
| 12-FRBE-F-152-m01 | Forward and Reverse Business Engineering | 5 | NUM | 106 |
| **Linguistics (10 ECTS credits)** | | | | |
| 04-DtLABA-BM-SW-152-m01 | Level One Module German Linguistics | 5 | NUM | 15 |
| 04-DtLABA-AM-SW1-152-m01 | Level Two Module Grammatical Structures of German | 5 | NUM | 13 |
| **Biology (10 ECTS credits)** | | | | |
| 07-1A1TI-152-m01 | Evolution and the Animal Kingdom | 5 | NUM | 21 |
| 07-2A2GENV-152-m01 | Genetics, Neurobiology, Behaviour | 5 | NUM | 23 |
| 07-M-BST-152-m01 | Mathematical Biology and Biostatistics | 4 | NUM | 29 |
| 07-3A3OEKO-152-m01 | Plant and Animal Ecology | 6 | NUM | 27 |
| 07-3A3GEMT-152-m01 | Genes, Molecules, Technologies | 6 | NUM | 25 |
| **Law (10 ECTS credits)** | | | | |
| 02-J1-171-m01 | Introduction to the German Legal System | 5 | NUM | 9 |
| 02-G&Hre-G-161-m01 | Commercial and Business Law for Economists | 5 | NUM | 8 |
| **Geography (10 ECTS credits)** | | | | |
| 04-Geo-FER-NE-152-m01 | Introduction to Geographical Remote Sensing | 5 | NUM | 19 |
| 04-Geo-FER-NA-152-m01 | Applications of Remote Sensing in Geography | 5 | NUM | 17 |
| **Medicine (10 ECTS credits)** | | | | |
| 03-M-MT-152-m01 | Practical Course in medical terminology | 5 | B/NB | 12 |
| 03-M-IM-152-m01 | Internal Medicine | 5 | NUM | 11 |
| **Key Skills Area (20 ECTS credits)** | | | | |
| **General Key Skills (5 ECTS credits)**<br>In addition to the modules listed below, students may also take modules offered by JMU as part of the pool of general transferable skills (ASQ). | | | | |
| **General Key Skills (subject-specific)** | | | | |
| 10-I-TUT1-152-m01 | Tutor activity 1 | 2 | B/NB | 74 |
| 10-I-TUT2-152-m01 | Tutor activity 2 | 2 | B/NB | 75 |
| 10-I-TUT3-152-m01 | Tutor activity 3 | 2 | B/NB | 76 |
| **Subject-specific Key Skills (15 ECTS credits)** | | | | |
| 10-I-SEM1-152-m01 | Seminar - Selected Topics in Computer Science 1 | 5 | NUM | 65 |
| 10-I-SEM2-152-m01 | Seminar - Selected Topics in Computer Science 2 | 5 | NUM | 67 |
| 10-I-PV-152-m01 | Project Presentation | 5 | NUM | 58 |

| **Thesis (10 ECTS credits)** | | | | |
|---|---|---|---|---|
| 10-I-BA-152-m01 | Bachelor's Thesis Informatics | 10 | NUM | 41 |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Commercial and Business Law for Economists** | | | 02-G&Hre-G-161-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of the Faculty of Law | | Faculty of Law | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

This module provides an introduction to German and European corporate and commercial law.

**Intended learning outcomes**

The student has knowledge of company and commercial law, in particular of company forms, power of representation, liability, formation and dissolution of companies as well as the basics of the law of commercial transactions and commercial companies.

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

V (3) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 120 minutes)
Assessment offered: Usually once a year, summer semester

**Allocation of places**

There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as Bachelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of other subjects. 10 of these will be allocated to students of the Master's degree programme Economics. Should the number of available places exceed the number of applications, the remaining places may be allocated to students of other subjects. Should there be more than 10 applications, the remaining places will be allocated as follows: Students applying after not having successfully completed assessment in past years will be given preferential consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places reallocated by lot as they become available.

**Additional information**

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**Workload**

150 h

**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Nanostructure Technology (2016)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's degree (1 major) Nanostructure Technology (2020)
Master's degree (1 major) Quantum Technology (2021)

| Module title | Abbreviation |
|---|---|
| **Introduction to the German Legal System** | 02-J1-171-M01 |

| Module coordinator | Module offered by |
|---|---|
| Dean of Studies Faculty of Law | Faculty of Law |

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

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

**Contents**

German contents available but not translated yet.

Die Vorlesung führt über die Beantwortung allgemeiner juristischer Fragen wie der Normenhierarchie, der Gesetzessystematik und Auslegungstechniken in die großen Rechtsgebiete der Rechtswissenschaft ein. Dabei werden insbesondere die fünf Bücher des Bürgerlichen Gesetzbuches sowie das Handels-, Gesellschafts- und das Arbeitsrecht besprochen. Gegenstand der Einheit Öffentliches Recht sind die Grundrechte, das Staatsorganisationsrecht, das Verwaltungsrecht in seinen allgemeinen und besonderen Ausprägungen sowie das Europa- und das Völkerrecht. Im Strafrecht wird inhaltlich vor allem auf den allgemeinen Teil und die wichtigsten Normen des Besonderen Teils des Strafgesetzbuches eingegangen.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Die Studierenden verfügen über Basiswissen in den wichtigsten Teilbereichen der Rechtswissenschaft. Sie haben neben fachlichen Grundkenntnissen über das materielle und das Prozessrecht auch allgemeine Kenntnisse beispielsweise über die Gesetzessystematik und die Rechtsquellenlehre erworben. Anhand von Beispielfällen haben sie ersten Einblick ins juristische Arbeiten erhalten.

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

V (4)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 120 minutes)

**Allocation of places**

max. 80 places. 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 with a restricted number of places will be allocated in the same procedure.

**Additional information**

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**Workload**

150 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Political and Social Studies (2020)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Geography (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Internal Medicine** | | | 03-M-IM-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| unknown | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | unknown | -- | |

**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 (0)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

oral examination (one candidate each: approx. 15 minutes, or groups of up to 3 candidates: approx. 10 minutes per candidate)
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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**Workload**

150 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical Course in medical terminology** | | | 03-M-MT-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Institute for the History of Medicine | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | unknown | -- | |

**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)

P (0)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 90 minutes)

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Level Two Module Grammatical Structures of German** | | | 04-DtLABA-AM-SW1-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of German Linguistics | | Institute of German Studies | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| | undergraduate | -- | |

**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 practise 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 practise 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 (1) + S (2) + T (1)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 75 minutes)

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 43 I Nr. 2 b)
§ 63 I Nr. 2 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major, 1 minor) German Language and Literature (Minor, 2015)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2015)
First state examination for the teaching degree Grundschule German (2015)
First state examination for the teaching degree Realschule German (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Mittelschule German (2015)
Bachelor's degree (2 majors) German Language and Literature (2015)
Master's degree (1 major) Russian Language and Culture (2017)

Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
First state examination for the teaching degree Mittelschule German (2020 (Prüfungsordnungsversion 2015))
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Level One Module German Linguistics** | | | 04-DtLABA-BM-SW-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of German Linguistics | | Institute of German Studies | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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 (2) + S (2) + T (1)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 75 minutes)

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 43 I Nr. 2 b)
§ 63 I Nr. 2 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major, 1 minor) German Language and Literature (Minor, 2015)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2015)
First state examination for the teaching degree Grundschule German (2015)
First state examination for the teaching degree Realschule German (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Mittelschule German (2015)
Bachelor's degree (2 majors) German Language and Literature (2015)

Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
First state examination for the teaching degree Mittelschule German (2020 (Prüfungsordnungsversion 2015))
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Applications of Remote Sensing in Geography** | | | 04-Geo-FERNA-152-m01 |
| **Module coordinator** | | | **Module offered by** |
| holder of the Professorship of Remote Sensing | | | Institute of Geography and Geology |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The lecture imparts basic knowledge about the analysis of remote sensing data for geographical questions. First, fundamental understanding of remotely sensed data as geoinformation and later geoinformation in general (geographical data, metadata, spatial overlaying of geodata, geographical information systems) is given. Following topics are analogue, visual image interpretation, digital image processing (calibration, transformation, filter) and atmospheric correction. A focus lies on the digital remote sensing based mapping, i.e. spectral analysis, classification and change detection. Furthermore, basics in modelling of remote sensing parameters is conveyed.

**Intended learning outcomes**

The students explain applications of earth observation and remote sensing. They explain geographical data and reflect their essential characteristics. They summarise fundamental aspects of (digital) image processing and assess different methodological approaches for the evaluation of remote sensing data for geographical questions.

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

V (2) + T (2)
Module taught in: German and/or English

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 45 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major, 1 minor) Geography (Minor, 2015)
Bachelor's degree (1 major, 1 minor) Geography (Focus Physical Geography) (2015)
Bachelor's degree (1 major, 1 minor) Geography (Focus Human Geography) (2015)
Bachelor's degree (2 majors) Geography (2015)
Bachelor's degree (1 major, 1 minor) Geography (2017)
Bachelor's degree (1 major) Computer Science (2017)

Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Geography (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Geography (2023)
Bachelor's degree (2 majors) Geography (2023)
Bachelor's degree (1 major, 1 minor) Geography (Minor, 2023)
Bachelor's degree (1 major, 1 minor) Geography (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Introduction to Geographical Remote Sensing** | | | 04-Geo-FERNE-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Professorship of Remote Sensing | | Institute of Geography and Geology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The lecture gives an overview of the principles of remote sensing, that are: theoretical basics, history of remote sensing / physical principles (energy and radiation, interactions radiation - atmosphere, interactions radiation - surfaces, objects under investigation: soils, vegetation, water) / thermal remote sensing: radiation laws, radiant temperature, emissivity / detectors: characterisation of remote sensing data, platforms and sensors (passive and active systems, e.g. hyperspectral and LiDAR) / radar remote sensing / radar interferometry / basics for remote sensing parameters (land, atmosphere, oceans).

**Intended learning outcomes**

The students describe basics of earth observation. They outline and explain the radiation path through the atmosphere to the object under investigation and back to the sensor. They emphasise essential characteristics of remote sensing data, sensors and platforms.

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

V (2) + T (2)
Module taught in: German and/or English

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 45 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 66 I Nr. 2

**Module appears in**

Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major, 1 minor) Geography (Minor, 2015)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (Minor, 2015)
Bachelor's degree (1 major, 1 minor) Geography (Focus Physical Geography) (2015)
Bachelor's degree (1 major, 1 minor) Geography (Focus Human Geography) (2015)
Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015)

First state examination for the teaching degree Gymnasium Geography (2015)
Bachelor's degree (2 majors) Geography (2015)
Bachelor's degree (1 major, 1 minor) Geography (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Geography (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
First state examination for the teaching degree Gymnasium Geography (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Geography (2023)
Bachelor's degree (2 majors) Geography (2023)
Bachelor's degree (1 major, 1 minor) Geography (Minor, 2023)
Bachelor's degree (1 major, 1 minor) Geography (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Evolution and the Animal Kingdom** | | | 07-1A1TI-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Professorship of Zoology at the Department of Electronmicroscopy | | Faculty of Biology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | Admission prerequisite to assessment: exercises. Regular attendance (minimum 80%) and successful completion of exercises (approx. 25 to 30 hours) are prerequisites for admission to assessment. | |

**Contents**

The lecture *Evolution* will acquaint students with fundamental concepts and mechanisms of evolutionary biology: the origins of diversity; natural and sexual selection; speciation; population genetics. It will provide students with an introduction to phylogenetic reconstruction and will thus enable them to develop an understanding of the system of plants and animals. During the exercise, students will complete exercises on mechanistic evolution and evolutionary history. The lecture *Tierreich* (*Animal Kingdom*) will discuss the diversity of animal organisms on the basis of the phyla of the animal kingdom focusing on phylogenetic criteria. It will address the ecological constraints that led to the development of different types of body plans with their different structures and functions. In this context, the lecture will also develop an awareness in students of how important a knowledge of the fundamental principles of zoology is for research and applications not only but in particular in biology and medicine. In the exercise, students will prepare and/or examine selected species and histological preparations and will thus become familiar with the functional and morphological characteristics of the major multicellular animal phyla. In this context, students will practise working with light microscopes and stereo microscopes and will acquire fundamental preparation skills. They will prepare drawings, documenting and interpreting what they have seen.

**Intended learning outcomes**

Students will be familiar with the fundamental concepts and mechanisms of evolutionary biology and will know that these are key to understanding biological processes. They will have gained an overview of the diversity of animals on the basis of different types of body plans and will understand important structures in both a functional and an ecological context.

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

V (2) + Ü (3)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 minutes)
creditable for bonus

**Allocation of places**

--

**Additional information**

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**Workload**

150 h

**Teaching cycle**

--

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

§ 41 I Nr. 1 (4 ECTS credits) and § 41 I Nr. 4 (1 ECTS credits)
§ 61 I Nr. 1 (4 ECTS credits) and § 61 I Nr. 4 (1 ECTS credits)

| **Module appears in** |
| --- |
| Bachelor's degree (1 major) Biology (2015) |
| Bachelor's degree (1 major) Computer Science (2015) |
| Bachelor's degree (1 major) Mathematics (2015) |
| Bachelor's degree (1 major) Computational Mathematics (2015) |
| Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015) |
| Bachelor's degree (1 major) Biology (2017) |
| Bachelor's degree (1 major) Computer Science (2017) |
| Bachelor's degree (1 major) Computer Science (2019) |
| Bachelor's degree (1 major) Biology (2021) |
| Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020) |
| Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021) |
| Bachelor's degree (1 major) Biology (2022) |
| Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) |
| Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) |
| Bachelor's degree (1 major) Mathematics (2023) |
| Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Genetics, Neurobiology, Behaviour** | | | 07-2A2GENV-152-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)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | Admission prerequisite to assessment: exercises. Regular attendance (minimum 80%) and successful completion of exercises (approx. 25 to 30 hours) are prerequisites for admission to assessment. | |

**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 and will be able to relate animal behaviour to the molecular and formal bases of inheritance.

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

V (3)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 90 minutes)
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 61 I Nr. 2 (2 ECTS credits)
§ 61 I Nr. 3 (1 ECTS credits)
§ 61 I Nr. 4 (1 ECTS credits)

**Module appears in**

Bachelor's degree (1 major) Biology (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Biology (2019)
Module studies (Bachelor) Orientierungsstudien (2020)
Bachelor's degree (1 major) Biology (2021)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020)

Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Genes, Molecules, Technologies** | | | 07-3A3GEMT-152-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**

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

V (4)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 minutes)
creditable for bonus

**Allocation of places**

--

**Additional information**

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**Workload**

180 h

**Teaching cycle**

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| **Referred to in LPO I** (examination regulations for teaching-degree programmes) |
| --- |
| -- |
| **Module appears in** |
| Bachelor's degree (1 major) Biology (2015) |
| Bachelor's degree (1 major) Computer Science (2015) |
| Bachelor's degree (1 major) Mathematics (2015) |
| Bachelor's degree (1 major) Computational Mathematics (2015) |
| Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015) |
| Bachelor's degree (1 major) Biology (2017) |
| Bachelor's degree (1 major) Computer Science (2017) |
| Bachelor's degree (1 major) Computer Science (2019) |
| Bachelor's degree (1 major) Biology (2021) |
| Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020) |
| Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021) |
| Bachelor's degree (1 major) Biology (2022) |
| Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) |
| exchange program Biosciences (2022) |
| Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) |
| Bachelor's degree (1 major) Mathematics (2023) |
| Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Plant and Animal Ecology** | | | 07-3A30EKO-152-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 (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 minutes)
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

180 h

**Teaching cycle**

--

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

§ 61 I Nr. 4

**Module appears in**

Bachelor's degree (1 major) Biology (2015)
Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015)
First state examination for the teaching degree Gymnasium Biology (2015)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Biology (2021)

Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
exchange program Biosciences (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Geography (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Mathematical Biology and Biostatistics** | | | 07-M-BST-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Bioinformatics | | Faculty of Biology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 4 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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 (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 minutes)
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

120 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Biochemistry (2015)
Bachelor's degree (1 major) Biology (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major) Biochemistry (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Biology (2021)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Biochemistry (2022)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Interactive Computer Graphics** | | | 10-I=ICG-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | 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 | graduate | -- | |

**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 (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits):
HCI

**Workload**

150 h

**Teaching cycle**

--

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

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**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Master's degree (1 major) Computer Science (2016)
Bachelor's degree (1 major) Computer Science (2017)

Bachelor's degree (1 major) Computer Science (2019)

| Module title | | | Abbreviation |
|---|---|---|---|
| **3D Point Cloud Processing** | | | 10-I-3D-152-M01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science XVII | | 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**

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)

Bachelor's degree (1 major) Computer Science (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Algorithms and data structures** | | | 10-I-ADS-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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**

Students are proficient in independently designing, precisely describing and analyzing algorithms. The students know the basic paradigms for the design of algorithms and can implement them in practical programs. Students are able to estimate the runtime behavior of algorithms and prove the correctness of algorithms.

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

Teaching cycle: only in winter semester

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

§ 49 I Nr. 1 a)
§ 69 I Nr. 1 a)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Economathematics (2015)
Bachelor's degree (1 major) Human-Computer Systems (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)

Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Mathematics (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Algorithmic Graph Theory** | | | 10-I-AGT-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science I | | 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**

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)

Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Computer Science (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Advanced Programming** | | | 10-I-APR-172-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science II | | 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**

With the knowledge of basic programming, taught in introductory lectures, it is possible to realize simpler programs. If more complex problems are to be tackled, suboptimal results like long, incomprehensible functions and code duplicates occur. In this lecture, further knowledge is to be conveyed on how to give programs and code a sensible structure. Also, further topics in the areas of software security and parallel programming are discussed.

**Intended learning outcomes**

Students learn advanced programming paradigms especially suited for space applications. Different patterns are then implemented in multiple languages and their efficiency measured using standard metrics. In addition, parallel processing concepts are introduced culminating in the use of GPU architectures for extremely quick processing.

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Computer Science (2019)
Master's degree (1 major) Nanostructure Technology (2020)
Master's degree (1 major) Physics (2020)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Business Information Systems (2020)

Master's degree (1 major) Physics International (2020)
Master's degree (1 major) Quantum Engineering (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Master's degree (1 major) Quantum Technology (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Master's degree (1 major) Quantum Engineering (2024)
Master's degree (1 major) Physics International (2024)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Bachelor's degree (1 major) Digital Business & Data Science (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Bachelor's Thesis Informatics** | | | 10-I-BA-152-M01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

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

No courses assigned to module

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Bachelor's thesis (approx. 50 to 100 pages)
Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

Time to complete: 10 weeks.

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Operating Systems** | | | 10-I-BS-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science II | | 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**

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
Master's degree (1 major) Physics (2016)
Master's degree (1 major) Nanostructure Technology (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Databases** | | | 10-I-DB-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 49 I Nr. 1 b)
§ 69 I Nr. 1 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Business Information Systems (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
Bachelor's degree (1 major) Functional Materials (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's degree (1 major) Physics (2016)
Bachelor's degree (1 major) Business Information Systems (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)

Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Functional Materials (2021)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Mathematical Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Bachelor's degree (1 major) Functional Materials (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Data Mining** | | | 10-I-DM-152-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 (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Business Information Systems (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor's degree (1 major) Business Information Systems (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Master's degree (1 major) Information Systems (2022)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Fundamentals of Programming** | | | 10-I-GdP-172-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science II | | 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**

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 49 I Nr. 1 b)
§ 69 I Nr. 1 b)

**Module appears in**

Bachelor's degree (1 major) Physics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major) Physics (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Mathematical Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)

Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Bachelor's degree (1 major) Economathematics (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Selected Basics of Computer Science** | | | 10-I-GI-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical course in hardware** | | | 10-I-HWP-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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 (6)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

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**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Computer Science (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (1 major) Mathematics (2023)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Information Transmission** | | | 10-I-IÜ-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science III | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | 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** (type, number of weekly contact hours, language — if other than German)

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Cryptography and Data Security** | | | 10-I-KD-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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, homomorphous 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, homomorphous encryption

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Computer Science (2017)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Computational Complexity** | | | 10-I-KT-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Computer Science (2017)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Logic for informatics** | | | 10-I-LOG-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (1 major) Mathematics (2023)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical Course in Programming** | | | 10-I-PP-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| | undergraduate | -- | |

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

P (6)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

Teaching cycle: every semester

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

§ 49 I Nr. 1 c)
§ 69 I Nr. 1 d)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Human-Computer Systems (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's degree (1 major) Functional Materials (2016)
Bachelor's degree (1 major) Computer Science (2017)
Master's degree (1 major) Functional Materials (2022)
Master's degree (1 major) Functional Materials (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Project Presentation** | | | 10-I-PV-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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

S (5)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

presentation of a project developed by the candidate analogous to a presentation for laypersons with a knowledge of computer science at a trade fair as well as discussion (approx. 10 to 15 minutes total)
Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Computer Architecture** | | | 10-I-RAK-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)
§ 69 I Nr. 1 c): Rechnerarchitektur

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's degree (1 major) Physics (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Physics International (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Master's degree (1 major) Physics International (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Digital computer systems** | | | 10-I-RAL-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Introduction to digital technologies, Boolean algebras, combinatory circuits, synchronous and asynchronous circuits, 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)

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Orientierungsstudien (2020)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Business Information Systems (2020)

Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Computer Networks and Communication Systems** | | | 10-I-RK-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science III | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 8 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Properties of computer and communication systems: data traffic in distributed systems. Performance analysis of computer networks and communication systems: problem statement and introduction to method architecture and structure of computer networks: network structure, network access, access methods, digital transfer hierarchies, dataflow control and traffic control, transfer network. Communication protocols: fundamental principles and ISO architecture models. Internet: structure and basic mechanism, TCP/IP, routing, network management. Mobile communication networks: fundamental concepts, GSM, UMTS. Future communication systems and networks.

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

240 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)

Bachelor's degree (1 major) Computer Science (2017)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Seminar - Selected Topics in Computer Science 1** | | | 10-I-SEM1-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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 (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

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

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Business Information Systems (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor's degree (1 major) Business Information Systems (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Computer Science (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Business Information Systems (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Seminar - Selected Topics in Computer Science 2** | | | 10-I-SEM2-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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 (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Wrap-up report on tutoring activities (5 to 10 pages)
Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Business Information Systems (2015)
Bachelor's degree (1 major) Business Information Systems (2016)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Module studies (Bachelor) Computer Science (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Business Information Systems (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Software Technology** | | | 10-I-ST-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | 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), software development processes, unified process, agile software development, project management, quality assurance.

**Intended learning outcomes**

The students possess a fundamental theoretical and practical knowledge on the design and development of software systems.

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

Teaching cycle: only in summer semester

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

§ 49 I Nr. 1 b)
§ 69 I Nr. 1 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Economathematics (2015)
Bachelor's degree (1 major) Human-Computer Systems (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor's degree (1 major) Business Information Systems (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Economathematics (2017)

Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Module studies (Bachelor) Orientierungsstudien (2020)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Economathematics (2021)
Bachelor's degree (1 major) Economathematics (2022)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Economathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Economathematics (2024)
Bachelor's degree (1 major) Digital Business & Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical course in software** | | | 10-I-SWP-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | (not) successfully completed | 10-I-PP, 10-I-ST | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | In addition, the knowledge and skills acquired in module 10-I-ADS are required. Prior attendance of this module is therefore highly recommended. | |

**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 (6)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

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

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

§ 69 I Nr. 1 d)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Mathematics (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Tutorial Theoretical Informatics** | | | 10-I-TIT-172-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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 (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) exercises (consisting in completion of approx. 11 home work exercise sheets, presentation of own solutions in the exercise groups as well as approx. 5 short assessments written in the exercise group) or
b) written examination (approx. 180 to 240 minutes)
Die Prüfungsart ist vom Prüfling festzulegen

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2017)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Theoretical Informatics** | | | 10-I-TIV-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | 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**

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)

V (4)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 49 I Nr. 1 a)
§ 69 I Nr. 1 a)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Tutor activity 1** | | | 10-I-TUT1-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 2 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| | undergraduate | -- | |

**Contents**

Tutoring activities in the area of computer science.

**Intended learning outcomes**

Imparting knowledge and skills to students of computer science.

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

T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Wrap-up report on tutoring activities (5 to 10 pages)

**Allocation of places**

--

**Additional information**

--

**Workload**

60 h

**Teaching cycle**

--

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

§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Tutor activity 2** | | | 10-I-TUT2-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 2 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| | undergraduate | -- | |

**Contents**

Tutoring activities in the area of computer science.

**Intended learning outcomes**

Imparting knowledge and skills to students of computer science.

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

T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Wrap-up report on tutoring activities (5 to 10 pages)

**Allocation of places**

--

**Additional information**

--

**Workload**

60 h

**Teaching cycle**

--

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

§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Tutor activity 3** | | | 10-I-TUT3-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 2 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| | undergraduate | -- | |

**Contents**

Tutoring activities in the area of computer science.

**Intended learning outcomes**

Imparting knowledge and skills to students of computer science.

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

T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Wrap-up report on tutoring activities (5 to 10 pages)

**Allocation of places**

--

**Additional information**

--

**Workload**

60 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Knowledge-based Systems** | | | 10-I-WBS-152-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: 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** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

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

§ 22 II Nr. 3 b)

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Business Information Systems (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor's degree (1 major) Business Information Systems (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)

Bachelor's degree (1 major) Business Information Systems (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Ordinary Differential Equations for students of other subjects** | | | 10-M-DGLaf-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 90 to 180 minutes, usually chosen) or
b) oral examination of one candidate each (15 to 30 minutes) or
c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
Bachelor's degree (1 major) Functional Materials (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Functional Materials (2021)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Bachelor's degree (1 major) Functional Materials (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Introduction to Discrete Mathematics for students of other subjects** | | | 10-M-DIMaf-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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 (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 90 to 180 minutes, usually chosen) or
b) oral examination of one candidate each (15 to 30 minutes) or
c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Mathematics 1 for students in Computer Science** | | | 10-M-INF1-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Propositional logic, set theory, proof techniques, relations; sequences, limits and lambda-symbols; the ring of integers; elementary group theory; residue class rings; basics in linear algebra, linear maps and matrix calculus, systems of linear 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** (type, number of weekly contact hours, language — if other than German)

V (4) + Ü (2)
Module taught in: Ü: German or English

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 90 to 180 minutes, usually chosen) or
b) oral examination of one candidate each (15 to 30 minutes) or
c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
exchange program Mathematics (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Mathematics 2 for students in Computer Science** | | | 10-M-INF2-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Determinants, eigenvalue theory; event and probability spaces, combinatorics, random variables, examples of distributions, parameter estimates; basics in 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** (type, number of weekly contact hours, language — if other than German)

V (4) + Ü (2)
Module taught in: Ü: German or English

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 90 to 180 minutes, usually chosen) or
b) oral examination of one candidate each (15 to 30 minutes) or
c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
exchange program Mathematics (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Numerical Mathematics 1 for students of other subjects** | | | 10-M-NUM1af-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 90 to 180 minutes, usually chosen) or
b) oral examination of one candidate each (15 to 30 minutes) or
c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Physics (2015)
Bachelor's degree (1 major) Nanostructure Technology (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2015)
Bachelor's degree (1 major) Functional Materials (2015)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Physics (2020)
Bachelor's degree (1 major) Nanostructure Technology (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major) Functional Materials (2021)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (1 major) Quantum Technology (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Bachelor's degree (1 major) Functional Materials (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Operations Research for students of other subjects** | | | 10-M-ORSaf-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 90 to 180 minutes, usually chosen) or
b) oral examination of one candidate each (15 to 30 minutes) or
c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)
Language of assessment: German and/or English
Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Master's degree (1 major) Physics (2016)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's degree (1 major) Physics (2020)
Master's degree (1 major) Physics International (2020)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Stochastics 1 for students of other subjects** | | | 10-M-STO-1af-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 90 to 180 minutes, usually chosen) or
b) oral examination of one candidate each (15 to 30 minutes) or
c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Introduction Into Number Theory for students of other subjects** | | | 10-M-ZTHaf-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

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

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 90 to 180 minutes, usually chosen) or
b) oral examination of one candidate each (15 to 30 minutes) or
c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Introduction to Physics for Students of other Disciplines** | | | 11-EFNF-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 7 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 2 semester | undergraduate | -- | |

**Contents**

Fundamentals of mechanics, vibration theory, thermodynamics, optics, science of electricity, atomic and nuclear physics.

**Intended learning outcomes**

The students are able to identify fundamental physical contexts. They are able to assign them to corresponding fields in physics. They are able to apply simple formulae in order to analyse and evaluate these contexts.

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

V (4) + V (3)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (60 to 120 minutes)

**Allocation of places**

--

**Additional information**

according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter d) and No. I 1st letter d) of annex 1 to the APOLmCh and No. 4 of annex 2 to the APOLmCh

**Workload**

210 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Biology (2011)
Bachelor's degree (1 major) Chemistry (2010)
Bachelor's degree (1 major) Psychology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2013)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)
Bachelor's degree (2 majors) Special Education (2009)
Magister Theologiae Catholic Theology (2013)
First state examination for the teaching degree Gymnasium English (2009)
First state examination for the teaching degree Gymnasium Biology (2009)
First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Gymnasium Geography (2009)
First state examination for the teaching degree Gymnasium French Studies (2009)
First state examination for the teaching degree Gymnasium German (2009)
First state examination for the teaching degree Gymnasium History (2009)
First state examination for the teaching degree Gymnasium Greek Philology (2009)

First state examination for the teaching degree Gymnasium Computer Science (2009)
First state examination for the teaching degree Gymnasium Italian Studies (2009)
First state examination for the teaching degree Gymnasium Catholic Theology (2009)
First state examination for the teaching degree Gymnasium Latin Philology (2009)
First state examination for the teaching degree Gymnasium Mathematics (2012)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Gymnasium Music (2009)
First state examination for the teaching degree Gymnasium Physics (2009)
First state examination for the teaching degree Gymnasium Russian (2009)
First state examination for the teaching degree Gymnasium Social Science (2009)
First state examination for the teaching degree Gymnasium Spanish Studies (2009)
First state examination for the teaching degree Gymnasium Science of Sport (2009)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (1 major) Biochemistry (2015)
Bachelor's degree (1 major) Chemistry (2015)
Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Food Chemistry (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Musicology (2015)
Bachelor's degree (1 major) Physics (2015)
Bachelor's degree (1 major) Psychology (2015)
Bachelor's degree (1 major) Business Management and Economics (2015)
Bachelor's degree (1 major) Nanostructure Technology (2015)
Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Music Education (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Political and Social Studies (2015)
Bachelor's degree (1 major) Functional Materials (2015)
Bachelor's degree (1 major) Academic Speech Therapy (2015)
Bachelor's degree (1 major) Indology/South Asian Studies (2015)
Bachelor's degree (1 major, 1 minor) Egyptology (2015)
Bachelor's degree (1 major, 1 minor) Pedagogy (2015)
Bachelor's degree (1 major, 1 minor) History (2015)
Bachelor's degree (1 major, 1 minor) Musicology (2015)
Bachelor's degree (1 major, 1 minor) Philosophy (2015)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015)
Bachelor's degree (1 major, 1 minor) Ancient World (2015)
Bachelor's degree (1 major, 1 minor) Philosophy and Religion (2015)
Bachelor's degree (1 major, 1 minor) Theological Studies (2015)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2015)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2015)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2015)
Bachelor's degree (2 majors) Egyptology (2015)
Bachelor's degree (2 majors) Pedagogy (2015)
Bachelor's degree (2 majors) Protestant Theology (2015)
Bachelor's degree (2 majors) Musicology (2015)
Bachelor's degree (2 majors) Philosophy (2015)
Bachelor's degree (2 majors) Special Education (2015)
Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015)
Bachelor's degree (2 majors) Latin Philology (2015)

Bachelor's degree (2 majors) Music Education (2015)
Bachelor's degree (2 majors) Philosophy and Religion (2015)
Bachelor's degree (2 majors) Theological Studies (2015)
Bachelor's degree (2 majors) Political and Social Studies (2015)
Bachelor's degree (2 majors) Russian Language and Culture (2015)
Bachelor's degree (2 majors) Greek Philology (2015)
Bachelor's degree (2 majors) European Ethnology (2015)
Bachelor's degree (2 majors) Indology/South Asian Studies (2015)
First state examination for the teaching degree Gymnasium English (2015)
First state examination for the teaching degree Gymnasium Biology (2015)
First state examination for the teaching degree Gymnasium Chemistry (2015)
First state examination for the teaching degree Gymnasium Geography (2015)
First state examination for the teaching degree Gymnasium French Studies (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Gymnasium History (2015)
First state examination for the teaching degree Gymnasium Greek Philology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
First state examination for the teaching degree Gymnasium Italian Studies (2015)
First state examination for the teaching degree Gymnasium Catholic Theology (2015)
First state examination for the teaching degree Gymnasium Latin Philology (2015)
First state examination for the teaching degree Gymnasium Mathematics (2015)
First state examination for the teaching degree Gymnasium Physics (2015)
First state examination for the teaching degree Gymnasium Russian (2015)
First state examination for the teaching degree Gymnasium Social Science (2015)
First state examination for the teaching degree Gymnasium Spanish Studies (2015)
First state examination for the teaching degree Gymnasium Science of Sport (2015)
Bachelor's degree (2 majors) Geography (2015)
Bachelor's degree (2 majors) French Studies (2015)
Bachelor's degree (2 majors) History (2015)
Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2015)
Bachelor's degree (2 majors) German Language and Literature (2015)
Bachelor's degree (1 major) Mathematical Physics (2016)
First state examination for the teaching degree Gymnasium Music (2015)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015)
Bachelor's degree (1 major, 1 minor) French Studies (2016)
Bachelor's degree (2 majors) French Studies (2016)
Bachelor's degree (1 major, 1 minor) Italian Studies (2016)
Bachelor's degree (2 majors) Italian Studies (2016)
Bachelor's degree (1 major, 1 minor) Spanish Studies (2016)
Bachelor's degree (2 majors) Spanish Studies (2016)
Bachelor's degree (1 major) Romanic Languages (French/Italian) (2016)
Bachelor's degree (1 major) Romanic Languages (French/Spanish) (2016)
Bachelor's degree (1 major) Romanic Languages (Italian/Spanish) (2016)
Bachelor's degree (1 major) Business Information Systems (2016)
First state examination for the teaching degree Gymnasium French Studies (2016)
First state examination for the teaching degree Gymnasium Italian Studies (2016)
First state examination for the teaching degree Gymnasium Spanish Studies (2016)
Bachelor's degree (1 major) Games Engineering (2016)
Bachelor's degree (1 major, 1 minor) English and American Studies (2016)
Bachelor's degree (2 majors) English and American Studies (2016)
First state examination for the teaching degree Gymnasium English (2016)
Bachelor's degree (1 major) Media Communication (2016)
Bachelor's degree (1 major) Food Chemistry (2016)

Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major, 1 minor) Geography (2017)
Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2017)
Bachelor's degree (2 majors) History of Medieval and Modern Art (2017)
Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2017)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Biochemistry (2017)
Bachelor's degree (1 major) Chemistry (2017)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)
Bachelor's degree (1 major) Economathematics (2017)
Bachelor's degree (1 major) Games Engineering (2017)
Bachelor's degree (1 major) Computer Science (2017)
First state examination for the teaching degree Gymnasium Greek Philology (2018)
Bachelor's degree (1 major) Media Communication (2018)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Human-Computer Systems (2018)
Bachelor's degree (2 majors) Classical Archaeology (2018)
Bachelor's degree (1 major, 1 minor) Classical Archaeology (2018)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2018)
Bachelor's degree (2 majors) Digital Humanities (2018)
First state examination for the teaching degree Gymnasium Physics (2018)
Bachelor's degree (1 major) Computer Science (2019)
First state examination for the teaching degree Gymnasium Mathematics (2019)
Bachelor's degree (1 major, 1 minor) English and American Studies (2019)
Bachelor's degree (1 major) Indology/South Asian Studies (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (2 majors) Indology/South Asian Studies (2019)
Bachelor's degree (1 major) Business Management and Economics (2019)
Bachelor's degree (1 major) Modern China (2019)
Bachelor's degree (1 major) Food Chemistry (2019)
Bachelor's degree (1 major) Biomedicine (2020)
Bachelor's degree (1 major) Pedagogy (2020)
Bachelor's degree (1 major) Political and Social Studies (2020)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2020)
Bachelor's degree (2 majors) European Ethnology (2020)
Bachelor's degree (2 majors) Political and Social Studies (2020)
Bachelor's degree (2 majors) Special Education (2020)
Bachelor's degree (1 major) Physics (2020)
Bachelor's degree (1 major) Nanostructure Technology (2020)
Bachelor's degree (1 major) Mathematical Physics (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2020)
First state examination for the teaching degree Gymnasium Physics (2020)
Bachelor's degree (1 major, 1 minor) Pedagogy (2020)
Bachelor's degree (2 majors) Pedagogy (2020)
First state examination for the teaching degree Gymnasium Political and Social Studies (2020)
Bachelor's degree (1 major) Psychology (2020)
Bachelor's degree (1 major) Biology (2021)
Magister Theologiae Catholic Theology (2021)
Bachelor's degree (2 majors) History (2021)
Bachelor's degree (1 major, 1 minor) History (2021)

First state examination for the teaching degree Gymnasium History (2021)
Bachelor's degree (1 major) Media Communication (2021)
Bachelor's degree (2 majors) Theological Studies (2021)
Bachelor's degree (1 major, 1 minor) Theological Studies (2021)
Bachelor's degree (1 major, 1 minor) English and American Studies (2021)
Bachelor's degree (2 majors) English and American Studies (2021)
First state examination for the teaching degree Gymnasium English (2021)
Bachelor's degree (1 major) Functional Materials (2021)
First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)
Bachelor's degree (1 major) Food Chemistry (2021)
Bachelor's degree (1 major) Quantum Technology (2021)
Bachelor's degree (2 majors) Special Education (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Economathematics (2021)
Bachelor's degree (1 major) Business Management and Economics (2021)
Bachelor's degree (1 major) Human-Computer Systems (2022)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)
Bachelor's degree (1 major) Biochemistry (2022)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Economathematics (2022)
Bachelor's degree (1 major) Mathematical Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
First state examination for the teaching degree Gymnasium Philosophy and Ethics (2022)
Bachelor's degree (2 majors) Ancient Near Eastern Archaeology (2022)
Bachelor's degree (1 major, 1 minor) Ancient World (2022)
Bachelor's degree (2 majors) Ancient Near Eastern Studies (2022)
Bachelor's degree (1 major) Franco-German studies: language, culture, digital competence (2022)
First state examination for the teaching degree Gymnasium Russian (2023)
First state examination for the teaching degree Gymnasium Mathematics (2023)
First state examination for the teaching degree Gymnasium English (2023)
First state examination for the teaching degree Gymnasium Geography (2023)
Bachelor's degree (1 major) European Law (2023)
Bachelor's degree (1 major, 1 minor) English and American Studies (2023)
Bachelor's degree (2 majors) English and American Studies (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Economathematics (2023)
Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2023)
Bachelor's degree (2 majors) History of Medieval and Modern Art (2023)
Bachelor's degree (2 majors) Special Education (2023)
Bachelor's degree (1 major) Business Management and Economics (2023)
Bachelor's degree (1 major) Geography (2023)
Bachelor's degree (2 majors) Geography (2023)
Bachelor's degree (1 major, 1 minor) Geography (2023)
Bachelor's degree (2 majors) European Ethnology/Empiric Cultural Studies (2023)
First state examination for the teaching degree Gymnasium German (2024)
Bachelor's degree (1 major) Mathematical Physics (2024)
Bachelor's degree (2 majors) German Language and Literature (2024)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2024)
Bachelor's degree (1 major) Music Education (2024)

Bachelor's degree (2 majors) Music Education (2024)
Bachelor's degree (1 major, 1 minor) Music Education (2024)
Bachelor's degree (1 major) Indology/South Asian Studies (2024)
Bachelor's degree (2 majors) Indology/South Asian Studies (2024)
Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2024)
Bachelor's degree (1 major, 1 minor) Ancient World (2024)
Bachelor's degree (2 majors) Digital Humanities (2024)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2024)
Bachelor's degree (1 major) Midwifery (2024)
Bachelor's degree (2 majors) Greek Philology (2024)
Bachelor's degree (2 majors) Latin Philology (2024)
First state examination for the teaching degree Gymnasium Latin Philology (2024)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Economathematics (2024)
Bachelor's degree (1 major) Business Management and Economics (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
First state examination for the teaching degree Gymnasium English (2024)
First state examination for the teaching degree Gymnasium History (2024)
First state examination for the teaching degree Gymnasium Greek Philology (2024)
Bachelor's degree (1 major) Human-Computer-Interaction (2024)
Bachelor's degree (2 majors) Art Education (2024)
Bachelor's degree (1 major) Digital Business & Data Science (2024)
Bachelor's degree (1 major) Classics (2024)
Bachelor's degree (1 major) Diversity, Ethics and Religions (2024)
Bachelor's degree (1 major) Functional Materials (2025)
Bachelor's degree (1 major)  (2025)
Bachelor's degree (1 major) Food Chemistry (2025)
Bachelor's degree (1 major, 1 minor) European Ethnology/Empiric Cultural Studies (2025)
Bachelor's degree (1 major) Pedagogy (2025)
Bachelor's degree (2 majors) Pedagogy (2025)
Bachelor's degree (1 major) Economathematics (2025)
Bachelor's degree (1 major) Academic Speech Therapy (2025)
Bachelor's degree (1 major, 1 minor) Pedagogy (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Laboratory Course Physics for Students of other Disciplines** | | | 11-PFNF-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 3 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Simple experiments in the fields of mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance atomic and nuclear physics, imaging methods.

**Intended learning outcomes**

The students have recognised and understood physical contexts on the basis of the implementation of own experiments. They can conduct simple experiments in the laboratory. They are able to identify and assess sources of errors in experiments. They are able to compile a protocol for experimental procedures. They have a basic understanding of physical phenomena and know the basic ideas and ways of functioning of different measuring and imaging methods as well as their applications, especially in the field of biomedicine.

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

P (4)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) practical assignment with oral test (approx. 15 minutes, during experiments) and b) written examination (approx. 90 minutes).
Each experiment comprises preparation, performance and evaluation. Test as well as performance of experiments can each be repeated once.

**Allocation of places**

Only as part of pool of general transferable skills (ASQ): 10 places (lottery)

**Additional information**

according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter d) and No. I 1st letter d) of annex 1 to the APOLmCh and No. 4 of annex 2 to the APOLmCh

**Workload**

90 h

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor's degree (1 major) Biology (2011)
Bachelor's degree (1 major) Chemistry (2010)
Bachelor's degree (1 major) Psychology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2013)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)
Bachelor's degree (2 majors) Special Education (2009)
Magister Theologiae Catholic Theology (2013)
First state examination for the teaching degree Gymnasium English (2009)
First state examination for the teaching degree Gymnasium Biology (2009)

First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Gymnasium Geography (2009)
First state examination for the teaching degree Gymnasium French Studies (2009)
First state examination for the teaching degree Gymnasium German (2009)
First state examination for the teaching degree Gymnasium History (2009)
First state examination for the teaching degree Gymnasium Greek Philology (2009)
First state examination for the teaching degree Gymnasium Computer Science (2009)
First state examination for the teaching degree Gymnasium Italian Studies (2009)
First state examination for the teaching degree Gymnasium Catholic Theology (2009)
First state examination for the teaching degree Gymnasium Latin Philology (2009)
First state examination for the teaching degree Gymnasium Mathematics (2012)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Gymnasium Music (2009)
First state examination for the teaching degree Gymnasium Physics (2009)
First state examination for the teaching degree Gymnasium Russian (2009)
First state examination for the teaching degree Gymnasium Social Science (2009)
First state examination for the teaching degree Gymnasium Spanish Studies (2009)
First state examination for the teaching degree Gymnasium Science of Sport (2009)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (1 major) Biochemistry (2015)
Bachelor's degree (1 major) Chemistry (2015)
Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Food Chemistry (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Musicology (2015)
Bachelor's degree (1 major) Physics (2015)
Bachelor's degree (1 major) Psychology (2015)
Bachelor's degree (1 major) Business Management and Economics (2015)
Bachelor's degree (1 major) Nanostructure Technology (2015)
Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Music Education (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Political and Social Studies (2015)
Bachelor's degree (1 major) Functional Materials (2015)
Bachelor's degree (1 major) Academic Speech Therapy (2015)
Bachelor's degree (1 major) Indology/South Asian Studies (2015)
Bachelor's degree (1 major, 1 minor) Egyptology (2015)
Bachelor's degree (1 major, 1 minor) Pedagogy (2015)
Bachelor's degree (1 major, 1 minor) History (2015)
Bachelor's degree (1 major, 1 minor) Musicology (2015)
Bachelor's degree (1 major, 1 minor) Philosophy (2015)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015)
Bachelor's degree (1 major, 1 minor) Ancient World (2015)
Bachelor's degree (1 major, 1 minor) Philosophy and Religion (2015)
Bachelor's degree (1 major, 1 minor) Theological Studies (2015)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2015)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2015)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2015)
Bachelor's degree (2 majors) Egyptology (2015)
Bachelor's degree (2 majors) Pedagogy (2015)

Bachelor's degree (2 majors) Protestant Theology (2015)
Bachelor's degree (2 majors) Musicology (2015)
Bachelor's degree (2 majors) Philosophy (2015)
Bachelor's degree (2 majors) Special Education (2015)
Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015)
Bachelor's degree (2 majors) Latin Philology (2015)
Bachelor's degree (2 majors) Music Education (2015)
Bachelor's degree (2 majors) Philosophy and Religion (2015)
Bachelor's degree (2 majors) Theological Studies (2015)
Bachelor's degree (2 majors) Political and Social Studies (2015)
Bachelor's degree (2 majors) Russian Language and Culture (2015)
Bachelor's degree (2 majors) Greek Philology (2015)
Bachelor's degree (2 majors) European Ethnology (2015)
Bachelor's degree (2 majors) Indology/South Asian Studies (2015)
First state examination for the teaching degree Gymnasium English (2015)
First state examination for the teaching degree Gymnasium Biology (2015)
First state examination for the teaching degree Gymnasium Chemistry (2015)
First state examination for the teaching degree Gymnasium Geography (2015)
First state examination for the teaching degree Gymnasium French Studies (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Gymnasium History (2015)
First state examination for the teaching degree Gymnasium Greek Philology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
First state examination for the teaching degree Gymnasium Italian Studies (2015)
First state examination for the teaching degree Gymnasium Catholic Theology (2015)
First state examination for the teaching degree Gymnasium Latin Philology (2015)
First state examination for the teaching degree Gymnasium Mathematics (2015)
First state examination for the teaching degree Gymnasium Physics (2015)
First state examination for the teaching degree Gymnasium Russian (2015)
First state examination for the teaching degree Gymnasium Social Science (2015)
First state examination for the teaching degree Gymnasium Spanish Studies (2015)
First state examination for the teaching degree Gymnasium Science of Sport (2015)
Bachelor's degree (2 majors) Geography (2015)
Bachelor's degree (2 majors) French Studies (2015)
Bachelor's degree (2 majors) History (2015)
Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2015)
Bachelor's degree (2 majors) German Language and Literature (2015)
Bachelor's degree (1 major) Mathematical Physics (2016)
First state examination for the teaching degree Gymnasium Music (2015)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015)
Bachelor's degree (1 major, 1 minor) French Studies (2016)
Bachelor's degree (2 majors) French Studies (2016)
Bachelor's degree (1 major, 1 minor) Italian Studies (2016)
Bachelor's degree (2 majors) Italian Studies (2016)
Bachelor's degree (1 major, 1 minor) Spanish Studies (2016)
Bachelor's degree (2 majors) Spanish Studies (2016)
Bachelor's degree (1 major) Romanic Languages (French/Italian) (2016)
Bachelor's degree (1 major) Romanic Languages (French/Spanish) (2016)
Bachelor's degree (1 major) Romanic Languages (Italian/Spanish) (2016)
Bachelor's degree (1 major) Business Information Systems (2016)
First state examination for the teaching degree Gymnasium French Studies (2016)
First state examination for the teaching degree Gymnasium Italian Studies (2016)
First state examination for the teaching degree Gymnasium Spanish Studies (2016)

Bachelor's degree (1 major) Games Engineering (2016)
Bachelor's degree (1 major, 1 minor) English and American Studies (2016)
Bachelor's degree (2 majors) English and American Studies (2016)
First state examination for the teaching degree Gymnasium English (2016)
Bachelor's degree (1 major) Media Communication (2016)
Bachelor's degree (1 major) Food Chemistry (2016)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major, 1 minor) Geography (2017)
Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2017)
Bachelor's degree (2 majors) History of Medieval and Modern Art (2017)
Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2017)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Biochemistry (2017)
Bachelor's degree (1 major) Chemistry (2017)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)
Bachelor's degree (1 major) Economathematics (2017)
Bachelor's degree (1 major) Games Engineering (2017)
Bachelor's degree (1 major) Computer Science (2017)
First state examination for the teaching degree Gymnasium Greek Philology (2018)
Bachelor's degree (1 major) Media Communication (2018)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Human-Computer Systems (2018)
Bachelor's degree (2 majors) Classical Archaeology (2018)
Bachelor's degree (1 major, 1 minor) Classical Archaeology (2018)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2018)
Bachelor's degree (2 majors) Digital Humanities (2018)
First state examination for the teaching degree Gymnasium Physics (2018)
Bachelor's degree (1 major) Computer Science (2019)
First state examination for the teaching degree Gymnasium Mathematics (2019)
Bachelor's degree (1 major, 1 minor) English and American Studies (2019)
Bachelor's degree (1 major) Indology/South Asian Studies (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (2 majors) Indology/South Asian Studies (2019)
Bachelor's degree (1 major) Business Management and Economics (2019)
Bachelor's degree (1 major) Modern China (2019)
Bachelor's degree (1 major) Food Chemistry (2019)
Module studies (Bachelor) Orientierungsstudien (2020)
Bachelor's degree (1 major) Biomedicine (2020)
Bachelor's degree (1 major) Pedagogy (2020)
Bachelor's degree (1 major) Political and Social Studies (2020)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2020)
Bachelor's degree (2 majors) European Ethnology (2020)
Bachelor's degree (2 majors) Political and Social Studies (2020)
Bachelor's degree (2 majors) Special Education (2020)
Bachelor's degree (1 major) Physics (2020)
Bachelor's degree (1 major) Nanostructure Technology (2020)
Bachelor's degree (1 major) Mathematical Physics (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2020)
First state examination for the teaching degree Gymnasium Physics (2020)
Bachelor's degree (1 major, 1 minor) Pedagogy (2020)

Bachelor's degree (2 majors) Pedagogy (2020)
First state examination for the teaching degree Gymnasium Political and Social Studies (2020)
Bachelor's degree (1 major) Psychology (2020)
Bachelor's degree (1 major) Biology (2021)
Magister Theologiae Catholic Theology (2021)
Bachelor's degree (2 majors) History (2021)
Bachelor's degree (1 major, 1 minor) History (2021)
First state examination for the teaching degree Gymnasium History (2021)
Bachelor's degree (1 major) Media Communication (2021)
Bachelor's degree (2 majors) Theological Studies (2021)
Bachelor's degree (1 major, 1 minor) Theological Studies (2021)
Bachelor's degree (1 major, 1 minor) English and American Studies (2021)
Bachelor's degree (2 majors) English and American Studies (2021)
First state examination for the teaching degree Gymnasium English (2021)
Bachelor's degree (1 major) Functional Materials (2021)
First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021)
Bachelor's degree (1 major) Computer Science und Sustainability (2021)
Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)
Bachelor's degree (1 major) Food Chemistry (2021)
Bachelor's degree (1 major) Quantum Technology (2021)
Bachelor's degree (2 majors) Special Education (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Economathematics (2021)
Bachelor's degree (1 major) Business Management and Economics (2021)
Bachelor's degree (1 major) Human-Computer Systems (2022)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)
Bachelor's degree (1 major) Biochemistry (2022)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Economathematics (2022)
Bachelor's degree (1 major) Mathematical Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
First state examination for the teaching degree Gymnasium Philosophy and Ethics (2022)
Bachelor's degree (2 majors) Ancient Near Eastern Archaeology (2022)
Bachelor's degree (1 major, 1 minor) Ancient World (2022)
Bachelor's degree (2 majors) Ancient Near Eastern Studies (2022)
Bachelor's degree (1 major) Franco-German studies: language, culture, digital competence (2022)
First state examination for the teaching degree Gymnasium Russian (2023)
First state examination for the teaching degree Gymnasium Mathematics (2023)
First state examination for the teaching degree Gymnasium English (2023)
First state examination for the teaching degree Gymnasium Geography (2023)
Bachelor's degree (1 major) European Law (2023)
Bachelor's degree (1 major, 1 minor) English and American Studies (2023)
Bachelor's degree (2 majors) English and American Studies (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Economathematics (2023)
Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2023)
Bachelor's degree (2 majors) History of Medieval and Modern Art (2023)
Bachelor's degree (2 majors) Special Education (2023)
Bachelor's degree (1 major) Business Management and Economics (2023)
Bachelor's degree (1 major) Geography (2023)
Bachelor's degree (2 majors) Geography (2023)

Bachelor's degree (1 major, 1 minor) Geography (2023)
Bachelor's degree (2 majors) European Ethnology/Empiric Cultural Studies (2023)
First state examination for the teaching degree Gymnasium German (2024)
Bachelor's degree (1 major) Mathematical Physics (2024)
Bachelor's degree (2 majors) German Language and Literature (2024)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2024)
Bachelor's degree (1 major) Music Education (2024)
Bachelor's degree (2 majors) Music Education (2024)
Bachelor's degree (1 major, 1 minor) Music Education (2024)
Bachelor's degree (1 major) Indology/South Asian Studies (2024)
Bachelor's degree (2 majors) Indology/South Asian Studies (2024)
Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2024)
Bachelor's degree (1 major, 1 minor) Ancient World (2024)
Bachelor's degree (2 majors) Digital Humanities (2024)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2024)
Bachelor's degree (1 major) Midwifery (2024)
Bachelor's degree (2 majors) Greek Philology (2024)
Bachelor's degree (2 majors) Latin Philology (2024)
First state examination for the teaching degree Gymnasium Latin Philology (2024)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Economathematics (2024)
Bachelor's degree (1 major) Business Management and Economics (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
First state examination for the teaching degree Gymnasium English (2024)
First state examination for the teaching degree Gymnasium History (2024)
First state examination for the teaching degree Gymnasium Greek Philology (2024)
Bachelor's degree (1 major) Human-Computer-Interaction (2024)
Bachelor's degree (2 majors) Art Education (2024)
Bachelor's degree (1 major) Digital Business & Data Science (2024)
Bachelor's degree (1 major) Classics (2024)
Bachelor's degree (1 major) Diversity, Ethics and Religions (2024)
Bachelor's degree (1 major) Functional Materials (2025)
Bachelor's degree (1 major)  (2025)
Bachelor's degree (1 major) Food Chemistry (2025)
Bachelor's degree (1 major, 1 minor) European Ethnology/Empiric Cultural Studies (2025)
Bachelor's degree (1 major) Pedagogy (2025)
Bachelor's degree (2 majors) Pedagogy (2025)
Bachelor's degree (1 major) Economathematics (2025)
Bachelor's degree (1 major) Academic Speech Therapy (2025)
Bachelor's degree (1 major, 1 minor) Pedagogy (2025)
Bachelor's degree (1 major) Games Engineering (2025)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Supply, Production and Operations Management. An Introduction** | | | 12-BPL-G-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Business Management and Industrial Management | | Faculty of Management and Economics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | 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** (type, number of weekly contact hours, language — if other than German)

V (2) + T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 minutes)

**Allocation of places**

620 places.
(1) 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). (2) The remaining places will be allocated to students of other subjects. (3) When places are allocated in accordance with (2) and the number of applications exceeds the number of available places, places will be allocated according to the following quotas: a) 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. b) 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. c) Quota 3 (25 % of places): lottery. (4) A waiting list will be maintained and places re-allocated by lot as they become available.

**Additional information**

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**Workload**

150 h

**Teaching cycle**

Teaching cycle: winter semester

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

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**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Business Management and Economics (2015)

Bachelor's degree (1 major) Economathematics (2015)
Bachelor's degree (1 major) Business Information Systems (2015)
Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2015)
Master's degree (1 major) China Business and Economics (2016)
Bachelor's degree (1 major) Business Information Systems (2016)
Bachelor's degree (1 major) Economathematics (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's degree (1 major) China Business and Economics (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (1 major) Business Management and Economics (2019)
Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2019)
Bachelor's degree (1 major) Business Information Systems (2020)

| Module title | Abbreviation |
|---|---|
| **Introduction to Business Informatics** | 12-Ewiinf-G-152-m01 |

| Module coordinator | Module offered by |
|---|---|
| holder of the Chair of Business Management and Business Information Systems | Faculty of Management and Economics |

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

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

**Contents**

This course provides a comprehensive overview of the theoretical and practical aspects of information systems. The content ranges from the history of information systems and business software to business models, technical requirements and process modelling. In addition to the lectures, tutorials with practical exercises in HTML, CSS, process mining and BPMN support a deeper understanding and application of the knowledge learnt.

Outline of syllabus:
1. overview and technological basics of WI
2. hardware, computer networks and the internet
3. databases and blockchain
4. business models, company structure and organisation
5. connection between business administration and information systems
6. business software and process mining
7. software development
8. future technologies and current research

Reading:
Thome: Grundzüge der Wirtschaftsinformatik.

**Intended learning outcomes**

The "Business Informatics" module aims to achieve the following learning outcomes:
1. Apply fundamentals: after completing the module, students will have an understanding of the basic concepts and terms of information systems and will be able to explain lecture elements addressed, such as hardware components, various database types or blockchain technology. Thanks to the practical exercises, they are able to implement simple applications and apply what they have learnt in practice. The students were also able to gain an overview of the various fields of business informatics.
2. Analysing business processes and system landscapes: After completing the module, students will be able to analyse business models and process modelling and demonstrate their skills by creating BPMN diagrams in practical exercises. They know the basics of software development and are familiar with ERP systems.
3. Conception of business solutions: Students are able to use learned knowledge about business software, structural and process organisation and new technologies to develop realistic solution strategies and business models for operational challenges. They have knowledge of the integration of information systems into operational processes.
4. Evaluating technology trends: Participants will be able to critically evaluate current and future trends in business informatics, including artificial intelligence and Industry 4.0, and contribute their assessments to discussions.

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

V (2) + T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 60 minutes) or
b) written examination consisting entirely or partly of multiple choice questions (approx. 60 minutes)
Language of assessment: German and/or English
creditable for bonus

| **Allocation of places** |
| --- |
| 840 places.<br>(1) 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). (2) Additional places will be allocated to students of other subjects. (3) When places are allocated in accordance with (2) and the number of applications exceeds the number of available places, places will be allocated by lot among all applicants irrespective of their subjects. (4) Places on all courses of the module with a restricted number of places will be allocated in the same procedure. (5) A waiting list will be maintained and places re-allocated by lot as they become available. |
| **Additional information** |
| -- |
| **Workload** |
| 150 h |
| **Teaching cycle** |
| Teaching cycle: winter semester |
| **Referred to in LPO I** (examination regulations for teaching-degree programmes) |
| -- |
| **Module appears in** |
| Bachelor's degree (1 major) Computer Science (2015)<br>Bachelor's degree (1 major) Business Management and Economics (2015)<br>Bachelor's degree (1 major) Business Information Systems (2015)<br>Master's degree (1 major) China Business and Economics (2016)<br>Bachelor's degree (1 major) Business Information Systems (2016)<br>Bachelor's degree (1 major) Computer Science (2017)<br>Bachelor's degree (1 major) Computer Science (2019)<br>Master's degree (1 major) China Business and Economics (2019)<br>Bachelor's degree (1 major) Business Information Systems (2019)<br>Bachelor's degree (1 major) Business Management and Economics (2019)<br>Bachelor's degree (1 major) Business Information Systems (2020) |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Financial Accounting** | | | 12-ExtUR-G-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Business Management and Business Taxation | | Faculty of Management and Economics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

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

V (2) + T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 minutes)

**Allocation of places**

840 places.
(1) 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). (2) The remaining places will be allocated to students of other subjects. (3) When places are allocated in accordance with (2) and the number of applications exceeds the number of available places, places will be allocated according to the following quotas: a) 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. b) 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. c) Quota 3 (25 % of places): lottery.

**Additional information**

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**Workload**

150 h

**Teaching cycle**

Teaching cycle: winter semester

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

--

**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Business Management and Economics (2015)
Bachelor's degree (1 major) Economathematics (2015)
Bachelor's degree (1 major) Business Information Systems (2015)

Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2015)
Master's degree (1 major) China Business and Economics (2016)
Bachelor's degree (1 major) Business Information Systems (2016)
Bachelor's degree (1 major) Economathematics (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's degree (1 major) China Business and Economics (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (1 major) Business Management and Economics (2019)
Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2019)
Bachelor's degree (1 major) Business Information Systems (2020)

| Module title | Abbreviation |
|---|---|
| **Forward and Reverse Business Engineering** | 12-FRBE-F-152-m01 |

| Module coordinator | Module offered by |
|---|---|
| holder of the Chair of Business Management and Business Information Systems | Faculty of Management and Economics |

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

| Duration | Module level | Other prerequisites |
|---|---|---|
| 1 semester | 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 "Forward und Reverse Business Engineering" module aims to achieve the following learning outcomes:
1. Students acquire profound expertise in the process of adapting business software libraries and learn how to apply this knowledge to practical scenarios.
2. Mastery of forward engineering methods such as situation analysis, requirements analysis, process modeling, and business blueprinting, as well as reverse engineering methods like reverse business engineering and their practical implementation in corresponding tools.
3. Students develop interdisciplinary methodological skills that enable them to independently and flexibly tackle complex challenges. This includes, in particular, the application of the aforementioned methods of forward and reverse engineering

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

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)
creditable for bonus

**Allocation of places**

50 places. 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 (2) and the number of applications exceeds the number of available places, places will be allocated by lot among applicants from this group. (4) Places on all courses of the module with a restricted number of places will be allocated in the same procedure. (5) A waiting list will be maintained and places re-allocated by lot as they become available.

**Additional information**

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**Workload**

150 h

| **Teaching cycle** |
| --- |
| Teaching cycle: winter semester |
| **Referred to in LPO I** (examination regulations for teaching-degree programmes) |
| -- |
| **Module appears in** |
| Bachelor's degree (1 major) Computer Science (2015)<br>Bachelor's degree (1 major) Business Management and Economics (2015)<br>Bachelor's degree (1 major) Economathematics (2015)<br>Bachelor's degree (1 major) Business Information Systems (2015)<br>Master's degree (1 major) Media Communication (2015)<br>Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2015)<br>Master's degree (1 major) China Business and Economics (2016)<br>Bachelor's degree (1 major) Business Information Systems (2016)<br>Master's degree (1 major) Media Communication (2016)<br>Bachelor's degree (1 major) Economathematics (2017)<br>Bachelor's degree (1 major) Computer Science (2017)<br>Master's degree (1 major) Media Communication (2018)<br>Bachelor's degree (1 major) Computer Science (2019)<br>Master's degree (1 major) China Business and Economics (2019)<br>Bachelor's degree (1 major) Business Information Systems (2019)<br>Bachelor's degree (1 major) Business Management and Economics (2019)<br>Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2019)<br>Master's degree (1 major) Media Communication (2019)<br>Bachelor's degree (1 major) Business Information Systems (2020)<br>Master's degree (1 major) China Business and Economics (2021)<br>Bachelor's degree (1 major) Business Information Systems (2021)<br>Bachelor's degree (1 major) Economathematics (2021)<br>Bachelor's degree (1 major) Business Management and Economics (2021)<br>Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021)<br>Bachelor's degree (1 major) Economathematics (2022)<br>Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)<br>exchange program Business Management and Economics (2022)<br>Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)<br>Bachelor's degree (1 major) Business Information Systems (2023)<br>Bachelor's degree (1 major) Economathematics (2023)<br>Bachelor's degree (1 major) Business Management and Economics (2023)<br>Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2023) |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Integrated Business Processes** | | | 12-GP-G-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Business Management and Business Information Systems | | Faculty of Management and Economics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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 S4/HANA 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 S/4HANA. 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** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

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)
creditable for bonus

**Allocation of places**

15 places. (1) The number of places is not restricted for students of the Bachelor's degree subject Wirtschaftsinformatik (Business Information Systems) (BSc with 180 ECTS credits). (2) Additional places will be allocated to students of other subjects provided there is enough capacity. These additional places will be allocated by lot among all applicants irrespective of their subjects. (3) Places on all courses of the module with a restricted number of places will be allocated in the same procedure. (4) A waiting list will be maintained and places re-allocated by lot as they become available.

**Additional information**

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**Workload**

150 h

**Teaching cycle**

Teaching cycle: summer semester

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

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| **Module appears in** |
| --- |
| Bachelor's degree (1 major) Computer Science (2015) |
| Bachelor's degree (1 major) Business Management and Economics (2015) |
| Bachelor's degree (1 major) Economathematics (2015) |
| Bachelor's degree (1 major) Business Information Systems (2015) |
| Master's degree (1 major) Media Communication (2015) |
| Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2015) |
| Master's degree (1 major) China Business and Economics (2016) |
| Bachelor's degree (1 major) Business Information Systems (2016) |
| Master's degree (1 major) Media Communication (2016) |
| Bachelor's degree (1 major) Economathematics (2017) |
| Bachelor's degree (1 major) Computer Science (2017) |
| Master's degree (1 major) Media Communication (2018) |
| Bachelor's degree (1 major) Computer Science (2019) |
| Master's degree (1 major) China Business and Economics (2019) |
| Bachelor's degree (1 major) Business Information Systems (2019) |
| Bachelor's degree (1 major) Business Management and Economics (2019) |
| Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2019) |
| Master's degree (1 major) Media Communication (2019) |
| Bachelor's degree (1 major) Business Information Systems (2020) |
| Master's degree (1 major) China Business and Economics (2021) |
| Bachelor's degree (1 major) Business Information Systems (2021) |
| Bachelor's degree (1 major) Economathematics (2021) |
| Bachelor's degree (1 major) Business Management and Economics (2021) |
| Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021) |
| Bachelor's degree (1 major) Economathematics (2022) |
| Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) |
| exchange program Business Management and Economics (2022) |
| Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) |
| Bachelor's degree (1 major) Business Information Systems (2023) |
| Bachelor's degree (1 major) Economathematics (2023) |
| Bachelor's degree (1 major) Business Management and Economics (2023) |
| Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2023) |

| Module title | Abbreviation |
|---|---|
| **Investment and Finance. An Introduction** | 12-I&F-G-152-m01 |

| Module coordinator | Module offered by |
|---|---|
| holder of the Chair of Business Management and Corporate Finance | Faculty of Management and Economics |

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

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

**Contents**

This module provides an overview of neoclassical investment and financing theory. The students will be familiarized with the basics of finance, including both tax aspects and risk considerations.

Structure:

Part 1: Investment calculation
a. Financial Mathematics: calculation of compound interest and annuities
b. Investments under certainty
c. Investments taking into account taxes
d. Investments under uncertainty

Part 2: Financing
a. Forms of financing
b. Capital structure policy (equity versus debt financing)
c. Dividend policy (external versus internal financing)

**Intended learning outcomes**

After completing the course „Investments and Finance: An Introduction", the students will be able to

(i) understand the fundamentals in financial mathematics;
(ii) solve investments decisions by means of dynamic approaches, in particular via capital plans and present values;
(iii) systematize forms of financing and evaluate their application.

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

V (2) + T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 minutes)

**Allocation of places**

620 places.
(1) 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). (2) The remaining places will be allocated to students of other subjects. (3) When places are allocated in accordance with (2) and the number of applications exceeds the number of available places, places will be allocated according to the following quotas: a) 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. b) 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. c) Quota 3 (25 % of places): lottery. (4) A waiting list will be maintained and places re-allocated by lot as they become available.

| **Additional information** |
| --- |
| -- |
| **Workload** |
| 150 h |
| **Teaching cycle** |
| Teaching cycle: winter semester |
| **Referred to in LPO I** (examination regulations for teaching-degree programmes) |
| -- |
| **Module appears in** |
| Bachelor's degree (1 major) Computer Science (2015)<br>Bachelor's degree (1 major) Mathematics (2015)<br>Bachelor's degree (1 major) Business Management and Economics (2015)<br>Bachelor's degree (1 major) Economathematics (2015)<br>Bachelor's degree (1 major) Business Information Systems (2015)<br>Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2015)<br>Master's degree (1 major) China Business and Economics (2016)<br>Bachelor's degree (1 major) Business Information Systems (2016)<br>Bachelor's degree (1 major) Economathematics (2017)<br>Bachelor's degree (1 major) Computer Science (2017)<br>Bachelor's degree (1 major) Computer Science (2019)<br>Master's degree (1 major) China Business and Economics (2019)<br>Bachelor's degree (1 major) Business Information Systems (2019)<br>Bachelor's degree (1 major) Business Management and Economics (2019)<br>Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2019)<br>Bachelor's degree (1 major) Business Information Systems (2020) |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Managerial Accounting** | | | 12-IntUR-G-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Business Management, Controlling and Accounting | | Faculty of Management and Economics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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:
Coenenberg/Fischer/Günther: Kostenrechnung und Kostenanalyse, Stuttgart.
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 case studies of medium difficulty that calculate relevant costs and benefits and take on this basis a reasoned decision.

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

V (2) + T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 minutes)

**Allocation of places**

840 places.
(1) 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). (2) The remaining places will be allocated to students of other subjects. (3) When places are allocated in accordance with (2) and the number of applications exceeds the number of available places, places will be allocated according to the following quotas: a) 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 achie-

ved, places will be allocated by lot. b) 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. c) Quota 3 (25 % of places): lottery. (4) A waiting list will be maintained and places re-allocated by lot as they become available.

**Additional information**

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**Workload**

150 h

**Teaching cycle**

Teaching cycle: summer semester

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

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**Module appears in**

Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Business Management and Economics (2015)
Bachelor's degree (1 major) Economathematics (2015)
Bachelor's degree (1 major) Business Information Systems (2015)
Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2015)
Master's degree (1 major) China Business and Economics (2016)
Bachelor's degree (1 major) Business Information Systems (2016)
Bachelor's degree (1 major) Economathematics (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's degree (1 major) China Business and Economics (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (1 major) Business Management and Economics (2019)
Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2019)
Bachelor's degree (1 major) Business Information Systems (2020)

| Module title | Abbreviation |
|---|---|
| **Introduction to Business Administration - Minor** | 12-NW-EBWL-152-m01 |

| Module coordinator | Module offered by |
|---|---|
| holder of the Chair of Business Management and Corporate Finance | Faculty of Management and Economics |

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

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

**Contents**

This course aims to provide non-specialist students with an overview of the structure and the ways of thinking of modern business administration. In this context, we will also apply selected conventional tools for the description and solution of problems in selected areas of the subject.

Outline of syllabus

1. What is business?
2. Business and its view of human beings
3. Optimal decisions in business administration
4. Cooperation benefits
5. Coordination of conventional markets
6. Market failure
7. Coordination in companies
8. Stakeholder value vs. shareholder value
9. Financial implementation of shareholder value
10. Legal forms

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 minutes)

**Allocation of places**

200 places (lottery)

**Additional information**

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**Workload**

150 h

**Teaching cycle**

Teaching cycle: every year, winter semester

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

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**Module appears in**

Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)

Bachelor's degree (1 major) Political and Social Studies (2015)
Master's degree (1 major) Media Communication (2015)
Master's degree (1 major) Media Communication (2016)
Bachelor's degree (1 major) Computer Science (2017)
Master's degree (1 major) Media Communication (2018)
Bachelor's degree (1 major) Computer Science (2019)
Master's degree (1 major) Media Communication (2019)
Master's degree (1 major) Diversity management, religion and education (2019)
Bachelor's degree (1 major) Political and Social Studies (2020)
Bachelor's degree (1 major) Geography (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Introduction to Economics - Minor** | | | 12-NW-EVWL-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Monetary Economics and International Financial Markets | | Faculty of Management and Economics | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**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 micropores and macroeconomic models are mediated.

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

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 minutes)

**Allocation of places**

max. 200 places. 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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**Workload**

150 h

**Teaching cycle**

Teaching cycle: every year, winter semester

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

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**Module appears in**

Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Political and Social Studies (2015)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Master's degree (1 major) Diversity management, religion and education (2019)
Bachelor's degree (1 major) Political and Social Studies (2020)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Geography (2023)