Module Catalogue

for the Subject

Computer Science

as Unterrichtsfach

with the degree "Erste Staatsprüfung für das Lehramt an Realschulen"

Contents

The subject is divided into

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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:

LASPO2015

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

08-Sep-2015 (2015-121)

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.

Scientific Discipline

(60 ECTS credits)

Compulsory Courses

(40 ECTS credits)

General Compulsory Courses

(30 ECTS credits)

Module title			Abbreviation
Introduction to Programming			10-I-EinP-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

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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination 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

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Additional information

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Workload

150 h

Teaching cycle

Teaching cycle: only in winter 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) Business Information Systems (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) Business Information Systems (2019)

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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination 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

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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)

§ 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
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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination 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

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Additional information

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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 (German Realschule)		10-I-SWP-RS-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-ST and either 10-I-PP or 10-I-EPP

Duration	Module level	Other prerequisites
1 semester	undergraduate	In addition, the knowledge and skills acquired in module 10-I-ADS and/ or 10-I-GADS are required. Prior attendance of these modules 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 is creditable for 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

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Additional information

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Workload

300 h

Teaching cycle

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

§ 49 I Nr. 1 c)

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)

Theoretical Computer Science

(10 ECTS credits)

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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination 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

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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)

§ 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
Tutorial Theoretical Informatics	10-I-TIT-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	(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 is creditable for bonus)

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

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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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)

Compulsory Electives

(20 ECTS credits)

Algorithms and Data Structures

(10 ECTS credits)

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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination 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

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Additional information

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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
Algorithms and Data Structures Level One Course		10-I-GADS-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

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

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

V (4) + Ü (3)

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

written examination (approx. 60 to 120 minutes) or oral examination of one candidate each (approx. 20 minutes) or oral examination in groups of 2 candidates (approx. 15 minutes per candidate)
creditable for bonus

Allocation of places

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Additional information

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Workload

300 h

Teaching cycle

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

§ 49 I Nr. 1 a)

Module appears in

Bachelor's degree (1 major, 1 minor) Digital Humanities (Minor, 2015)
Bachelor's degree (2 majors) Digital Humanities (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
Bachelor's degree (1 major) Business Information Systems (2016)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2018)
Bachelor's degree (1 major, 1 minor) Digital Humanities (Minor, 2018)
Bachelor's degree (2 majors) Digital Humanities (2018)
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)

Bachelor's degree (1 major) Digital Business & Data Science (2024)

Programming Practical Courses

(10 ECTS credits)

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	
1-2 semester	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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination 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

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Additional information

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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
Introductory Programming Course	10-I-EPP-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

The programming language used is Java. In the practical course, small to middle-sized java programs are to be implemented independently.

Intended learning outcomes

The students are able to independently develop and implement small to middle sized 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 is creditable for bonus)

practical examination (programming exercises, approx. 240 hours) and written examination (approx. 60 to 120 minutes)
If announced by the lecturer at the beginning of the course, the written examination 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

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Additional information

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Workload

300 h

Teaching cycle

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

§ 49 I Nr. 1 c)

Module appears in

Bachelor's degree (1 major) Business Information Systems (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
Bachelor's degree (1 major) Business Information Systems (2016)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2018)
Bachelor's degree (1 major) Business Information Systems (2019)

Teaching

(12 ECTS credits)

Compulsory Courses

(12 ECTS credits)

Module title		Abbreviation
Computer Science Education 1 (incl. Practical Course in the Application of Computer Science Systems form an Educational Point of View)		10-I-DDI1-152-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)
6	numerical grade	--

Duration	Module level	Other prerequisites
2 semester	undergraduate	--

Contents

The module gives an overview of computer science didactics. It demonstrates and discusses possibilities for a practical application in the classroom.

Intended learning outcomes

Students are familiar (in particular in the area of computer science in *Sekundarstufe I*) with methods, techniques and media for teaching topics in computer science. They are able to didactically analyse and prepare practical topics. Students are familiar with both historical and current teaching approaches, typical teaching methods as well as guidelines and standards for teaching computer science. They are able to plan, organise and deliver classes.

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

V (2) + Ü (2) + P (2)

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

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination 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

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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)

§ 49 I Nr. 2
§ 69 I Nr. 2

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)

Module title	Abbreviation
Computer Science Education 2 (incl. Seminar in Computer Science Education at the German Realschule)	10-I-DDI2-RS-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)	
6	numerical grade	--	

Duration	Module level	Other prerequisites	
1 semester	undergraduate	--	

Contents

This course discusses different topics in computer science didactics in more detail. It demonstrates and discusses possibilities for a practical application in the classroom. The seminar supplementing the course focuses on topics in computer science didactics for *Realschule* including, in particular, relevant practical skills for use in the classroom.

Intended learning outcomes

The students are able to plan, execute and assess projects, are familiar with important aspects of the planning and analysis of computer science classes, master fundamental teaching and learning strategies and are able to assess these. The students are able to handle the special problems of their subject in *Realschule* and know how to apply selected computer science systems in practice.

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

V (2) + Ü (2) + S (2)

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

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination 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

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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)

§ 49 I Nr. 2

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)

Paper

(4 ECTS credits)

Students studying for a teaching degree Realschule must complete a practical training in didactics and teaching methodology (studienbegleitendes fachdidaktisches Praktikum) which refers to one of the subjects they selected as vertieft studiertes Fach (subject studied with a focus on the scientific discipline) pursuant to Section 34 Subsection 1 No. 4 LPO I (examination regulations for teaching-degree programmes). The obligatory accompanying tutorial is offered by the respective subject. The ECTS credits obtained are counted in the subject Erziehungswissenschaften pursuant to Section 10 Subsection 3 LASPO (general academic and examination regulations for teaching-degree programms).

Module title		Abbreviation
Practical Training in Classroom Teaching in Computer Science Education including Theory (German Realschule)		10-I-SBFD-RS-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)
4	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

The module introduces students to the classroom practice of their *Unterrichtsfach* (subject studied with a focus on the scientific discipline). Using specific teaching models, examples and projects in different grades, the module introduces students to subject-specific techniques. In the university course accompanying the placement, students reflect and structure the school type-specific experiences made during their teaching placements and explore additional subject-specific and didactic aspects. In this context, the course discusses selected practical aspects of teaching computer science in accordance with applicable guidelines and curricula. The course focuses on recent developments in classroom practice, also taking into account aspects of school pedagogy and learning psychology that can support the successful practical implementation of subject-specific conceptual designs.

Intended learning outcomes

The students are familiar with the most important components of planning and organising classes. They are able to teach the relevant topics in different grades as well as to critically reflect recent developments in education. They are able to connect ideas from school pedagogy and learning psychology with their expertise in the area of didactics and to incorporate these into their teaching.

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

P (0) + S (2)

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

Written elaboration of teaching practice (15 to 20 pages)
Contents and duration of placement as specified in Section 34 Subsection 1 Sentence 1 No. 4 LPO I (examination regulations for teaching-degree programmes); participation in mandatory teaching practice, completion of all set tasks as specified by placement school.

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 34 I 1 Nr. 4

Module appears in

First state examination for the teaching degree Realschule Educational Science (2015)

Freier Bereich (general as well as subject-specific electives)

(ECTS credits)

Teaching degree students must take modules worth a total of 15 ECTS credits in the area Freier Bereich (general as well as subject-specific electives) (Section 9 LASPO (general academic and examination regulations for teaching-degree programmes)). To achieve the required number of ECTS credits, students may take any modules from the areas below.

Freier Bereich -- interdisciplinary: The interdisciplinary additional offer for a teaching degree can be found in the respective Annex "Ergänzende Bestimmungen für den "Freien Bereich" im Rahmen des Studiums für ein Lehramt".

Computer Science

(ECTS credits)

(Freier Bereich (general as well as subject-specific electives) -- subject specific)

Module title			Abbreviation
Exam Tutorial for the German Staatsexamen			10-I-REP-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)
4	(not) successfully completed		--

Duration	Module level	Other prerequisites
2 semester	undergraduate	--

Contents

Revision of contents of modules covering the subject as well as the subject didactics of computer science.

Intended learning outcomes

The students have refreshed their skills for the solution of the type of problems asked in the written state examination.

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 is creditable for bonus)

One exercise per area covered in the state examination

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 22 II Nr. 2 f)
§ 22 II Nr. 3 b)

Module appears in

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)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
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 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 Computer Science Education		10-I-DS-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)
4	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Selected topics in computer science didactics.

Intended learning outcomes

The students gain initial experience in the area of independent scientific work. They are able to acquaint themselves with and structure a given topic, using selected literature, as well as to prepare a talk on the respective subject. They are also able to actively participate in a scientific discussion.

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 is creditable for bonus)

written elaboration (approx. 20 pages) and presentation including discussion (approx. 45 to 60 minutes) on a topic from the field of computer science didactics
Assessment offered: Only in the semester in which the course is offered

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

Teaching cycle: usually once a year

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

§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)

Module title		Abbreviation
Advanced Topics of Computer Science Education		10-I-DV-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)
4	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Discussion of topics in teaching computer science in *Gymnasium* that takes into account different aspects, in particular subject-specific foundations, didactic analyses, the contemporary debate in computer science didactics as well as possible approaches in the classroom.

Intended learning outcomes

The students are able to discuss central topics and issues on teaching computer science in a *Gymnasium*, taking into account subject-specific, didactic and methodical aspects.

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 is creditable for bonus)

talk (approx. 30 minutes) or practical assignment (exercise) with examination talk (approx. 15 minutes)
Assessment offered: Only in the semester in which the course is offered

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

Teaching cycle: Usually every 2 years

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

§ 22 II Nr. 2 f)
§ 22 II Nr. 2 f), § 22 II Nr. 3 f)

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)

Module title			Abbreviation
Robotics in Education (practical course)			10-I-DRO-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)
4	(not) successfully completed		--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Discussion of problems in robotics in the computer science classroom that takes into account different aspects, in particular subject-specific foundations, didactic analyses, the contemporary debate in computer science didactics as well as possible approaches in the classroom.

Intended learning outcomes

The students are able to discuss central topics and questions of robotics in the computer science classroom, taking into account subject-specific, didactic and methodical aspects.

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 is creditable for bonus)

practical assignment (supervision of a group of pupils) with examination talk (approx. 15 minutes)
Assessment offered: Only in the semester in which the course is offered

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

Teaching cycle: Usually every 2 years

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

§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)

Module title		Abbreviation
Practical Course on Computer Science Education		10-I-DPR-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)
4	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Discussion of problems in programming in the computer science classroom that takes into account different aspects, in particular subject-specific foundations, didactic analyses, the contemporary debate in computer science didactics as well as possible approaches in the classroom.

Intended learning outcomes

The students are able to discuss central topics and questions of programming in the computer science classroom, taking into account subject-specific, didactic and methodical aspects.

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 is creditable for bonus)

practical assignment with examination talk (approx. 15 minutes)
Assessment offered: Only in the semester in which the course is offered

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

Teaching cycle: Usually every 2 years

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

§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)

Module title		Abbreviation
Hands-on Computer Science		10-I-DPP-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)
6	(not) successfully completed	--

Duration	Module level	Other prerequisites
2 semester	undergraduate	--

Contents

Design and implementation of a school project on a topic in computer science, e. g. for project days, school term papers (*Facharbeiten*), *Pluskurse* (additional courses for the in-depth study of areas of special interest), workshops. In the theoretical phase, the students formulate the subject-specific and didactic requirements of the topic, search for a suitable topic, elaborate this topic for the project and draw up a project plan. This is done in groups with students providing each other with advice as well as challenging and reflecting on each other's work. In the practical phase, the students prepare the implementation of the project, implement the project with pupils and afterwards reflect the planning and implementation.

Intended learning outcomes

The students are able to select a topic from the area of computer science that is suitable for a school project and are able to elaborate it. They are familiar with different aspects of project planning and management and are able to critically reflect the process.

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

Ü (2) + S (2)

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

practical assignment (preparing and delivering a school lab session) with examination talk (approx. 15 minutes)
Assessment offered: Only in the semester in which the course is offered

Allocation of places

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Additional information

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Workload

180 h

Teaching cycle

Teaching cycle: Usually every 2 years

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

§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)

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	
1-2 semester	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 is creditable for bonus)
Wrap-up report on tutoring activities (5 to 10 pages)

Allocation of places
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Additional information
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Workload
60 h

Teaching cycle
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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
1-2 semester	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 is creditable for bonus)
Wrap-up report on tutoring activities (5 to 10 pages)

Allocation of places
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Additional information
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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)

Paper

(10 ECTS credits)

Preparation of a written Hausarbeit (thesis) in accordance with the provisions of Section 29 LPO I (examination regulations for teaching-degree programmes) is a prerequisite for teaching degree students to be admitted to the Erste Staatsprüfung (First State Examination). In accordance with the provisions of Section 29 LPO I, students studying for a teaching degree Realschule may write this thesis in one of the subjects they selected as Unterrichtsfach (subject studied with a focus on the scientific discipline) or in the subject Erziehungswissenschaften (Educational Science). Pursuant to Section 29 Subsection 1 Sentence 2 LPO I, students may also choose to write an interdisciplinary thesis.

Module title			Abbreviation
Thesis Computer Science (Teaching Degree at the German Realschule)			10-I-HA-RS-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
1-2 semester	undergraduate	--

Contents

Researching and writing on a defined problem in computer science or computer science didactics 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 is creditable for bonus)

Hausarbeit (thesis) pursuant to Section 29 LPO I (examination regulations for teaching-degree programmes) (250 to 300 hours)
Language of assessment: German; exceptions pursuant to Section 29 Subsection 4 LPO I (examination regulations for teaching-degree programmes)

Allocation of places

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Additional information

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Workload

300 h

Teaching cycle

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

§ 29

Module appears in

First state examination for the teaching degree Realschule Computer Science (2015)