



Module Catalogue

for the Subject

Physics

as a Bachelor's with 1 major
with the degree "Bachelor of Science"
(180 ECTS credits)

Examination regulations version: 2007
Responsible: Faculty of Physics and Astronomy

Contents

| | |
|---|----|
| The subject is divided into | 3 |
| Content and Objectives of the Programme | 4 |
| Abbreviations used, Conventions, Notes, In accordance with | 5 |
| Compulsory Courses | 6 |
| Experimental Physics | 7 |
| Experimental Physics 1 (Mechanics, Thermodynamics, Waves and Oscillations) | 8 |
| Experimental Physics 2 (Electrics and Magnetism) | 9 |
| Experimental Physics 3 (Optics, Quantum Phenomena, Introduction Atomic Physics) | 10 |
| Experimental Physics 4 (Introduction to Solid State Physics) | 11 |
| Experimental Physics 5 (Physics of Atoms and Molecules) | 12 |
| Nuclear and Elementary Particle Physics | 13 |
| Experimental Physics 7 (Solid State Phenomena [Semiconductor, Superconductivity, Magnetism]) | 14 |
| Theoretical Physics | 15 |
| Theoretical Physics 1 (Theoretical Mechanics) | 16 |
| Theoretical Physics 2 (Theoretical Electrostatics and Elektrodynamics) | 17 |
| Theoretical Physics 3 (Theoretical Quantum Mechanics) | 18 |
| Theoretical Physics 3 FOKUS (Theoretical Quantum Mechanics) | 19 |
| Theoretical Physics 4 (Theoretical Thermodynamics and Statistics) | 20 |
| Lab Course Physics | 21 |
| Basic Practical Course B for Students of Physics (Bachelor of Science and Teaching Degree) | 22 |
| Advanced Undergraduate Laboratory (Atomic Physics, Nuclear Physics, Basic Semiconductor Circuits) | 23 |
| Advanced Practical Course Bachelor | 24 |
| Main Seminar Experimental / Theoretical Physics | 25 |
| Mathematics | 26 |
| Mathematics 3 for students of Physics and Engineering | 27 |
| Mathematics for Physicists 1 | 28 |
| Mathematics for Physicists 2 | 29 |
| Mathematics 4 for Students of Physics and Engineering | 30 |
| Module Comprehensive Tests | 31 |
| Oral Exam Experimental Physics (Physicists) | 32 |
| Oral Exam Theoretical Physics | 33 |
| Compulsory Electives | 34 |
| Chemistry | 35 |
| General Chemistry for Physics and Engineers | 36 |
| Computer Science | 37 |
| Introduction to Computer Science for Students of all Faculties | 38 |
| Numerical Mathematics | 39 |
| Numerical Mathematics 1 | 40 |
| Numerical Mathematics 2 | 41 |
| Programming Course for Mathematics and other students | 42 |
| Computeroriented Mathematics | 43 |
| Thesis | 44 |
| Bachelor Thesis Physics | 45 |
| Subject-specific Key Skills | 46 |
| Measurements and Data Analysis | 47 |
| Computational Physics | 48 |
| Electronics | 49 |
| Laboratory and Measurement Technology | 50 |
| Astrophysics | 51 |

The subject is divided into

| section / sub-section | ECTS credits | starting page |
|-----------------------------|--------------|---------------|
| Compulsory Courses | 140 | 6 |
| Experimental Physics | 46 | 7 |
| Theoretical Physics | 32 | 15 |
| Lab Course Physics | 16 | 21 |
| Mathematics | 34 | 26 |
| Module Comprehensive Tests | 12 | 31 |
| Compulsory Electives | 10 | 34 |
| Chemistry | 10 | 35 |
| Computer Science | 10 | 37 |
| Numerical Mathematics | 10 | 39 |
| Thesis | 10 | 44 |
| Subject-specific Key Skills | 14 | 46 |

Content and Objectives of the Programme

The goal of the studies is it to mediate knowledge on the most important subsections of physics and to make the students familiar with the methods of physical scientific and physical thinking and working. By training of analytic thinking abilities the students acquire the ability to deal later with the various fields of applications and to compile the basic knowledge in particular necessary for a consecutive Bachelor and Master course of studies. Therefore the main emphasis is put on the understanding of the fundamental experimental and theoretical physical terms and laws as well as on basic scientific methods and the development of the typical scientific thinking and working structures. During the Bachelor thesis the student should work on a thematic and temporally limited experimental or theoretical engineering-scientific task in the field of experimental or theoretical physics using well-known procedures and scientific criteria under guidance to a large extent independently.

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:

ASPO2007

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

8-Apr-2008 (2008-6)

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

(140 ECTS credits)

Experimental Physics

(46 ECTS credits)

| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Experimental Physics 1 (Mechanics, Thermodynamics, Waves and Oscillations) | | 11-E1-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Physical laws of mechanics, vibrations and waves, thermodynamics | | |
| Intended learning outcomes | | |
| The students understand the basic contexts and principles of mechanics, vibration, waves and thermodynamics. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| Module title | | Abbreviation |
| Experimental Physics 2 (Electrics and Magnetism) | | 11-E2-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Physical laws of the science of electricity, magnetism, electromagnetic vibrations and waves | | |
| Intended learning outcomes | | |
| The students understand the basic contexts and principles of science of electricity, magnetism, electromagnetic vibrations and waves. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| Module title | | Abbreviation |
| Experimental Physics 3 (Optics, Quantum Phenomena, Introduction Atomic Physics) | | 11-E3-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Physical laws of optics, quantum phenomena, introduction to Atomic Physics. | | |
| Intended learning outcomes | | |
| The students have knowledge of the basic contexts and principles of optics, quantum phenomena and Atomic Physics. | | |
| Courses (type, number of weekly contact hours, language — if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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|---|--------------------------|---|
| Module title | | Abbreviation |
| Experimental Physics 4 (Introduction to Solid State Physics) | | 11-E4-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Physical laws of solids: Bonding and structure, lattice dynamics, thermal properties, principles of electronic properties (free electron gas). | | |
| Intended learning outcomes | | |
| The students have knowledge of the basic contexts and principles of solids: Bonding and structure, lattice dynamics, thermal properties, principles of electronic properties (free electron gas). | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| Module title | | Abbreviation |
| Experimental Physics 5 (Physics of Atoms and Molecules) | | 11-E5-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Physical laws of Atomic and Molecular Physics. | | |
| Intended learning outcomes | | |
| The students have knowledge of the basic contexts and principles of Atomic and Molecular Physics (atoms: Quantum mechanical atom model, one/multi-electron atoms, electronic dipole transitions, atoms in B field as well as molecules: Bonding models and elementary excitations: rotations, vibrations, electronic excitations) | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| Module title | | Abbreviation |
| Nuclear and Elementary Particle Physics | | 11-E6-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 4 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Physical laws of Nuclear and Elementary Particle Physics. | | |
| Intended learning outcomes | | |
| The students have knowledge of the basic contexts and principles of Nuclear and Elementary Particle Physics. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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|--|--------------------------|---|
| Module title | | Abbreviation |
| Experimental Physics 7 (Solid State Phenomena [Semiconductor, Superconductivity, Magnetism]) | | 11-E7-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 4 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Physical laws of solid-state phenomena (semiconductors, superconductivity, magnetism) | | |
| Intended learning outcomes | | |
| The students have knowledge of the basic contexts and principles of electronic transport and electrical properties (semi-conductors: Doping effects, pn transitions, metal-semiconductor interfaces; superconductivity: phenomenological models, BCS model; magnetism: Dia-, para- and ferromagnetism, mean field description of magnetic order) | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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Theoretical Physics

(32 ECTS credits)

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| Module title | | Abbreviation |
| Theoretical Physics 1 (Theoretical Mechanics) | | 11-T1-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Newtonian mechanics, Lagrangian mechanics, Hamiltonian equation of motion, conservation laws. | | |
| Intended learning outcomes | | |
| The students have knowledge of the principles of classical theoretical mechanics and the required calculation methods. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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|--|--------------------------|---|
| Module title | | Abbreviation |
| Theoretical Physics 2 (Theoretical Electrostatics and Elektrodynamics) | | 11-T2-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Electrostatics, magnetostatics, Maxwell equations, covariant formulation, electrodynamics and matter. | | |
| Intended learning outcomes | | |
| The students have knowledge of the principles of classical electrodynamics and the required calculation methods. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| Module title | | Abbreviation |
| Theoretical Physics 3 (Theoretical Quantum Mechanics) | | 11-T3-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Limits of classical physics, Schrödinger equation, mathematical foundations of quantum mechanics, harmonic oscillator, angular momentum and spin, hydrogen atom, many-particle systems. | | |
| Intended learning outcomes | | |
| The students have knowledge of the principles of quantum mechanics and the required calculation methods. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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|--|--------------------------|---|
| Module title | | Abbreviation |
| Theoretical Physics 3 FOKUS (Theoretical Quantum Mechanics) | | 11-T3F-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Limits of classical physics, Schrödinger equation, mathematical foundations of quantum mechanics, harmonic oscillator, angular momentum and spin, hydrogen atom, many-particle systems | | |
| Intended learning outcomes | | |
| The students have knowledge of the principles of quantum mechanics and the required calculation methods | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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|--|--------------------------|---|
| Module title | | Abbreviation |
| Theoretical Physics 4 (Theoretical Thermodynamics and Statistics) | | 11-T4-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Principles of thermodynamics, fundamental theorems, thermodynamic potentials, principles of statistical mechanics. | | |
| Intended learning outcomes | | |
| The students have knowledge of the principles of thermodynamics and statistical mechanics and the required calculation methods. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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Lab Course Physics

(16 ECTS credits)

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|--|------------------------------|---|
| Module title | | Abbreviation |
| Basic Practical Course B for Students of Physics (Bachelor of Science and Teaching Degree) | | 11-PGA-PGR-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | (not) successfully completed | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | Recommended: 11-PFR |
| Contents | | |
| Physical laws of mechanics, thermodynamics, optics, science of electricity, vibrations and waves. | | |
| Intended learning outcomes | | |
| The students have knowledge and skills of physical measuring instruments and experimental techniques. They are able to independently plan and conduct experiments in cooperation with others, and to document the results in a measurement protocol. | | |
| Courses (type, number of weekly contact hours, language — if other than German) | | |
| Beispiele aus Mechanik, Wärmelehre und Elektrik (Examples from Mechanics, Thermodynamics and Electricity, BAM): P (2 weekly contact hours) Klassische Physik (Classical Physics, KLP): P (2 weekly contact hours) Elektrizitätslehre und Schaltungen (Electricity and Circuits, ELS): P (2 weekly contact hours) | | |
| Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus) | | |
| <p>This module has the following assessment components</p> <ol style="list-style-type: none"> 1. Lab course in part 1: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). 2. Lab course in part 2: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). 3. Lab course in part 3: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). <p>Students must register for assessment components 1 through 3 online (registration deadline to be announced). Students will be offered one opportunity to retake element a) and/or element b). To pass an assessment component, they must pass both elements a) and b). To pass this module, students must successfully complete each of the three courses. To pass this module, students must pass each of the assessment components 1 through 3. To pass this module, students must successfully complete two out of the three courses.</p> | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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|--|------------------------------|---|
| Module title | | Abbreviation |
| Advanced Undergraduate Laboratory (Atomic Physics, Nuclear Physics, Basic Semiconductor Circuits) | | 11-PGB-PGN-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 4 | (not) successfully completed | 11-PFR |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | Recommended: 11-PGA-PGR |
| Contents | | |
| Physical laws of Atomic Physics, Nuclear Physics and wave optics. Basic measuring methods using computers and storage oscilloscopes. | | |
| Intended learning outcomes | | |
| The students have knowledge and skills of physical measuring instruments and experimental techniques. They are able to independently plan and conduct experiments in cooperation with others, and to document the results in a measurement protocol. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| Wellenoptik (Physical Optics, WOP): P (2 weekly contact hours) Atom- und Kernphysik (Atomic and Nuclear Physics, AKP): P (2 weekly contact hours) Computer und Messtechnik (Computers and Measurement Technology, CMT): P (2 weekly contact hours) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| <p>This module has the following assessment components</p> <ol style="list-style-type: none"> 1. Lab course in part 1: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). 2. Lab course in part 2: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). <p>Students must register for assessment components 1 and 2 online (registration deadline to be announced). Students will be offered one opportunity to retake element a) and/or element b). To pass an assessment component, they must pass both elements a) and b). To pass this module, students must successfully complete two out of the three courses. To pass this module, students must pass both assessment component 1 and assessment component 2.</p> | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| Module title | | Abbreviation |
| Advanced Practical Course Bachelor | | 11-PFB-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 4 | (not) successfully completed | 11-E1, 11-E2 |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | 11-A3 |
| Contents | | |
| Principles of Nuclear, Atomic and Molecular Physics, experiments on cryogenic temperatures and correlated systems, properties of solids, surfaces and interfaces. | | |
| Intended learning outcomes | | |
| The students have knowledge of conducting an experiment and of analysing and documenting the experimental results. They have basic knowledge of issuing a scientific publication and of using modern evaluation systems. They are able to work on a task based on publications and to acquire practical experimental methods. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| Fortgeschrittenen-Praktikum Bachelor Theorie (Advanced Practical Course Bachelor Theory): S (1 weekly contact hour) Fortgeschrittenen-Praktikum Bachelor Praxis (Advanced Practical Course Bachelor Practice): P (3 weekly contact hours) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| This module has the following assessment components 1. Seminar: talk (with discussion) demonstrating the students' understanding of the physics-related aspects of the experiments to be prepared (approx. 30 minutes) 2. Lab course: Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. Students must prepare an experiment log (8 to 10 pages). Students must register for assessment components 1 and 2 online (details to be announced). To pass this module, students must pass both assessment component 1 and assessment component 2. | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| Module title | | Abbreviation |
| Main Seminar Experimental / Theoretical Physics | | 11-PHS-072-m01 |
| Module coordinator | | Module offered by |
| Managing Directors of the Institute of Applied Physics and the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 2 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Current issues of Theoretical/Experimental Physics. | | |
| Intended learning outcomes | | |
| The students have knowledge of the scientific methods, work and presentation techniques of a current question of Theoretical or Experimental Physics. | | |
| Courses (type, number of weekly contact hours, language — if other than German) | | |
| S (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus) | | |
| talk (approx. 30 to 45 minutes) with discussion | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
| -- | | |

Mathematics

(34 ECTS credits)

| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Mathematics 3 for students of Physics and Engineering | | 11-MPI3-062-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. |
| Contents | | |
| Ordinary and partial differential equations in Physics. | | |
| Intended learning outcomes | | |
| The students have basic mathematical knowledge of dynamic equations and solution methods for common and partial differential equations. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Mathematics for Physicists 1 | | 10-M-PHY1-072-m01 |
| Module coordinator | | Module offered by |
| Dean of Studies Mathematik (Mathematics) | | Institute of Mathematics |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 10 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Basics on numbers and functions, sequences and series, differential and integral calculus in one variable, vector spaces, simple differential equations. | | |
| Intended learning outcomes | | |
| The student gets acquainted with basic concepts of mathematics. He/She learns to apply these methods to simple problems in natural sciences, in particular in physics, and is able to interpret the results. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (90 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Mathematics for Physicists 2 | | 10-M-PHY2-072-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) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Linear maps and systems of linear equations, matrix calculus, eigenvalue theory, differential and integral calculus in several variables, differential equations, Fourier analysis. | | |
| Intended learning outcomes | | |
| The student gets acquainted with fundamental concepts of advanced mathematics. He/She learns to apply these methods to problems in natural sciences, in particular in physics, and is able to interpret the results. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (90 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
| -- | | |

| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Mathematics 4 for Students of Physics and Engineering | | 11-MPI4-062-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Functional analysis and complex analysis. | | |
| Intended learning outcomes | | |
| The students have basic knowledge of mathematics of Hilbert space and the theory of functions of a complex variable as well as the required calculation methods. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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Module Comprehensive Tests

(12 ECTS credits)

| | | |
|---|--------------------------|---|
| Module title | | Abbreviation |
| Oral Exam Experimental Physics (Physicists) | | 11-PREP-072-m01 |
| Module coordinator | | Module offered by |
| chairperson of examination committee | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| The purpose of the examination is to determine whether the candidate understands basic contexts of Experimental and Applied Physics and is able to apply the acquired scientific methods. | | |
| Intended learning outcomes | | |
| The students have gained an overview of the basic contexts of Experimental and Applied Physics and are able to apply the acquired scientific methods. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| A (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| oral examination of one candidate each (approx. 30 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Oral Exam Theoretical Physics | | 11-PRT-072-m01 |
| Module coordinator | | Module offered by |
| chairperson of examination committee | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| The purpose of the examination is to determine whether the candidate understands basic contexts of Theoretical Physics and is able to apply the acquired scientific methods. | | |
| Intended learning outcomes | | |
| The students have gained an overview of the basic contexts of Theoretical Physics and are able to apply the acquired scientific methods. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| A (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| oral examination of one candidate each (approx. 30 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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Compulsory Electives

(10 ECTS credits)

Chemistry

(10 ECTS credits)

| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| General Chemistry for Physics and Engineers | | o8-CP1-072-m01 |
| Module coordinator | | Module offered by |
| lecturer of the course | | Institute of Inorganic Chemistry |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 10 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| This module discusses the fundamental principles of both inorganic and organic chemistry. The lab course gives students the opportunity to learn essential methods and perform simple experiments. | | |
| Intended learning outcomes | | |
| Students are able to explain the principles of the periodic table and to extract information from it. They are able to explain basic models of the structure of matter. They have developed the ability to use the language of chemical formulas to describe chemical reactions and to interpret them by identifying the type of reaction. They are able to identify fundamental problems in chemistry and perform experiments to solve them. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| This module comprises 3 module components. Information on courses will be listed separately for each module component. <ul style="list-style-type: none"> • o8-IOC-1-072: V (no information on SWS (weekly contact hours) and course language available) • o8-CP1-1-072: V (no information on SWS (weekly contact hours) and course language available) • o8-CP1-3-072: P (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments. | | |
| Assessment in module component o8-IOC-1-072: Organic Chemistry for students of medicine, biomedicine, dental medicine, engineering and natural science <ul style="list-style-type: none"> • 3 ECTS, Method of grading: numerical grade • written examination (approx. 60 minutes) | | |
| Assessment in module component o8-CP1-1-072: Basics of General and Inorganic Chemistry <ul style="list-style-type: none"> • 5 ECTS, Method of grading: numerical grade • written examination (60 minutes) | | |
| Assessment in module component o8-CP1-3-072: General and Analytical Chemistry (lab) <ul style="list-style-type: none"> • 2 ECTS, Method of grading: (not) successfully completed • for each experiment: Vortestate (pre-experiment exams, approx. 10 minutes each), assessment of practical performance (log, 2 to 5 pages), Nachtstate (post-experiment exams, approx. 10 minutes each) • Assessment offered: once a year, summer semester • Only after successful completion of module components: Successful completion of module component o8-CP1-1 is a prerequisite for participation in module component o8-CP1-3. | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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Computer Science

(10 ECTS credits)

| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Introduction to Computer Science for Students of all Faculties | | 10-I-EIN-072-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 | Admission prerequisite to assessment: academic requirements to be met in exercises as specified at the beginning of the course. |
| Contents | | |
| Foundations of computer science including representation of information and websites (HTML, XML, EBNF), databases, algorithms and data structures, programming (Java). | | |
| Intended learning outcomes | | |
| The students are familiar with the fundamentals of computer science, e. g. in the areas of representation of information and websites (HTML, XML, EBNF), databases, algorithms and data structures, programming in Java. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| a) written examination (approx. 90 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: 30 minutes, groups of 3: 40 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
| -- | | |

Numerical Mathematics

(10 ECTS credits)

| | | |
|---|--------------------------|---|
| Module title | | Abbreviation |
| Numerical Mathematics 1 | | 10-M-NM1-072-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) |
| 8 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Solution of systems of linear equations and curve fitting problems, nonlinear equations and systems of equations, interpolation with polynomials, splines and trigonometric functions, numerical integration. | | |
| Intended learning outcomes | | |
| The student is acquainted with the fundamental concepts and methods in numerical mathematics, applies them to practical problems and knows about their typical fields of application. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| a) written examination (90 minutes; usually chosen) or b) oral examination of one candidate each (20 minutes) or c) oral examination in groups (groups of 2, 30 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|---|--------------------------|---|
| Module title | | Abbreviation |
| Numerical Mathematics 2 | | 10-M-NM2-072-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) |
| 5 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Solution methods and applications for eigenvalue problems, linear programming, initial value problems for ordinary differential equations, boundary value problems. | | |
| Intended learning outcomes | | |
| The student is able to draw a distinction between the different concepts of numerical mathematics and knows about their advantages and limitations concerning the possibilities of application in different fields of natural and engineering sciences and economics. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| a) written examination (90 minutes) or b) oral examination of one candidate each (20 minutes) or c) oral examination in groups of 2 candidates (30 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|--|------------------------------|---|
| Module title | | Abbreviation |
| Programming Course for Mathematics and other students | | 10-M-PRG-072-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) |
| 3 | (not) successfully completed | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Basics of a modern programming language (e. g. C or Fortran) taking into account the particular needs in mathematics. | | |
| Intended learning outcomes | | |
| The student is able to work independently on small programming exercises and standard programming problems in mathematics. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| P (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| project in the form of programming exercises (expenditure of time as specified at the beginning of the course) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|--|------------------------------|---|
| Module title | | Abbreviation |
| Computeroriented Mathematics | | 10-M-COM-072-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) |
| 3 | (not) successfully completed | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Introduction to modern mathematical software for symobc computation (e. g. Mathematica or Maple) and numerical computation (e. g. Matlab) to supplement the basic modules in analysis and linear algebra (10-M-ANA and 10-M-LNA). Computer-based solution of problems in linear algebra, geometry, analysis, in particular differential and integral calculus; visualisation of functions. | | |
| Intended learning outcomes | | |
| The student learns the use of advanced modern mathematical software packages, and is able to assess their fields of application to solve mathematical problems. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| project in the form of programming exercises (expenditure of time as specified at the beginning of the course) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
| -- | | |

Thesis

(10 ECTS credits)

| | | |
|---|--------------------------|---|
| Module title | | Abbreviation |
| Bachelor Thesis Physics | | 11-BA-P-072-m01 |
| Module coordinator | | Module offered by |
| chairperson of examination committee | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 10 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Mostly independent processing of an experimental or theoretical task of Physics according to known procedures and scientific aspects. | | |
| Intended learning outcomes | | |
| The students are able to independently work on an experimental or theoretical task from Physics, especially according to known methods and scientific aspects and to write the Bachelor's thesis. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| no courses assigned | | |
| 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 thesis (approx. 25 pages) Language of assessment: German or English | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
| -- | | |

Subject-specific Key Skills

(14 ECTS credits)

| | | |
|---|--------------------------|---|
| Module title | | Abbreviation |
| Measurements and Data Analysis | | 11-PFR-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 2 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Types of error, error approximation and propagation, graphs, linear regression, average values and standard deviation, distribution functions, significance tests, writing of lab reports and publications. | | |
| Intended learning outcomes | | |
| In this module, the students acquire subject-specific transferable skills. They have knowledge of practical experimental work, error propagation and the principles of statistics. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|---|--------------------------|---|
| Module title | | Abbreviation |
| Computational Physics | | 11-A1-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Introduction to two of the programming languages relevant for students of Physics and Engineering, solving physical problems with computer programmes. | | |
| Intended learning outcomes | | |
| The students have acquired the following transferable skills: Basic knowledge of two programming languages, skills in working with computers, knowledge of algorithms to solve numeric physical problems. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Electronics | | 11-A2-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | -- |
| Contents | | |
| Principles of passive and active electronic components and their application in analogous and digital circuit technology. | | |
| Intended learning outcomes | | |
| The students have knowledge of the practical setup of electronic circuits from the field of analogous and digital circuit technology. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 90 minutes) | | |
| Allocation of places | | |
| -- | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|--|--------------------------|---|
| Module title | | Abbreviation |
| Laboratory and Measurement Technology | | 11-A3-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Applied Physics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. |
| Contents | | |
| Introduction to electronic and optical measuring methods of physical metrology, vacuum technology and cryogenics, cryogenics, light sources, spectroscopic methods and measured value acquisition. | | |
| Intended learning outcomes | | |
| The students have acquired the following transferable skills: Electronic and optical measuring methods in physical metrology, cryogenics and vacuum technology, cryogenics, light sources, spectroscopic methods and measured value acquisition. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + Ü (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
| Only as part of pool of general key skills (ASQ): 15 places. Places will be allocated by lot. | | |
| Additional information | | |
| -- | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| | | |
|---|--------------------------|---|
| Module title | | Abbreviation |
| Astrophysics | | 11-A4-072-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | undergraduate | Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. |
| Contents | | |
| History of astronomy, coordinates and time measurement, the solar system, size scales in outer space, telescopes and detectors, stellar structure, stellar atmospheres, stellar evolution, final stages of stellar evolution, interstellar medium, structure of the Milky Way, local universe, expanding space-time, galaxies, active galactic nuclei, large-scale structure of the universe, Friedmann World Models, thermodynamics of the early universe, primordial nucleosynthesis, cosmic microwave background radiation, structure formation, inflation | | |
| Intended learning outcomes | | |
| The students are familiar with the modern world view of Astrophysics. They know methods and tools for astrophysical observations and evaluations. They are able to use these methods to plan and analyse own observations. They know the structure of the universe, e.g. of stars and galaxies and understand the process of their development. | | |
| Courses (type, number of weekly contact hours, language – if other than German) | | |
| V + S (no information on SWS (weekly contact hours) and course language available) | | |
| Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) | | |
| written examination (approx. 120 minutes) | | |
| Allocation of places | | |
| Only as part of pool of general key skills (ASQ): 15 places. Places will be allocated by lot. | | |
| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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