Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Module Catalogue

for the Subject

Emerging Educational Technologies for Science Technology Engineering Mathematics STEM (EET4STEM)

with the degree "Zertifikatsprogramm als Zusatzstudium"

(30 ECTS credits)

Examination regulations version: 2026
Responsible: Faculty of Biology
Responsible: Faculty of Chemistry and Pharmacy
Responsible: Faculty of Mathematics and Computer Science
Responsible: Faculty of Physics and Astronomy

Contents

The subject is divided into

Content and Objectives of the Programme

The EET4STEM supplementary study program in the Elite Network Bavaria is offered by the Faculty of Biology, the Faculty of Chemistry and Pharmacy, the Faculty of Mathematics and Computer Science and the Faculty of Physics and Astronomy of the JMU as a supplementary study program in accordance with Article 77, Paragraph 5, Sentence 1, No. 2 of the BayHIG.

The program is aimed at particularly high-performing and motivated students in a secondary school teaching program with at least one STEM subject, as well as particularly high-performing and motivated students in computer science-related programs. The program familiarizes students with the interdisciplinary design, development, and implementation of innovative educational technologies and imparts subject-specific didactic skills to teach the content and methods of a STEM subject using innovative educational technologies.

Based on the study program, the participating faculties will issue a certificate for the EET4STEM certificate program in the Elite Network Bavaria upon completion of all required module achievements in accordance with this FSB.

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)):

??-???-2026 (2026-??)

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.

Compulsory Courses

(55 ECTS credits)

Digital Foundations of Emerging Educational Technologies

(30 ECTS credits)

Module title			Abbreviation
Introduction to Informatics for EET4STEM			10-I=EINEET-262-m01
Module coordinator			**Module offered by**
--			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	--	--	

Contents

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Intended learning outcomes

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

V (4) + Ü (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 is creditable for bonus)

Written examination (approx. 60 to 120 minutes)
Language of assessment: German and/or English
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)

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Module title			Abbreviation
Programming for Emerging Educational Technologies 1			10-I=PEET1-262-m01
Module coordinator		**Module offered by**	
--		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	--	--	

Contents

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Intended learning outcomes

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

Ü (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 is creditable for bonus)

portfolio (approx. 30 pages in total)
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)

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Module title			Abbreviation
Programming for Emerging Educational Technologies 2			10-I=PEET2-262-m01
Module coordinator		**Module offered by**	
--		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	--	--	

Contents

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Intended learning outcomes

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

Ü (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 is creditable for bonus)

portfolio (approx. 30 pages in total)
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)

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Module title			Abbreviation
Web and Online Technologies			10-HCI=WOT-262-m01
Module coordinator		**Module offered by**	
--		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	--	--	

Contents

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Intended learning outcomes

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

V/S (2) + Ü (1)
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 is creditable for bonus)

a) written examination (approx. 60 to 90 minutes) or
b) project work: report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic or
c) oral examination of one candidate each (approx. 20 minutes) or
d) oral examination in groups of up to 3 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)

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Module title			Abbreviation
Introduction into Human-Computer Interaction			10-I-MCS-242-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	undergraduate	--	

Contents

Human-Computer Interaction studies the design, evaluation, and implementation of interactive computer systems. Special focus lies on fundamental psychological and physiological properties of the human users, the technical principals and models of modern computer systems, as well as on the derived boundary conditions of designing usable and human-oriented interactions with technical systems. The topics of this course cover the human perception and cognition, the human memory and attention, the design of interactive systems, popuplar evaluation methods, principles of computer systems, input processing techniques, human interfaces and typical means of interaction, from text-based input methods over graphical user interfaces to multi-modal interfaces. Accompanying practical tasks convey to the students typical methods of requirement analysis, prototyping and evaluation.

Intended learning outcomes

After successfully completing this course, students have a fundamental understanding of human-computer interface design principles. They understand the possibilities and limitations of technology and user and the applications of modern user interfaces. They know the necessary steps of user-centric design and typical design principles.

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

V (3) + Ü (1)

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) written examination (approx. 120 minutes) or
b) presentation (30 to 60 minutes) or
c) oral examination of one candidate each (30 to 60 minutes)
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

Teaching cycle: once a year, winter semester

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

§ 22 II Nr. 3 b)

Emerging Educational Technologies

(25 ECTS credits)

Module title			**Abbreviation**
Educational Technologies Development Lab 1			19-EET=ELET1-262-m01
Module coordinator			**Module offered by**
--			M!nd-Center
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	--	--	

Contents

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Intended learning outcomes

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

V/S (2) + Ü (1)
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 is creditable for bonus)

a) report (approx. 30 pages) or
b) portfolio (approx. 30 pages in total)
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)

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Module title			Abbreviation
Educational Technologies Development Lab 2			19-EET=ELET2-262-m01
Module coordinator			**Module offered by**
--			M!nd-Center
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
20	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	--	--	

Contents

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Intended learning outcomes

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

V/S (4) + Ü (6)
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 is creditable for bonus)

portfolio (approx. 500 hours in total)
Language of assessment: German and/or English
creditable for bonus

Allocation of places

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Additional information

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Workload

600 h

Teaching cycle

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

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Compulsory Electives Subject didactics

(10 ECTS credits)

Subject didactics Biology

(0 or 10 ECTS credits)

Module title			Abbreviation
Didactics in Biology I: Basics			07-GY-FDBIO-1-152-m01
Module coordinator		**Module offered by**	
head of group Didactics of 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	--	

Contents

The lecture *Einführung in die Fachdidaktik Biologie* (*Introduction to Biology Didactics*) will discuss central concepts and principles of biology lessons as well as methods in biology and teaching aids. Building on this knowledge, students will learn how to outline problem-based biology lessons. The course will discuss topics such as modes of interaction in the classroom, teaching methods and approaches, the definition of learning outcomes, out-of-classroom learning environments, topics and theories in biology didactics etc. The seminar *Biologieunterricht* (*The Biology Classroom*) will equip students with detailed knowledge on how to plan and design classes for the respective type of school. Students will prepare didactic analyses on topics from the curriculum. They will discuss general aspects of curriculum theory and, working in small teams, will translate the material to be taught, in a didactically reduced manner, into teaching sequences and lessons. At the same time, students will integrate different teaching methods and modes of interaction in the classroom (as well as teaching aids) into their lessons, keeping in mind what is and what is not possible in the respective type of school, and will deliver their lessons or parts of these in the seminar. Didactic aspects will be evaluated and discussed in class. There will be separate seminars for each type of school; please select the seminar for the school type for which you are pursuing a teaching degree. Using examples from the classroom, the seminar *Unterrichtsmittel* (*Teaching Aids*) will acquaint students with specific teaching aids (originals, preparations and media) for use in the biology classroom and will assess these with regard to the media literacy skills to be developed. The seminar will discuss both traditional aids used in the biology classroom (models, blackboard, OHP, transparencies, textbook and worksheets etc.) and modern aids (computer simulations, ppt presentations etc.). After having received a theoretical introduction to teaching aids, students will be arranged into small teams that will deliver lessons or individual phases of lessons on specific topics from the curriculum. They will focus on a teaching aid of their choice which will subsequently be assessed with regard to aspects of media didactics.

Intended learning outcomes

- Ability to name relevant aspects of biology didactics.
- Ability to design lively biology lessons, using original objects and teaching aids.
- Ability to prepare scientific and didactic analyses on selected topics from the curriculum for the respective type of school and to present these topics in a manner that is tailored to the target group.
- Ability to translate, with the help of didactic analyses, selected topics from the curriculum into teaching sequences and lessons as well as to deliver these teaching sequences and lessons, applying problem-based and/or open teaching methods.
- Ability to evaluate and reflect on lessons, taking didactic aspects into account.
- Knowledge of the fact that the term "teaching aids in the biology classroom" refers to originals, preparations and media.
- Familiarity with a biology-specific, didactic definition of the term "media".
- Overview of classifications of media, factors that influence the choice of media as well as the function of media.
- Familiarity with the limitations and problems associated with the use of media in the classroom.
- Practical skills using media of all kinds (hardware side).
- Ability to independently prepare teaching aids.
- Ability to use teaching aids in classroom situations in a way that is appropriate for pupils and the material taught.
- Advantages and disadvantages of specific teaching aids; limitations associated with the use of media in the classroom.

Courses (type, number of weekly contact hours, language — if other than German)
V (2) + S (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 minutes) 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)
§ 61 I Nr. 8

Module title			Abbreviation
Didactics Biology II: Special Didactics			07-GY-FDBIO-2-152-m01

Module coordinator	Module offered by
head of group Didactics of Biology	Faculty of Biology

ECTS	Method of grading	Only after succ. compl. of module(s)
5	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

The seminar *Arbeiten im Lehr-Lern-Labor* (*Working in the Teach'n'Learn Lab*) or *Arbeiten im Lehr-Lern-Garten* (*Working in the Teach'n'Learn Garden*) will provide students with an overview of selected methods in biology. They will learn to prepare these methods, in a didactically reduced manner, for pupils and, having been arranged into teams, will deliver the respective units to groups of pupils. Students will thus learn to tailor research-oriented experiments to the age group they are teaching and will acquire practical experience in the supervision of a group of pupils. In the seminar *Arbeitstechniken und Schulversuche* (*Methods and Experiments in the Classroom*), students will be arranged into small teams and will perform a variety of experiments on classic topics in biology. The experiments, which will be tailored to the requirements of *Sekundarstufe I* and *II*, will subsequently be assessed in class with regard to didactic aspects and/or will be integrated into concrete classroom situations. Students will thus acquire techniques and background knowledge that will enable them to deliver lively and motivating lessons to different age groups. The seminar *Arbeiten im Lehr-Lern-Labor* (*Working in the Teach'n'Learn Lab*) or *Arbeiten im Lehr-Lern-Garten* (*Working in the Teach'n'Learn Garden*) will provide students with an overview of selected methods in biology. They will learn to prepare these methods, in a didactically reduced manner, for pupils and, having been arranged into teams, will deliver the respective units to groups of pupils. Students will thus learn to tailor research-oriented experiments to the age group they are teaching and will acquire practical experience in the supervision of a group of pupils.

Intended learning outcomes

- Ability to didactically adapt selected traditional and modern methods in biology.
- Ability to prepare, deliver and evaluate teach'n'learn units.
- Ability to independently supervise teach'n'learn units

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

S (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)

portfolio (approx. 30 hours)
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)

§ 61 I Nr. 8

Subject didactics Chemistry

(0 or 10 ECTS credits)

Module title			Abbreviation
Introduction into Teaching Chemistry for High School			08-FD1-LAGY-152-m01
Module coordinator			**Module offered by**
holder of the Professorship of Didactics of Chemistry			Institute of Inorganic Chemistry
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on learning outcomes available.

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

V (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)

a) written examination (approx. 90 minutes) and b) presentation (approx. 20 minutes)
Language of assessment: German and/or English

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)

§ 62 I Nr. 6

Module title			Abbreviation
Teaching Chemical Practice for High School			08-FD2-LAGY-152-m01
Module coordinator		**Module offered by**	
holder of the Professorship of Didactics of Chemistry		Institute of Inorganic Chemistry	
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 learning outcomes available.

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

S (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)

a) written examination (approx. 60 minutes) and b) portfolio (approx. 15 pages)
Language of assessment: German and/or English

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)

§ 62 I Nr. 6

Subject didactics Computer Science

(0 or 10 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 title			Abbreviation
Computer Science Education 2			10-I-DDI2-GY-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

This course discusses different topics in computer science didactics in more detail. It demonstrates and discusses possibilities for a practical application 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.

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

120 h

Teaching cycle

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

§ 69 I Nr. 2 and § 69 I Nr. 1 c): Rechnerarchitektur

Subject didactics Mathematics

(0 or 10 ECTS credits)

Module title			Abbreviation
Didactics of Mathematics: Algebra and Analysis (German Gymnasium)			10-M-DGY1-232-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)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	--	

Contents

Discussion of advanced topics in mathematics didactics for Gymnasium using the examples of algebra (Sekundarstufe I) and analysis (Sekundarstufe II) as well as discussion of possibilities of implementation in the classroom, also including modern technologies.

Intended learning outcomes

The student is acquainted with mathematical ways of thinking and working techniques (in particular in the fields of algebra in Sekundarstufe I and analysis in sekundarstufe II) and is able to take into account the students'perception of mathematical topics, He/She knows different aspects of planning and analysing teaching of mathematics, masters different strategies for teaching and learning und can assess them.

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

V (2) + Ü (2) + 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 minutes) and written exercises (approx. 10 exercise sheets with approx. 3 exercises each from the didactics of algebra and approx. 10 exercise sheets with approx. 3 exercises each from the didactics of analysis)
Language of assessment: German and/or English
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)

§ 73 I Nr. 6

Module title			Abbreviation
Didactics of Mathematics: Geometry (German Gymnasium)			10-M-DGY2-191-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)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Discussion of basic topics in mathematics didactics for Gymnasium using the example of geometry (Sekundarstufe I) as well as discussion of possibilities of implementation in the classroom, also including modern technologies.

Intended learning outcomes

The student is acquainted with basic mathematical ways of thinking and working techniques (in particular in the field of geometry in Sekundarstufe I) and is able to take into account the students'perception of mathematical topics, He/She knows important aspects of planning and analysing teaching of mathematics, masters different strategies for teaching and learning und can assess them.

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)

a) written examination (60 to 120 minutes) or
b) oral examination of one candidate each (approx. 30 minutes) or
c) oral examination in groups (groups of 2 or 3, 10 to 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

120 h

Teaching cycle

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

§ 73 I Nr. 6

Subject didactics Physics

(0 or 10 ECTS credits)

Module title			Abbreviation
Physics Teaching Concepts			11-L-PD-172-m01
Module coordinator		**Module offered by**	
holder of the Chair of Physics and its Didactics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	--	

Contents

Teaching of basic concepts of physics education and didactic consolidation of subject-relevant scientific content of the degree programme. Justification/legitimation of physics teaching; educational objectives of physics as a subject; competence models and educational standards; elementarisation and didactic reconstruction of physics content; methods and media in physics lessons and their use to promote learning; student perceptions and typical learning difficulties in the subject areas of physics relevant to teaching and teaching concepts based on these; dealing with student perceptions; teaching approaches to the structure and cognitive/working methods of the science of physics, including historical development;

Intended learning outcomes

Students are familiar with central physics teaching concepts to design target group-orientated physics lessons. They clearly differentiate didactic aspects of physics lessons from scientific and educational aspects. They are familiar with subject-specific student conceptions and their significance for the students' learning process. They critically discuss specific teaching concepts against this background.

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

V (2) + V (2) + Ü (1)

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) written examination (approx. 60 minutes) or
b) oral examination of one candidate each (approx. 15 minutes) or
c) oral examination in groups (groups of 2, approx. 15 minutes per candidate) or
d) term paper (approx. 8 pages)
Language of assessment: German and/or English

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)

§ 36 I Nr. 7
§ 38 I Nr. 1
§ 53 I Nr. 2
§ 77 I Nr. 2

Module title			Abbreviation
Physics Teaching Concepts Seminar			11-L-PDS-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Physics and its Didactics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Different topics of current subject-didactic research; examples: Interest and physics education, girls in physics education, evaluation, task culture, interdisciplinary classes, language in physics education, effects of subject media and their application for learning support, especially regarding computers, epistemological and working methods, new teaching methods.

Intended learning outcomes

Knowledge of selected methods of didactic physical research, evaluation of didactic physical research projects, knowledge of didactic physical literature. Ability to critically evaluate Physics classes in view of different aspects and to discuss different prioritisations and approaches.

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)

a) written examination (approx. 45 minutes) or
b) oral examination of one candidate each (approx. 10 minutes) or
c) oral examination in groups (groups of 2, approx. 10 minutes per candidate) or
d) term paper (approx. 8 pages)
Language of assessment: German and/or English

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)

§ 77 I Nr. 2

Module title			Abbreviation
Student Lab Preparation Course (Physics) German Gymnasium			11-L-L3SGY-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Physics and its Didactics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The module gives an overview of applicable physical experiments that provide an introduction to science and can be performed in teaching-learning-laboratories (M!ND center). In these experiments, different working methods are employed.

Intended learning outcomes

The students know how to prepare and follow-up a visit in a teaching-learning-laboratory (M!ND-Center) and have gained an overview of current didactic research topics and further possibilities for development in the field of subject-didactic research. They are able to evaluate and assess the (affective) learning achievements of pupils, to hold scientific-propaedeutic classes, to positively influence the motivation of pupils in the subject of Physics and to raise their interest for current physical research questions. The students are able to select, set up or build pupils experiments in a target-oriented manner, and to supervise pupils while experimenting.

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)

a) written examination (approx. 45 minutes) or
b) oral examination of one candidate each (approx. 10 minutes) or
c) oral examination in groups (groups of 2, approx. 10 minutes per candidate) or
d) term paper (approx. 8 pages)
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

90 h

Teaching cycle

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

§ 77 I Nr. 2

Compulsory Electives Profession-specific key competencies

(5 ECTS credits)

Module title			Abbreviation
Key Competencies EET4STEM 1			19-EET-SK1-262-m01
Module coordinator		**Module offered by**	
--		M!nd-Center	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	--	--	

Contents

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Intended learning outcomes

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

V/S (2) + Ü (1)
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 is creditable for bonus)

a) written examination (approx. 60 to 90 minutes) or
b) project work: report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic or
c) oral examination of one candidate each (approx. 20 minutes) or
d) oral examination in groups of up to 3 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)

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Module title			Abbreviation
Key Competencies EET4STEM 2			19-EET-SK2-262-m01
Module coordinator		**Module offered by**	
--		M!nd-Center	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	--	--	

Contents

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Intended learning outcomes

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

V/S (2) + Ü (1)
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 is creditable for bonus)

a) written examination (approx. 60 to 90 minutes) or
b) project work: report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic or
c) oral examination of one candidate each (approx. 20 minutes) or
d) oral examination in groups of up to 3 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)

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