Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Subdivided Module Catalogue

for the Subject

FOKUS Physics - Nanostructuring Technology

as a Master's with 1 major

with the degree "Master of Science"

(120 ECTS credits)

Examination regulations version: 2010
Responsible: Faculty of Physics and Astronomy

Course of Studies - Contents and Objectives

The FOKUS master study program is a special course, which provides on the one hand short time study (only 8 semesters in a consecutive Bachelor and Master program) and on the other hand puts significant emphasis on early integration of research activities. This Master study program is embedded an financed through the »Elitenetzwerk Bayern« (ENB). The master course is especially preparing the students for their later scientific work in the field of Nanostructuring Technology. Qualified graduates may pursue doctoral work (degree Dr. rer. nat. or Dr.-Engineer) at doctorate-granting institutions. The goal of the studies is it to mediate special knowledge on the most important subsections of the Nanostructuring technology and to make the students familiar with the methods of engineering 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 special knowledge obtained within the Bachelor programme. During the Master thesis the student should independently work on a new thematic and temporally limited experimental or theoretical engineering-scientific task in the field of nanostructuring technology using well-known procedures and scientific criteria.

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)):

21-Sep-2010 (2010-62)

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

The subject is divided into

Abbreviation	Module title	ECTS credits	Method of grading	page
Compulsory Courses (46 ECTS credits)				
11-PFM-072-m01	Advanced Practical Course Master	6	B/NB	136
11-FPN-072-m01	FOKUS Project Practical Course Nanostructuring Technology	10	NUM	97
11-FS-NF-072-m01	Professional Specialization FOKUS Nanostructuring Technology 1	15	NUM	98
11-MP-NF-072-m01	Scientific Methods and Project Management FOKUS Nanostructuring Technology 1	15	NUM	118
Compulsory Electives (44 ECTS credits)				
Compulsory Electives Nanomatrix (12 ECTS credits)				
08-NM-AW-MA-072-m01	Nanomatrix Inorganic Materials Chemistry (Master)	6	NUM	10
08-NM-NS-MA-072-m01	Nanoparticle Synthesis and Structuring Technologies (Master)	6	NUM	11
11-NM-WP-MA-072-m01	Nanomatrix Heat Insulating Systems and Photovoltaics	6	NUM	131
11-NM-HM-MA-072-m01	Nanomatrix Semiconductor Materials (Master)	6	NUM	128
11-NM-HP-MA-072-m01	Nanomatrix Semiconductor Processing (Master)	6	NUM	129
11-NM-MB-MA-072-m01	Nanomatrix Micro/Nano- and Optoelectronic Devices (Master)	6	NUM	130
03-NM-BW-MA-072-m01	Nanomatrix Biomedical Materials (Master)	6	NUM	8
07-NM-BS-MA-072-m01	Nanomatrix Biocompatible Structuring Technologies (Master)	6	NUM	9
11-NM-BV-MA-072-m01	Nanomatrix Biophysical Analyzing Systems and Processes (Master)	6	NUM	127
Compulsory Electives Specialisation Nanostructure Technology (10 ECTS credits)				
Applied Physics and Metrology (10 ECTS credits)				
11-MOE-092-m01	Opto-electronic Material Properties	5	NUM	116
11-OHL-092-m01	Organic Semiconductor	5	NUM	134
11-A2-081-m01	Electronics	6	NUM	12
11-ASI-092-m01	Reproducing Sensors in Infrared	3	NUM	15
11-ASL-092-m01	Applied Superconduction	6	NUM	17
11-EBV-092-m01	Principles of Image Processing	3	NUM	21
11-ENT-092-m01	Principles of Energy Technologies	6	NUM	23
11-EPP-092-m01	Introduction to Plasmaphysics	6	NUM	25
11-HLF-092-m01	Semiconductor Lasers - Principles and Current Research	6	NUM	99
11-KVM-092-m01	Principles of Classification of Patterns	3	NUM	105
11-LVW-092-m01	Introduction to LabVIEW	6	NUM	111
11-TDO-092-m01	Thermodynamics and Economics	6	NUM	168
Solid State Physics and Nanostructures (10 ECTS credits)				
11-MOE-092-m01	Opto-electronic Material Properties	5	NUM	116
11-ASL-092-m01	Applied Superconduction	6	NUM	17
11-HLF-092-m01	Semiconductor Lasers - Principles and Current Research	6	NUM	99
11-AHL-092-m01	Applied Semiconductor Physics	6	NUM	13
11-FK2-092-m01	Solid State Physics 2	8	NUM	27
11-FKS-092-m01	Solid State Spectroscopy	6	NUM	29
11-FKT-092-m01	Transport Phenomena in Solids	6	NUM	31
11-HLP-092-m01	Semiconductor Physics	6	NUM	101

11-HNS-092-m01	Semiconductor Nanostructures	6	NUM	103
11-LHQ-092-m01	Lithography in Semiconductor Technology and Theory of Quantum Transport	6	NUM	107
11-MAG-092-m01	Magnetism	6	NUM	113
11-MST-092-m01	Magnetism and Spin Transport	6	NUM	119
11-NAN-092-m01	Nanoanalytics	6	NUM	121
11-NDS-092-m01	Low-Dimensional Structures	4	NUM	123
11-NEL-092-m01	Nanoelectronics	6	NUM	125
11-NOP-092-m01	Nano-Optics	4	NUM	132
11-QM2-092-m01	Quantum Mechanics II	8	NUM	142
11-QPM-092-m01	Quantum Phenomena in electronic correlated Materials	6	NUM	144
11-QVTP-092-m01	Many Body Quantum Theory	8	NUM	146
11-RMS-092-m01	Relativistic Effects in Mesoscopic Systems	5	NUM	148
11-TFK-092-m01	Theoretical Solid State Physics	8	NUM	170
11-TSL-092-m01	Theory of Superconduction	5	NUM	172
Complex Systems, Quantum Control and Biophysics (10 ECTS credits)				
11-NOP-092-m01	Nano-Optics	4	NUM	132
11-BMT-092-m01	Biophysical Measurement Technology in Medical Science	6	NUM	19
11-LMB-092-m01	Laboratory and Measurement Technology in Biophysics	6	NUM	109
11-PKS-092-m01	Physics of Complex Systems	6	NUM	138
11-QIC-092-m01	Quantum Information and Quantum Computing	5	NUM	140
11-SDC-092-m01	Statistics, Data Analysis and Computer Physics	4	NUM	150
Other Modules Specialisation (10 ECTS credits)				
11-SF-4E-072-m01	Module Type 4E Special Training Experimental Physics	4	NUM	152
11-SF-4I-072-m01	Module Type 4I Special Training Interdisciplinary Research Fields	4	NUM	153
11-SF-4T-072-m01	Module Type 4T Special Training Theoretical Physics	4	NUM	155
11-SF-5E-072-m01	Module Type 5E Special Training Experimental Physics	5	NUM	156
11-SF-5I-072-m01	Module Type 5I Special Training Interdisciplinary Research Fields	5	NUM	157
11-SF-5T-072-m01	Module Type 5T Special Training Theoretical Physics	5	NUM	159
11-SF-6E-072-m01	Module Type 6E Special Training Experimental Physics	6	NUM	160
11-SF-6I-072-m01	Module Type 6I Special Training Interdisciplinary Research Fields	6	NUM	161
11-SF-6T-072-m01	Module Type 6T Special Training Theoretical Physics	6	NUM	163
11-SF-8E-072-m01	Module Type 8E Special Training Experimental Physics	8	NUM	164
11-SF-8I-072-m01	Module Type 8I Special Training Interdisciplinary Research Fields	8	NUM	165
11-SF-8T-072-m01	Module Type 8T Special Training Theoretical Physics	8	NUM	167
11-SF-4N-072-m01	Module Type 4N Special Training Nanostructure Technology	4	NUM	154
11-SF-5N-072-m01	Module Type 5N Special Training Nanostructure Technology	5	NUM	158
11-SF-6N-072-m01	Module Type 6N Special Training Nanostructure Technology	6	NUM	162
11-SF-8N-072-m01	Module Type 8N Special Training Nanostructure Technology	8	NUM	166
Research Modules Nanostructure Technology (16 ECTS credits)				
11-FM-VK8E-072-m01	FOKUS Research Module Type VK8E Experimental Physics	8	NUM	49

11-FM-VK8I-072-m01	FOKUS Research Module Type VK8I Interdisciplinary Research Fields	8	NUM	51
11-FM-VK8T-072-m01	FOKUS Research Module Type VK8T Theoretical Physics	8	NUM	55
11-FM-VK9E-072-m01	FOKUS Research Module Type VK9E Experimental Physics	9	NUM	57
11-FM-VK9I-072-m01	FOKUS Research Module Type VK9I Interdisciplinary Research Fields	9	NUM	59
11-FM-VK9T-072-m01	FOKUS Research Module Type VK9T Theoretical Physics	9	NUM	63
11-FM-VK10E-072-m01	FOKUS Research Module Type VK10E Experimental Physics	10	NUM	33
11-FM-VK10I-072-m01	FOKUS Research Module Type VK10I Interdisciplinary Research Fields	10	NUM	35
11-FM-VK10T-072-m01	FOKUS Research Module Type VK10T Theoretical Physics	10	NUM	39
11-FM-VK12E-072-m01	FOKUS Research Module Type VK12E Experimental Physics	12	NUM	41
11-FM-VK12I-072-m01	FOKUS Research Module Type VK12I Interdisciplinary Research Fields	12	NUM	43
11-FM-VK12T-072-m01	FOKUS Research Module Type VK12T Theoretical Physics	12	NUM	47
11-FM-VMK12E-072-m01	FOKUS Research Module Type VMK12E Experimental Physics	12	NUM	65
11-FM-VMK12I-072-m01	FOKUS Research Module Type VMK12I Interdisciplinary Research Fields	12	NUM	67
11-FM-VMK12T-072-m01	FOKUS Research Module Type VKM12T Theoretical Physics	12	NUM	71
11-FM-VMK13E-072-m01	FOKUS Research Module Type VMK13E Experimental Physics	13	NUM	73
11-FM-VMK13I-072-m01	FOKUS Research Module Type VMK13I Interdisciplinary Research Fields	13	NUM	75
11-FM-VMK13T-072-m01	FOKUS Research Module Type VKM13T Theoretical Physics	13	NUM	79
11-FM-VMK14E-072-m01	FOKUS Research Module Type VMK14E Experimental Physics	14	NUM	81
11-FM-VMK14I-072-m01	FOKUS Research Module Type VMK14I Interdisciplinary Research Fields	14	NUM	83
11-FM-VMK14T-072-m01	FOKUS Research Module Type VKM14T Theoretical Physics	14	NUM	87
11-FM-VMK16E-072-m01	FOKUS Research Module Type VMK16E Experimental Physics	16	NUM	89
11-FM-VMK16I-072-m01	FOKUS Research Module Type VMK16I Interdisciplinary Research Fields	16	NUM	91
11-FM-VMK16T-072-m01	FOKUS Research Module Type VKM16T Theoretical Physics	16	NUM	95
11-FM-VK8N-072-m01	FOKUS Research Module Type VK8N	8	NUM	53
11-FM-VK9N-072-m01	FOKUS Research Module Type VK9N	9	NUM	61
11-FM-VK10N-072-m01	FOKUS Research Module Type VK10N Nanostructure Technology	10	NUM	37
11-FM-VK12N-072-m01	FOKUS Research Module Type VK12N Nanostructure Technology	12	NUM	45
11-FM-VMK12N-072-m01	FOKUS Research Module Type VMK12N Nanostructure Technology	12	NUM	69
11-FM-VMK13N-072-m01	FOKUS Research Module Type VMK13N Nanostructure Technology	13	NUM	77
11-FM-VMK14N-072-m01	FOKUS Research Module Type VMK14N Nanostructure Technology	14	NUM	85
11-FM-VMK16N-072-m01	FOKUS Research Module Type VMK16N Nanostructure Technology	16	NUM	93
Compulsory Electives Non-technical (6 ECTS credits)				

41-IK-NW1-072-m01	Basic module: Competence for Acquiring Information - for students of natural sciences	1	B/NB	174
41-IK-NW2-072-m01	Second module: Competence for Acquiring Information - for students of natural sciences	2	NUM	177
42-ENO-IK-072-m01	Intercultural Competence (English, Advanced Level)	3	NUM	180
42-ENO-LK-072-m01	Cultural Studies (English, Advanced Level)	3	NUM	182
42-ENO-PR-072-m01	Advanced English Final Exam	2	NUM	188
42-ENO-NW1-072-m01	English for the Natural Sciences 1 (Advanced Level)	4	NUM	184
42-ENO-NW2-072-m01	English for the Natural Sciences 2 (Advanced Level)	4	NUM	186
42-FRO-GW1-072-m01	French for the Humanities 1 (Advanced Level)	4	NUM	189
42-FRO-GW2-072-m01	French for the Humanities 2 (Advanced Level)	4	NUM	191
42-FRO-IK-072-m01	Intercultural Competence (French, Advanced Level)	3	NUM	193
42-FRO-LK-072-m01	Intercultural Competence (French, Advanced Level)	3	NUM	195
42-FRO-PR-072-m01	Advanced French Final Exam	2	NUM	197
42-FRO-W1-072-m01	French for Business 1 (Advanced Level)	4	NUM	198
42-FRO-W2-072-m01	French for Business 2 (Advanced Level)	4	NUM	200
42-SPO-GW1-072-m01	Spanish for the Humanities 1 (Advanced Level)	4	NUM	202
42-SPO-GW2-072-m01	Spanish for the Humanities 2 (Advanced Level)	4	NUM	204
42-SPO-IK-072-m01	Intercultural Competence (Spanish, Advanced Level)	3	NUM	206
42-SPO-LK-072-m01	Cultural Studies (Spanish, Advanced Level)	3	NUM	208
42-SPO-PR-072-m01	Advanced Spanish Final Exam	2	NUM	210
42-SPO-W1-072-m01	Spanish for Business 1 (Advanced Level)	4	NUM	211
42-SPO-W2-072-m01	Spanish for Business 2 (Advanced Level)	4	NUM	213
41-IK-NW1-101-m01	Information Literacy for Students of the Natural Sciences (Basic Level)	2	B/NB	175
41-IK-NW2-101-m01	Information Literacy for Students of the Natural Sciences (Advanced Level)	2	B/NB	178
Thesis (30 ECTS credits)				
11-MA-NF-072-m01	Master Thesis FOKUS Nanostructuring Technology	30	NUM	115

Module title			Abbreviation
Nanomatrix Biomedical Materials (Master)			03-NM-BW-MA-072-m01
Module coordinator		**Module offered by**	
chairperson of examination committee of the Master's degree programme Human-Computer Interaction		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Fundamentals and specific knowledge for engineering work in the application areas power engineering, electronics and photonics and biophysical applications as well as the technology focuses materials science, nanostructuring technologies and components and system development, especially in the area of biomedical materials.

Intended learning outcomes

Students have developed an advanced knowledge in at least one application area or technology focus of engineering work, with a particular focus on biomedical materials.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Nanomatrix Biocompatible Structuring Technologies (Master)			07-NM-BS-MA-072-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Fundamentals as well as specific knowledge and skills for engineering work in the application directions power engineering, electronics and photonics, and biophysical applications and the technology fields of materials science, nano-structuring technologies and components and system development, in particular in the area of biocompatible structuring technologies.

Intended learning outcomes

Students have acquired advanced knowledge and skills in one or more application directions or technology fields of engineering work, in particular in the area of biocompatible structuring technologies.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Nanomatrix Inorganic Materials Chemistry (Master)			08-NM-AW-MA-072-m01
Module coordinator			**Module offered by**
Dean of Studies Chemie and Pharmazie (Chemistry and Pharmacy)			Chair of Chemical Technology of Material Synthesis
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Fundamentals as well as specific knowledge and skills for engineering work in the application directions power engineering, electronics and photonics and biophysical applications and the technology fields of materials science, nano-structuring technologies and components and system development, in particular in the area of inorganic materials chemistry.

Intended learning outcomes

Students have developed advanced knowledge and skills in one or more application directions or technology fields of engineering work, in particular in the area of inorganic materials chemistry.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Nanoparticle Synthesis and Structuring Technologies (Master)			08-NM-NS-MA-072-m01
Module coordinator			**Module offered by**
Dean of Studies Chemie and Pharmazie (Chemistry and Pharmacy)			Chair of Chemical Technology of Material Synthesis
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Fundamentals as well as specific knowledge and skills for engineering work in the application directions power engineering, electronics and photonics and biophysical applications and the technology fields of materials science, nano-structuring technologies and components and system development, in particular in the area of nanoparticle synthesis and structuring technologies.

Intended learning outcomes

Students have developed advanced knowledge and skills in one or more application directions or technology fields of engineering work, in particular in the area of nanoparticle synthesis and structuring technologies.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Electronics			11-A2-081-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 can be chosen to earn a bonus)

written examination (approx. 90 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2009)
Bachelor' degree (1 major) Physics (2008)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)
No final examination Special study offering (2010)

Module title			Abbreviation
Applied Semiconductor Physics			11-AHL-092-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	graduate	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

The lecture discusses the principles of Semiconductor Physics and provides an exemplary overview of the main components of electronics, optoelectronics and photonics.

Intended learning outcomes

The students know the characteristics of semiconductors, they have gained an overview of the electronic and phonon band structures of important semiconductors and the resulting electronic, optical and thermal properties. They know the principles of charge transport as well as the Poisson, Boltzmann and continuity equation for the solution of questions. They have gained insights into the methods of semiconductor production and are familiar with the theories of planar technology and recent developments in this field, they have a basic understanding of component production. They understand the structure and way of functioning of the main components of electronics (diode, transistor, field-effect transistor, thyristor, diac, triac), of microwave applications (tunnel, Impatt, Baritt or Gunn diode) and of optoelectronics (photo diode, solar cell, light-emitting diode, semiconductor injection laser), they know the realisation possibilities of low-dimensional charge carrier systems on the basis of semiconductors and their technological relevance, they are familiar with current developments in the field of components.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Reproducing Sensors in Infrared			11-ASI-092-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	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

Infrared cameras are important experimental and technical tools, e.g. for measuring temperatures. The spectral range of infrared ranges from the visible spectrum, where the Sun is dominating as the natural source of light, up to microwaves and radiowaves with artificial emitters. There is distinct and sometimes dominating emission from bodies with ambient temperature in the infrared spectrum. The lecture provides an introduction to the physical optics of this spectral range and discusses: Peculiarities of infrared cameras and thermal images, different types of sensors (bolometer, quantum well, superlattice) as well as the evaluation of such sensors on the basis of neurophysiological aspects.

Intended learning outcomes

The students have specific and advanced knowledge in the field of infrared spectral imaging. They know various technologies and detector structures as well as their application areas.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Applied Superconduction			11-ASL-092-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	graduate	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

Physical principles of superconductivity. Application in energy engineering. Instrumental developments. Methods of materials sciences for the calculation of temperature profiles in superconductors.

Intended learning outcomes

The students have a basic understanding of superconductivity as a macroscopic quantum phenomenon. They are able to evaluate the contributions of materials sciences to the development of superconductivity. They are able to discuss questions on superconductivity in a scientific manner and to critically question developments of energy technology. Furthermore, they can deal with practical mathematical questions.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: once a year, winter semester
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Biophysical Measurement Technology in Medical Science			11-BMT-092-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	graduate	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

The lecture covers the physical principles of imaging techniques and their application in Biomedicine. The main topics are conventional X-ray technique, computer tomography, imaging techniques of nuclear medicine, ultrasound and MR-tomography. The lecture additionally addresses systems theory of imaging systems and digital image processing.

Intended learning outcomes

The students know the physical principles of imaging techniques and their application in Biomedicine. They understand the principles of image generation and are able to explain different techniques and interpret simple images.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Principles of Image Processing			11-EBV-092-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	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 image processing. Pictures as two-dimensional signals; digitalisation. Two-dimensional Fourier transform. Histogram equalisation (e.g. image brightening) and pixel connectivity (e.g. noise reduction). Automatic image recognition: Segmentation, classification. Technological image generation. Applications (e.g. motion tracking). Three-dimensional images.

Intended learning outcomes

The students have specific and advanced knowledge in the field of image processing. They know the principles and theory of signal processing for images and have corresponding knowledge of image generation. They are able to independently work with literature, they understand the characteristics of image processing with commercial software and are able to process images for the analysis of experiments with imaging measuring methods.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Principles of Energy Technologies			11-ENT-092-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	graduate	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

Physical principles of energy conservation and energy conversion, energy transport and energy storage as well as renewable resources of energy. We also discuss aspects of optimising materials (e.g. nanostructured insulating materials, selective layers, highly activated carbons). The course is especially suitable for teaching degree students. Energy conservation via thermal insulation. Thermodynamic energy efficiency. Fossil fired energy converters. Nuclear power plants. Hydroelectricity. Wind turbines. Photovoltaics. Solar thermal: Heat. Solar thermal: Electricity. Biomass. Geothermal energy. Energy storage. Energy transport

Intended learning outcomes

The students know the principles of different methods of energy technology, especially energy conversion, transport and storage. They understand the structures of corresponding installations and are able to compare them.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Introduction to Plasmaphysics			11-EPP-092-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	graduate	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

Plasma Astrophysics: Dynamics of charged particles in electric and magnetic fields, Magnetohydrodynamics, Transport equations for energetic particles, Properties of magnetic turbulence, Propagation of solar particles within the solar wind, Particle acceleration via shock waves and via interaction with plasma turbulence, Particle acceleration and transport in galaxies and other astrophysical objects, Cosmic radiation.

Intended learning outcomes

The students know the principles of Plasma Physics, especially the description of transport phenomena in plasma. They are able to solve basic problems of Plasma Physics and to apply this knowledge to Astrophysics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module title			Abbreviation
Solid State Physics 2			11-FK2-092-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	graduate	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

Advanced Solid-State Physics. Electrons in periodic potential - the band structure. Dynamics in the semi-classical model. Dielectric properties and ferroelectrics. Semiconductors. Magnetism. Superconductivity. Coupled excitations and optical properties [optional]

Intended learning outcomes

The students have specific and advanced knowledge in the field of Solid-State Physics. They are theoretically able to specialise in a sub-discipline of Solid-State Physics.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module title			Abbreviation
Solid State Spectroscopy			11-FKS-092-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	graduate	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

Single- and many-particle picture of electrons in solids. Light-matter interaction. Optical spectroscopy. Electron spectroscopy. X-ray spectroscopies.

Intended learning outcomes

The students have specific and advanced knowledge in the field of solid-state spectroscopy. They know different types of spectroscopy and their fields of application. They understand the theoretical principles and the current developments in research.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module title			Abbreviation
Transport Phenomena in Solids			11-FKT-092-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	graduate	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

Transport phenomena in solids.

Intended learning outcomes

The students have specific and advanced knowledge in the field of transport phenomena in solids.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)

Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
FOKUS Research Module Type VK10E Experimental Physics			11-FM-VK10E-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	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Experimental Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Experimental Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Experimentelle Physik (FOKUS Introductory Module Experimental Physics): V (3 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Experimentelle Physik (FOKUS Block Taught Seminar Experimental Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK10I Interdisciplinary Research Fields			11-FM-VK10I-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	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in an interdisciplinary subject, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in an interdisciplinary specialist field, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Interdisziplinäre Fachgebiete (FOKUS Introductory Module Interdisciplinary Research Fields): V (3 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Interdisziplinäre Fachgebiete (FOKUS Block Taught Seminar Interdisciplinary Research Fields): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK10N Nanostructure Technology			11-FM-VK10N-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	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Nanostrukturtechnik (FOKUS Introductory Module Nanostructure Technology): V (3 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Nanostrukturtechnik (FOKUS Block Taught Seminar Nanostructure Technology): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
FOKUS Research Module Type VK10T Theoretical Physics			11-FM-VK10T-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	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Theoretical Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Theoretical Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Theoretische Physik (FOKUS Introductory Module Theoretical Physics): V (3 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Theoretische Physik (FOKUS Block Taught Seminar Theoretical Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK12E Experimental Physics			11-FM-VK12E-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)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Experimental Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Experimental Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Experimentelle Physik (FOKUS Introductory Module Experimental Physics): V (4 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Experimentelle Physik (FOKUS Block Taught Seminar Experimental Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK12I Interdisciplinary Research Fields			11-FM-VK12I-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)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in an interdisciplinary subject, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in an interdisciplinary specialist field, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Interdisziplinäre Fachgebiete (FOKUS Introductory Module Interdisciplinary Research Fields): V (4 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Interdisziplinäre Fachgebiete (FOKUS Block Taught Seminar Interdisciplinary Research Fields): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK12N Nanostructure Technology			11-FM-VK12N-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)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Nanostrukturtechnik (FOKUS Introductory Module Nanostructure Technology): V (4 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Nanostrukturtechnik (FOKUS Block Taught Seminar Nanostructure Technology): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
FOKUS Research Module Type VK12T Theoretical Physics			11-FM-VK12T-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)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Theoretical Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Theoretical Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Theoretische Physik (FOKUS Introductory Module Theoretical Physics): V (4 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Theoretische Physik (FOKUS Block Taught Seminar Theoretical Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK8E Experimental Physics			11-FM-VK8E-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)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Experimental Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Experimental Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Experimentelle Physik (FOKUS Introductory Module Experimental Physics): V (2 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Experimentelle Physik (FOKUS Block Taught Seminar Experimental Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK8I Interdisciplinary Research Fields			11-FM-VK8I-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)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in an interdisciplinary subject, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in an interdisciplinary specialist field, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Interdisziplinäre Fachgebiete (FOKUS Introductory Module Interdisciplinary Research Fields): V (2 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Interdisziplinäre Fachgebiete (FOKUS Block Taught Seminar Interdisciplinary Research Fields): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK8N			11-FM-VK8N-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)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Nanostrukturtechnik (FOKUS Introductory Module Nanostructure Technology): V (2 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Nanostrukturtechnik (FOKUS Block Taught Seminar Nanostructure Technology): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
FOKUS Research Module Type VK8T Theoretical Physics			11-FM-VK8T-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)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Theoretical Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Theoretical Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Theoretische Physik (FOKUS Introductory Module Theoretical Physics): V (2 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Theoretische Physik (FOKUS Block Taught Seminar Theoretical Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK9E Experimental Physics			11-FM-VK9E-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)**	
9	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Experimental Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Experimental Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Experimentelle Physik (FOKUS Introductory Module Experimental Physics): V (3 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Experimentelle Physik (FOKUS Block Taught Seminar Experimental Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK9I Interdisciplinary Research Fields			11-FM-VK9I-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)**	
9	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in an interdisciplinary subject, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in an interdisciplinary specialist field, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Interdisziplinäre Fachgebiete (FOKUS Introductory Module Interdisciplinary Research Fields): V (3 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Interdisziplinäre Fachgebiete (FOKUS Block Taught Seminar Interdisciplinary Research Fields): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VK9N			11-FM-VK9N-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)**	
9	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Nanostrukturtechnik (FOKUS Introductory Module Nanostructure Technology): V (3 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Nanostrukturtechnik (FOKUS Block Taught Seminar Nanostructure Technology): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
FOKUS Research Module Type VK9T Theoretical Physics			11-FM-VK9T-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)**	
9	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Theoretical Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Theoretical Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Theoretische Physik (FOKUS Introductory Module Theoretical Physics): V (3 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Theoretische Physik (FOKUS Block Taught Seminar Theoretical Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)

Assessment components 1 and 2 will be offered in German or English.
Students must register for assessment components 1 and 2 online (details to be announced).
Details on when assessment components 1 and 2 will be offered 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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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK12E Experimental Physics			11-FM-VMK12E-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)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Experimental Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Experimental Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Experimentelle Physik (FOKUS Introductory Module Experimental Physics): V (2 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Experimentelle Physik (FOKUS Block Taught Seminar Experimental Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Experimentelle Physik (FOKUS Mini Research Project Experimental Physics): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK12I Interdisciplinary Research Fields			11-FM-VMK12I-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)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in interdisciplinary subjects, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in interdisciplinary specialist fields, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Interdisziplinäre Fachgebiete (FOKUS Introductory Module Interdisciplinary Research Fields): V (2 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Interdisziplinäre Fachgebiete (FOKUS Block Taught Seminar Interdisciplinary Research Fields): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Interdisziplinäre Fachgebiete (FOKUS Mini Research Project Interdisciplinary Research Fields): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK12N Nanostructure Technology			11-FM-VMK12N-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)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Nanostrukturtechnik (FOKUS Introductory Module Nanostructure Technology): V (2 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Nanostrukturtechnik (FOKUS Block Taught Seminar Nanostructure Technology): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Nanostrukturtechnik (FOKUS Mini Research Project Nanostructure Technology): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
FOKUS Research Module Type VKM12T Theoretical Physics			11-FM-VMK12T-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)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Theoretical Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Theoretical Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Theoretische Physik (FOKUS Introductory Module Theoretical Physics): V (2 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Theoretische Physik (FOKUS Block Taught Seminar Theoretical Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Theoretische Physik (FOKUS Mini Research Project Theoretical Physics): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK13E Experimental Physics			11-FM-VMK13E-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)**	
13	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Experimental Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Experimental Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Experimentelle Physik (FOKUS Introductory Module Experimental Physics): V (3 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Experimentelle Physik (FOKUS Block Taught Seminar Experimental Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Experimentelle Physik (FOKUS Mini Research Project Experimental Physics): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK13I Interdisciplinary Research Fields			11-FM-VMK13I-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)**	
13	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in interdisciplinary subjects, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in interdisciplinary specialist fields, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Interdisziplinäre Fachgebiete (FOKUS Introductory Module Interdisciplinary Research Fields): V (3 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Interdisziplinäre Fachgebiete (FOKUS Block Taught Seminar Interdisciplinary Research Fields): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Interdisziplinäre Fachgebiete (FOKUS Mini Research Project Interdisciplinary Research Fields): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK13N Nanostructure Technology			11-FM-VMK13N-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)**	
13	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Nanostrukturtechnik (FOKUS Introductory Module Nanostructure Technology): V (3 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Nanostrukturtechnik (FOKUS Block Taught Seminar Nanostructure Technology): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Nanostrukturtechnik (FOKUS Mini Research Project Nanostructure Technology): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
FOKUS Research Module Type VKM13T Theoretical Physics			11-FM-VMK13T-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)**	
13	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Theoretical Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Theoretical Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Theoretische Physik (FOKUS Introductory Module Theoretical Physics): V (3 weekly contact hours) + Ü/P (1 weekly contact hour), details on availability to be announced
FOKUS Kompaktseminar Theoretische Physik (FOKUS Block Taught Seminar Theoretical Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Theoretische Physik (FOKUS Mini Research Project Theoretical Physics): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK14E Experimental Physics			11-FM-VMK14E-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)**	
14	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Experimental Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Experimental Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Experimentelle Physik (FOKUS Introductory Module Experimental Physics): V (3 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Experimentelle Physik (FOKUS Block Taught Seminar Experimental Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Experimentelle Physik (FOKUS Mini Research Project Experimental Physics): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK14I Interdisciplinary Research Fields			11-FM-VMK14I-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)**	
14	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in interdisciplinary subjects, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in interdisciplinary specialist fields, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Interdisziplinäre Fachgebiete (FOKUS Introductory Module Interdisciplinary Research Fields): V (3 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Interdisziplinäre Fachgebiete (FOKUS Block Taught Seminar Interdisciplinary Research Fields): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Interdisziplinäre Fachgebiete (FOKUS Mini Research Project Interdisciplinary Research Fields): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK14N Nanostructure Technology			11-FM-VMK14N-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)**	
14	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Nanostrukturtechnik (FOKUS Introductory Module Nanostructure Technology): V (3 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Nanostrukturtechnik (FOKUS Block Taught Seminar Nanostructure Technology): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Nanostrukturtechnik (FOKUS Mini Research Project Nanostructure Technology): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
FOKUS Research Module Type VKM14T Theoretical Physics			11-FM-VMK14T-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)**	
14	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Theoretical Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Theoretical Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Theoretische Physik (FOKUS Introductory Module Theoretical Physics): V (3 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Theoretische Physik (FOKUS Block Taught Seminar Theoretical Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Theoretische Physik (FOKUS Mini Research Project Theoretical Physics): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK16E Experimental Physics			11-FM-VMK16E-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)**	
16	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Experimental Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Experimental Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Experimentelle Physik (FOKUS Introductory Module Experimental Physics): V (4 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Experimentelle Physik (FOKUS Block Taught Seminar Experimental Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Experimentelle Physik (FOKUS Mini Research Project Experimental Physics): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK16I Interdisciplinary Research Fields			11-FM-VMK16I-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)**	
16	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in interdisciplinary subjects, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in interdisciplinary specialist fields, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Interdisziplinäre Fachgebiete (FOKUS Introductory Module Interdisciplinary Research Fields): V (4 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Interdisziplinäre Fachgebiete (FOKUS Block Taught Seminar Interdisciplinary Research Fields): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Interdisziplinäre Fachgebiete (FOKUS Mini Research Project Interdisciplinary Research Fields): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Research Module Type VMK16N Nanostructure Technology			11-FM-VMK16N-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)**	
16	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the field of nanostructure technology, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Nanostrukturtechnik (FOKUS Introductory Module Nanostructure Technology): V (4 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Nanostrukturtechnik (FOKUS Block Taught Seminar Nanostructure Technology): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Nanostrukturtechnik (FOKUS Mini Research Project Nanostructure Technology): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
FOKUS Research Module Type VKM16T Theoretical Physics			11-FM-VMK16T-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)**	
16	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific and advanced knowledge of independent scientific work in a current research area, especially in the discipline of Theoretical Physics, reproduction of knowledge, acquisition of social and methodological competencies. Application of the acquired professional knowledge and methods to new scientific questions in a mini research project (e.g. experiments, case studies etc.).

Intended learning outcomes

The students have special and advanced knowledge of independent scientific work in a current research area, especially in the specialist field of Theoretical Physics, and are able to reproduce the acquired knowledge, to apply the acquired methods, to summarise a sub-area of the current research area in an oral presentation and to successfully implement the acquired knowledge and methods in a mini research project.

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

FOKUS Einführungsmodul Theoretische Physik (FOKUS Introductory Module Theoretical Physics): V (4 weekly contact hours) + Ü/P (2 weekly contact hours), details on availability to be announced
FOKUS Kompaktseminar Theoretische Physik (FOKUS Block Taught Seminar Theoretical Physics): S (2 weekly contact hours), German or English, details on availability to be announced (block taught seminar (3 days), usually held during semester break)
FOKUS Miniforschungsprojekt Theoretische Physik (FOKUS Mini Research Project Theoretical Physics): P (2 weekly contact hours), German or English, details on availability to be announced (approx. 3 weeks, part time)

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

This module has the following assessment components
1. Topics covered in lectures and exercises: written examination (approx. 90 minutes) or talk (approx. 30 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or project report (approx. 8 pages)
2. Seminar: talk (approx. 30 to 45 minutes)
3. Research project: project report (approx. 8 pages)

Assessment components 1 through 3 will be offered in German or English.
Students must register for assessment components 1 through 3 online (details to be announced).
Details on when assessment components 1 through 3 will be offered to be announced.
To pass this module, students must pass each of the assessment components 1 through 3.

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
FOKUS Project Practical Course Nanostructuring Technology			11-FPN-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	graduate	--	

Contents

Independent work on a current research topic of nanostructure technology and implementation of scientific experiments including analysis and documentation of the results.

Intended learning outcomes

The students are able to independently work on a current research area of nanostructure technology, to conduct and analyse scientific experiments and to document the results.

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

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

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

a) project report (approx. 20 pages) and b) talk (approx. 30 minutes) with discussion on topic researched in project

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Professional Specialization FOKUS Nanostructuring Technology 1			11-FS-NF-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)**	
15	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Introduction to current experimental, theoretical or engineering questions from a subdiscipline of nanostructure technology with special relevance to the planned topic of the Master's thesis. Summary of the required fundamental topics in a seminar presentation.

Intended learning outcomes

The students have advanced scientific knowledge of the principles of a current experimental, theoretical or engineering subdiscipline of the current research on nanostructure technology with special relevance to the intended topic of the Master's thesis and are able to summarise their knowledge in an oral presentation.

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 can be chosen to earn a bonus)

talk (approx. 30 to 45 minutes) with discussion

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Semiconductor Lasers - Principles and Current Research			11-HLF-092-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	graduate	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

This lecture discusses the principles of laser physics, based on the example of semiconductor lasers, and current developments regarding components. The principles of lasers are described on the basis of a general laser model, which will then be extended to special aspects of semiconductor lasers. Basic concepts such as threshold condition, characteristic curve and laser efficiency are derived from coupled rate equations for charge carriers and photons. Other topics of the lecture are optical processes in semiconductors, layer and ridge waveguides, laser resonators, mode selection, dynamic properties as well as technology for the generation of semiconductor lasers. The lecture closes with current topics of laser research such as quantum dot lasers, quantum cascade lasers, terahertz lasers or high-performance lasers.

Intended learning outcomes

The students have advanced knowledge of the principles of semiconductor-laser physics. They can apply their knowledge to modern questions and know the applications in the current development of components.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012) Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Semiconductor Physics			11-HLP-092-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	graduate	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

Advanced examination of crystal bonding and the electronic band structure of semiconductors. Optical excitations and their coupling effects. Electron-phonon coupling. Temperature-dependent transport properties. Quantisation effects of semiconductors with reduced dimensions. (Semi-)magnetic semiconductors.

Intended learning outcomes

The students have specific and advanced knowledge in the field of Semiconductor Physics. They know the physical principles of semiconductors and have gained an overview of the important characteristics of semiconductor materials.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)
Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Semiconductor Nanostructures			11-HNS-092-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	graduate	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

Semiconductor nanostructures are frequently referred to as "artificial materials". In contrast to atoms, molecules or macroscopic crystals, their electronic, optical and magnetic properties can be systematically tailored by changing their size. The lecture addresses technological challenges in the preparation of semiconductor nanostructures of varying dimensions (2D, 1D, 0D). It provides the basic theoretical concepts to describe their properties, with a focus on optical properties and light-matter coupling. Moreover, it discusses the challenges and concepts of novel optoelectronic and quantum photonic devices based on such nanostructures, including building blocks for quantum communication and quantum computing architectures.

Intended learning outcomes

The students know the theoretical principles and characteristics of semiconductor nanostructures. They have knowledge of the technological methods to fabricate such structures, and of their applications to novel photonic devices. They are able to apply their knowledge to problems in this field of research.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012) Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Principles of Classification of Patterns			11-KVM-092-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	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

Signals such as images, but also acoustic records, spectra, electrical measurements often contain recurring patterns. These patterns are often classified and analysed by observers, e.g. by a doctor when analysing an ECG. More and more automatic procedures are adopted to take on these tasks and classify patterns. The lecture will discuss principles of different classifiers such as "minimum distance" and "maximum likelihood".

Intended learning outcomes

The students have specific and advanced knowledge in the field of pattern recognition. They know methods of classifying patterns in measuring data as well as ways to automatise these processes. They are able to apply these methods to practical problems.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Lithography in Semiconductor Technology and Theory of Quantum Transport			11-LHQ-092-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	graduate	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 the lithographic techniques of semiconductor technology and discussion of the required theory on quantum transport.

Intended learning outcomes

The students have specific and advanced knowledge of semiconductor lithography and of the theory of quantum transport.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Laboratory and Measurement Technology in Biophysics			11-LMB-092-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	graduate	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

The lecture covers relevant principles of molecular and cellular biology as well as the physical principles of biophysical procedures for the examination and manipulation of biological systems. The main topics are optical measuring techniques and sensors, methods of single-particle detection, special microscoping techniques and methods of structure elucidation of biomolecules.

Intended learning outcomes

The students know the principles of molecular and cellular biology as well as the physical principles of biophysical procedures for the examination and manipulation of biological systems. They have knowledge of optical measuring techniques and their applications and are able to apply techniques of structure elucidation to simple biomolecules.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Introduction to LabVIEW			11-LVW-092-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	graduate	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

The module comprises basic and advanced courses. The basic course "NI LabVIEW Basic 1" is the first level of each LabVIEW learning phase. LabVIEW Basic provides a systematic introduction to the functions and application fields of the development environment of LabVIEW. The students become acquainted with dataflow programming and with common LabVIEW architectures. They learn to develop LabVIEW applications for various application fields, from assessment and measurement applications up to data collection, device control, data recording and measurement analysis. In the advanced course "NI LabVIEW Core 2", the students learn to develop comprehensive standalone applications, including the graphical development environment LabVIEW. The course builds upon LabVIEW Basic 1 and provides an introduction to the most common development technologies, in order to enable the students to successfully implement and distribute LabVIEW applications for different application fields. Course topics include techniques and procedures for the optimisation of application performance, e.g. through an optimised reuse of existing codes, usage of file I/O functions, principles of data management, event computing and methods of error handling. After finishing the course, the students have the ability to apply LabVIEW functions according to individual requirements, which enables a fast and productive application development.

Intended learning outcomes

The students have specific and advanced knowledge in the application field of LabVIEW. They know the principles of working with LabVIEW and are able to develop applications, e.g. for recording and analysing measuring data.

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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) or e) project (approx. 60 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Magnetism			11-MAG-092-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	graduate	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

Dia- and paramagnetism, exchange interaction, ferromagnetism, antiferromagnetism, anisotropy, domain structure, nanomagnetism, superparamagnetism, experimental methods to measure magnetic properties, Kondo effect.

Intended learning outcomes

The students know basic terms, concepts and phenomena of magnetism and measuring methods for magnetic experiments; they are skilled in simple model building and in the formulation of mathematical-physical approaches and are able to apply them to tasks in the stated areas; they have competencies in independently working on problems of these areas; they are able to evaluate the accuracy of observations and analyses.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)

Module title			Abbreviation
Master Thesis FOKUS Nanostructuring Technology			11-MA-NF-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)**	
30	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Registration for assessment to be carried out electronically. Deadlines will be announced separately. Please consult with your supervisor.	

Contents

Mostly independent processing of an experimental, theoretical or engineering task in a current research area of nanostructure technology, especially according to known procedures and scientific aspects; writing of the thesis.

Intended learning outcomes

The students are able to independently work on an experimental, theoretical and engineering task from the current research on nanostructure technology, especially in accordance with known methods and scientific aspects and to summarise their results in a final paper.

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 can be chosen to earn a bonus)

written thesis (approx. 75 pages)
Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Opto-electronic Material Properties			11-MOE-092-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	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

Physical principles of optoelectronic material properties and applications.

Intended learning outcomes

The students know the principles of optoelectronic material characteristics.

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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Technology of Functional Materials (2010)
Master's degree (1 major) Technology of Functional Materials (2009)
Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Scientific Methods and Project Management FOKUS Nanostructuring Technology 1			11-MP-NF-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)**	
15	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Introduction to the methods of scientific work, taking into account methods of project planning. Application to theoretical, experimental or engineering questions of nanostructure technology. Writing of a scientific project plan for the planned Master's thesis.

Intended learning outcomes

The students have knowledge of the scientific methods, the methodological work and the methods of project planning of a current experimental, theoretical or engineering subdiscipline of nanostructure technology with special relevance to the intended topic of the Master's thesis and are able to develop a project plan for the Master's thesis, to plan the required work and to summarise their knowledge in an oral presentation.

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

R (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 can be chosen to earn a bonus)

talk (approx. 30 to 45 minutes) with discussion

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Magnetism and Spin Transport			11-MST-092-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**	
2 semester	graduate	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

The module spans two semesters. During the winter semester, the students become acquainted with the principles of magnetism (ranging from atoms to solids), properties of magnetic material (individual usage) and methods to characterise magnetic properties. During the summer semester, the students learn about spin transport in metallic systems in due consideration of giant magnetoresistance and tunnel magnetoresistance and its application in magnetic memory. As a last point, we discuss new phenomena from the field of spin dynamics and current-induced spin phenomena.

Intended learning outcomes

The students know the basic terms, concepts and phenomena of magnetism and measuring methods for magnetic experiments; they are familiar with spin transport applications of information technologies and have gained an overview of modern findings in this area (GMR, TMR). They are skilled in simple model building and in the formulation of mathematical-physical approaches and are able to apply them to tasks in the stated areas.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Nanoanalytics			11-NAN-092-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	graduate	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

Principles of analytic procedures in the field of nanostructure physics, imaging techniques from a microscopic level up to an atomic level, examination of chemical composition, spectroscopy of electronic properties, usage of X-ray methods. - Physics and material systems on the nanoscale. - Scanning probes: Atomic force microscopy. Scanning tunneling microscopy. - Electron probes: Scanning electron microscope. Transmission electron microscope. - Secondary ions - mass spectrometry - X-ray methods: Synchrotron spectroscopy. Photoemission. X-ray absorption

Intended learning outcomes

The students have basic knowledge of modern research methods for different nanostructures up to an atomic level. They know microscoping procedures that are used in practice in labs and the industry as well as spectroscopic methods for the determination of electronic properties. They are able to evaluate the efficiency of different research methods.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Low-Dimensional Structures			11-NDS-092-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	graduate	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

Low-dimensional structures: Crystal lattice symmetry. Lattice dynamics and growth techniques of low-dimensional structures. Comparison between these structures and volume solids. X-ray diffractometry. Molecular beam epitaxy.

Intended learning outcomes

The students have knowledge of the theoretical principles of the growth of low dimensional structures. They know methods of producing and analysing such structures. They know the bandstructures of the most important semiconductors as well as the fabrication and characteristics of semiconductor heterostructures and MOS-diodes. They are familiar with the subband structure of semiconductor heterostructures and MOS-diodes and can evaluate the importance of many-particle effects. They are able to solve problems related to potentials in one dimension by applying Poisson's equation. They know the k*p perturbation theory and can deduce the 2D subband structure from the bulk band structure. They have knowledge of the meaning of modulation doping and are familiar with the 2D hydrogen atom. They understand how an external magnetic field acts on the properties of a free electron gas in 2D. They have basic knowledge of the meaning of gauging, Landau-quantisation, filling factor and Landau degeneracy. They understand the dependence of various physical properties on the filling factor, and are able to solve implicit problems via numerical methods. They are familiar with elementary excitations in two-dimensional systems.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011)

Module title			Abbreviation
Nanoelectronics			11-NEL-092-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	graduate	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

The lecture and the corresponding exercises convey basic concepts of electronics of nanostructures. First, we discuss terms such as Fermi distribution, density of states and carrier concentration in view of small structures. Afterwards, we talk about application potentials of nanostructures in electronics. We examine the limits of the function of common switches and storages through miniaturisation and compare them to electronic properties of nanostructures. We gain an overview of nanoelectric amplifiers, rectifier, logic lattices and circuits and discuss the operating principle of quantum computers.

Intended learning outcomes

The students have mastered the basics of electronics of nanostructures in theory and practice. They know functions and applications of respective components.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Module title			Abbreviation
Nanomatrix Biophysical Analyzing Systems and Processes (Master)			11-NM-BV-MA-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	graduate	--	

Contents

Principles and specific knowledge of engineering work in the application fields of energy engineering, electronics, photonics and biophysics as well as in the technology-oriented materials sciences, technologies of nanostructuring, components and system development, especially in the field of biophysical analysis systems and procedures.

Intended learning outcomes

The students have advanced knowledge of one or more application or technology areas of engineering work, especially in the field of biophysical analysis systems and techniques.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Nanomatrix Semiconductor Materials (Master)			11-NM-HM-MA-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	graduate	--	

Contents

Principles and specific knowledge of engineering work in the application fields of energy engineering, electronics, photonics and biophysics as well as in the technology-oriented materials sciences, technologies of nanostructuring, components and system development, especially in the field of semiconductor materials.

Intended learning outcomes

The students have advanced knowledge of one or more application or technology areas of engineering work, especially in the field of semiconductor materials.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Nanomatrix Semiconductor Processing (Master)			11-NM-HP-MA-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	graduate	--	

Contents

Principles and specific knowledge of engineering work in the application fields of energy engineering, electronics, photonics and biophysics as well as in the technology-oriented materials sciences, technologies of nanostructuring, components and system development, especially in the field of semiconductor processes.

Intended learning outcomes

The students have advanced knowledge of one or more application or technology areas of engineering work, especially in the field of semiconductor processes.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Nanomatrix Micro/Nano- and Optoelectronic Devices (Master)			11-NM-MB-MA-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	graduate	--	

Contents

Principles and specific knowledge of engineering work in the application fields of energy engineering, electronics, photonics and biophysics as well as in the technology-oriented materials sciences, technologies of nanostructuring, components and system development, especially in the field of micro-/nano- and opto-electronic components.

Intended learning outcomes

The students have advanced knowledge of one or more application or technology areas of engineering work, especially in the field of micro-, nano- and optoelectronic components.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Nanomatrix Heat Insulating Systems and Photovoltaics			11-NM-WP-MA-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	graduate	--	

Contents

Principles and specific knowledge of engineering work in the application fields of energy engineering, electronics, photonics and biophysics as well as in the technology-oriented materials sciences, technologies of nanostructuring, components and system development, especially in the field of thermal insulation systems and photovoltaics.

Intended learning outcomes

The students have advanced knowledge of one or more application or technology areas of engineering work, especially in the field of thermal insulation systems and photovoltaics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Nano-Optics			11-NOP-092-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	graduate	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

Theoretical principles. Focussing of light. Microscopy. Optical nearfield probes. Nearfield microscopy. Single quantum emitters. Light emission in nano-tailored environments. Plasmons. Optical antennas.

Intended learning outcomes

The students have specific and advanced knowledge in the field of nano-optics. They are familiar with the theoretical principles and application areas of nano-optics and with current developments in this field.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)

Module title			Abbreviation
Organic Semiconductor			11-OHL-092-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	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

Physical principles of organic semiconductors, molecular and polymer electronics and sensor technology, applications.

Intended learning outcomes

The students have advanced knowledge of organic semiconductors.

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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)

Master's degree (1 major) Technology of Functional Materials (2010)
Master's degree (1 major) Technology of Functional Materials (2009)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Functional Materials (2012)

Module title			Abbreviation
Advanced Practical Course Master			11-PFM-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	11-E1, 11-E2	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	11-A3	

Contents

Principles of Nuclear, Atomic and Molecular Physics, experiments on cryogenic temperatures and correlated systems, properties of solids, surfaces and interfaces. Experiments on the following topics: X-rays - nuclear magnetic resonance (NMR) - quantum Hall effect - optical pumping and spectroscopy in the field of optics - Hall effect - superconductivity - laser - solid-state optics

Intended learning outcomes

Knowledge of conducting experiments, analysing and documenting experimental results, basic knowledge of issuing scientific publications, application of modern evaluation systems, working on a task based on publications and acquiring practical experimental methods.

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

Fortgeschrittenen-Praktikum Master (Advanced Practical Course Master) Part 1: P (3 weekly contact hours), German or English
Fortgeschrittenen-Praktikum Master (Advanced Practical Course Master) Part 2: P (3 weekly contact hours), German or English

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

This module has the following assessment components
1. Lab course in part 1 (Fortgeschrittenen-Praktikum Master/Advanced Practical Course Master Part 1): a) Preparing the experiment will be considered successfully completed if an oral test (approx. 30 minutes) is passed prior to the experiment. b) Performing and evaluating the experiment will be considered successfully completed if a test is passed. Students must prepare an experiment log (approx. 8 pages).
2. Lab course in part 2 (Fortgeschrittenen-Praktikum Master/Advanced Practical Course Master Part 2): a) Preparing the experiment will be considered successfully completed if an oral test (approx. 30 minutes) is passed prior to the experiment. b) Performing and evaluating the experiment will be considered successfully completed if a test is passed. Students must prepare an experiment log (approx. 8 pages).

Language of assessment: German or English
Students must register for assessment components 1 and 2 online (details to be announced).
Students will be offered one opportunity to retake element a) and/or element b) in the respective semester. To pass an assessment component, they must pass both elements (a and b) in the same semester.
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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Workload

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Teaching cycle

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

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Module appears in
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Physics of Complex Systems			11-PKS-092-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	graduate	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

1. Theory of critical phenomena in thermal equilibriumt
2. Introduction into the physics out of equilibriumt
3. Entropy production and fluctuationst
4. Phase transitions away from equilibriumt
5. Universalityt
6. Spin glassest
7. Theory of neural networks

Intended learning outcomes

The students have specific and advanced knowledge in the field of physics of complex systems. They know the methods of Statistical Physics, Computational Physics and non-linear dynamics, which are used to describe such systems. They are able to work on current research problems in this area.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011)

Module title			Abbreviation
Quantum Information and Quantum Computing			11-QIC-092-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	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

The first part introduces the theoretical concepts of quantum information and quantum computers. It discusses the main quantum algorithms. The second part discusses experimental possibilities for the realisation of entangled states. One of the main topics is the production, controlling and manipulation of coherent two-electron spin states. The third part covers the description and explanation of decoherence of quantum mechanical states.

Intended learning outcomes

The students have an advanced understanding of quantum theory and basic knowledge of quantum calculation. They are able to solve simple problems of quantum information theory.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)

Module title			Abbreviation
Quantum Mechanics II			11-QM2-092-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	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

"Quantum mechanics II" constitutes the central theoretical course of the international Master's program in Physics. It builds upon basics which are acquired in the lecture "Quantum mechanics I" of the Bachelor's degree. While the specific emphasis can be adjusted individually, the core topics that are supposed to be covered should include:
1. Second quantisation: Fermions and bosons
2. Band structures of particles in a crystal
3. Angular momentum, symmetry operators, Lie Algebras
4. Scattering theory: Potential scattering, partial wave expansion
5. Relativistic quantum mechanics: Klein-Gordon equation, Dirac equation, Loretz group, fine structure splitting of atomic spectra
6. Quantum entanglement
7. Canonical formalism

Intended learning outcomes

The students acquire in-depth knowledge of advanced quantum mechanics and have a thorough understanding of the mathematical and theoretical concepts of the listed topics. They are able to describe or model problems of modern theoretical Quantum Physics mathematically, to solve problems analytically, to use approximation methods and to interpret the results physically. The course is pivotal to subsequent theory courses in Astrophysics, High-Energy Physics and Condensed Matter/Solid-State Physics. The course is mandatory for all Master's students.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places
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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012)

Module title			Abbreviation
Quantum Phenomena in electronic correlated Materials			11-QPM-092-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	graduate	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

Quantum effects and phenomena in current solid-state research. Correlations. Free electron gas and Fermi liquid. Strongly correlated systems

Intended learning outcomes

The students have specific, advanced knowledge of the current research on Solid-State Physics, especially on quantum effects in strongly correlated systems. They are able to understand the connections between the theoretical description of such systems and the current experimental results.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)

Module title	Abbreviation
Many Body Quantum Theory	11-QVTP-092-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	graduate	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

This will usually be a course on quantum many particle physics approached by the perturbative methods using Green's functions.
An outline could be:

1 Single-particle Green's function
2 Review of second quantization
3 Diagrammatic method using many particle Green's functions at temperature T=0
4 Diagrammatic method for finite T
5 Landau theory of Fermi liquids
6 Superconductivity
7 One-dimensional systems and bosonization

Intended learning outcomes

The students have mastered the principles of quantum field theory in many-particle systems. They are able to apply the acquired methods to current problems of Theoretical Solid-State Physics.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011)

Module title			Abbreviation
Relativistic Effects in Mesoscopic Systems			11-RMS-092-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	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

Relativistic effects in mesoscopic systems. - Spin-orbit coupling. - Dirac equation. - Quantum Hall effect. - Topological insulators. - Majorana fermions

Intended learning outcomes

The students have mastered the mathematical methods for the description of relativistic quantum systems, especially in the field of mesoscopic physics. They are able to apply their knowledge to simple systems.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)

Module title			Abbreviation
Statistics, Data Analysis and Computer Physics			11-SDC-092-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	graduate	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

Statistics, data analysis and computer physics.

Intended learning outcomes

The students have specific and advanced knowledge in the field of statistics, data analysis and Computational Physics.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module title			Abbreviation
Module Type 4E Special Training Experimental Physics			11-SF-4E-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	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Experimental Physics.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of Experimental Physics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 8 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			**Abbreviation**
Module Type 4I Special Training Interdisciplinary Research Fields			11-SF-4I-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)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in an interdisciplinary field.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 8 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 4N Special Training Nanostructure Technology			11-SF-4N-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	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of nanostructure technology.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of nanostructure technology.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 8 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Module Type 4T Special Training Theoretical Physics			11-SF-4T-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)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Theoretical Physics.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of Theoretical Physics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 8 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 5E Special Training Experimental Physics			11-SF-5E-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Experimental Physics.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of Experimental Physics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 5l Special Training Interdisciplinary Research Fields			11-SF-5l-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in an interdisciplinary field.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 5N Special Training Nanostructure Technology			11-SF-5N-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Nanostructure Technology.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of nanostructure technology.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Module Type 5T Special Training Theoretical Physics			11-SF-5T-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Theoretical Physics.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of Theoretical Physics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 6E Special Training Experimental Physics			11-SF-6E-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	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Experimental Physics.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of Experimental Physics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 12 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 6I Special Training Interdisciplinary Research Fields			11-SF-6I-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)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in an interdisciplinary field.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 12 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 6N Special Training Nanostructure Technology			11-SF-6N-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	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of nanostructure technology.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of nanostructure technology.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 12 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Module Type 6T Special Training Theoretical Physics			11-SF-6T-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	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Theoretical Physics.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of Theoretical Physics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 12 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 8E Special Training Experimental Physics			11-SF-8E-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	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Experimental Physics.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of Experimental Physics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 16 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			**Abbreviation**
Module Type 8I Special Training Interdisciplinary Research Fields			11-SF-8I-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)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in an interdisciplinary field.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 16 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Module Type 8N Special Training Nanostructure Technology			11-SF-8N-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	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of nanostructure technology.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of nanostructure technology.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 16 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			**Abbreviation**
Module Type 8T Special Training Theoretical Physics			11-SF-8T-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	graduate	--	

Contents

Specific, advanced knowledge of one or more of the Faculty's current research areas in the field of Theoretical Physics.

Intended learning outcomes

The students have specific and advanced knowledge of one or more current research areas of the faculty in the field of Theoretical Physics.

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

V + R (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 can be chosen to earn a bonus)

a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 16 pages)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)
Master's degree (1 major) FOKUS Physics (2006)

Module title			Abbreviation
Thermodynamics and Economics			11-TDO-092-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	graduate	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

Energy and economic growth, entropy production, emission reduction. Part I describes the role of energy conversion in the development of the universe, the evolution of life and the unfolding of civilisation. In non-equilibrium thermodynamics, the entropy production density shows the relevance of the second law of thermodynamics for ecological damage and resource consumption. Energy conversion, entropy production and natural resources define the technological and ecological boundaries of industrial economic growth. Part 2 analyses how the factors capital, work, energy and creativity produce the goods and services of a national economy and determine economic growth. The productive power of cheap energy by far exceeds that of expensive labour. Within the current system of taxes and social security contributions, this discrepancy between power and costs of production factors leads to job cuts, waste of resources, impoverishment of nations and growing social tensions. The course discusses how factor income taxation can counteract this development. Part 3 includes seminar presentations, comprises the techniques of rational energy use and non-fossil energy use, and introduces the optimisation programme deeco (Dynamic Energy, Emission and Cost Optimization).

Intended learning outcomes

The students understand that energy conversion and entropy production are going to play an important role in the world's economic and social development. As an extension of economic theory, the students know the connections between thermodynamics and economy as well as the productive physical basis of modern economies. They are able to apply the acquired knowledge to particular problems.
NOTE: this is the module that was run by Prof. Dr. R. Kümmel, who has now retired. As the module was tailored to his own theory of economy, it has yet to be decided whether we will continue to offer this module.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places
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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011)

Module title			Abbreviation
Theoretical Solid State Physics			11-TFK-092-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	graduate	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

Principles of Theoretical Solid-State Physics. Fermi liquid theory. Electron-electron interaction. Variational methods. Magnetism. Superconductivity.

Intended learning outcomes

The students have basic knowledge of the theoretical description of solid-state phenomena. They know the corresponding mathematical or theoretical methods and are able to apply them to basic problems of solid-state theory and to understand the connections to experimental results. The individual students have elaborated on an advanced topic of solid-state theory and have discussed this topic in a seminar presentation.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module title			Abbreviation
Theory of Superconduction			11-TSL-092-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	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 the phenomenom of superconductivity. Microscopic theory of superconductivity (BCS theory). Phenomenological theory of superconductivity (Ginzburg-Landau theory). Mesoscopic aspects of superconductivity (Andreev scattering, Bobolioubov-de Gennes equation, SQUIDS). Quantum computing with superconductive elements.

Intended learning outcomes

The students have basic knowledge of the theoretical models for the description of superconductivity. They know the properties and application areas of these models and are able to apply calculation methods to simple problems.

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

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

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module title			Abbreviation
Basic module: Competence for Acquiring Information - for students of natural sciences			41-IK-NW1-072-m01
Module coordinator		**Module offered by**	
head of University Library		University Library	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
1	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Information literacy in an academic context:
- Search strategies and tools.
- Using the library's electronic resources.
- Resources for natural sciences: databases and journals.
- Online searches and search engines.
- Overview of additional resources (eLearning etc.).
- Reference management. Some sections of the module will focus on particular disciplines (wherever possible, on disciplines in the natural sciences).

Intended learning outcomes

Students know what information is needed for what purpose. They are able to locate information that is relevant within their discipline and beyond in a variety of resources and to evaluate this information. They recognise the difference in quality between information they have retrieved from specific, restricted access resources (databases) and information they have found on the free web. Students are able to manage and process the information they have found, using reference management software and eLearning tools. The module aims to equip students with the skills needed to find information and literature that is relevant to the topics of their Bachelor's theses.

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

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

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

written examination (60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2007)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Information Literacy for Students of the Natural Sciences (Basic Level)			41-IK-NW1-101-m01
Module coordinator		**Module offered by**	
head of University Library		University Library	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Information literacy in an academic context:
- Search strategies and tools.
- Using the library's electronic resources.
- Resources for natural sciences: databases and journals.
- Online searches and search engines.
- Overview of additional resources (eLearning etc.).
- Reference management. Some sections of the module will focus on particular disciplines (wherever possible, on disciplines in the natural sciences).

Intended learning outcomes

Students know what information is needed for what purpose. They are able to locate information that is relevant within their discipline and beyond in a variety of resources and to evaluate this information. They recognise the difference in quality between information they have retrieved from specific, restricted access resources (databases) and information they have found on the free web. Students are able to manage and process the information they have found, using reference management software and eLearning tools. The module aims to equip students with the skills needed to find information and literature that is relevant to the topics of their Bachelor's theses.

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

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

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

a) written examination (approx. 60 minutes) or b) preparing and delivering a presentation with slides (approx. 10 minutes or approx. 5 minutes and approx. 1 page) or c) completing exercises (approx. 10 exercises) or d) presentation without slides (approx. 20 to 30 minutes) or e) preparing and delivering a presentation with slides (approx. 5 minutes) and completing exercises (approx. 5 exercises) or f) presentation without slides (approx. 10 to 15 minutes) and completing exercises (approx. 5 exercises)

Allocation of places

Number of places: 5-50. There is a restricted number of places. If necessary, places will be allocated as follows: Students of the degree programmes of the respective subject-specific focuses will be given preferential consideration. The remaining places, if and when any become available, will be allocated to students of the other natural sciences degree programmes. In each of the above-mentioned groups, 30% of places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. The remaining 70% of places will each be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in
Bachelor' degree (1 major) Biochemistry (2011)
Bachelor' degree (1 major) Biochemistry (2013)
Bachelor' degree (1 major) Biochemistry (2009)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
No final examination Special study offering (2010)

Module title			Abbreviation
Second module: Competence for Acquiring Information - for students of natural sciences			41-IK-NW2-072-m01
Module coordinator		**Module offered by**	
head of University Library		University Library	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Information literacy in an academic context:
- More in-depth discussion of selected topics that were covered in the level one module, e. g. searching subject-specific databases.
- Publishing and information practices in the natural sciences.
- Subject-specific information retrieval tools, e. g. classifications and thesauri.
- New web-based information and communication technologies.
- Searching for subject-specific facts (e. g. substances and physical data).
- Information search skills for the workplace.
- Copyright and citations.
- Electronic publishing. Some sessions will focus on particular disciplines (wherever possible, on disciplines in the natural sciences).

Intended learning outcomes

Students have developed a differentiated understanding of the publishing and information practices in their discipline and are familiar with the possibilities offered by electronic publishing. They are able to use electronic tools to locate subject-specific facts in a variety of resources. Students are able to work with subject-specific information retrieval tools as well as to use new web-based technologies to share information. They have developed an understanding of the legal framework surrounding publications, information, and communication in an academic context and are able to use information responsibly.

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

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

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

written examination (60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2007)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2006)

Module title			Abbreviation
Information Literacy for Students of the Natural Sciences (Advanced Level)			41-IK-NW2-101-m01
Module coordinator		**Module offered by**	
head of University Library		University Library	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Knowledge and skills equivalent to those achieved in the basic module desirable.	

Contents

Information literacy in an academic context:
- More in-depth discussion of selected topics that were covered in the level one module, e. g. searching subject-specific databases.
- Publishing and information practices in the natural sciences.
- Subject-specific information retrieval tools, e. g. classifications and thesauri.
- New web-based information and communication technologies.
- Searching for subject-specific facts (e. g. substances and physical data).
- Information search skills for the workplace.
- Copyright and citations.
- Electronic publishing. Some sessions will focus on particular disciplines (wherever possible, on disciplines in the natural sciences).

Intended learning outcomes

Students have developed a differentiated understanding of the publishing and information practices in their discipline and are familiar with the possibilities offered by electronic publishing. They are able to use electronic tools to locate subject-specific facts in a variety of resources. Students are able to work with subject-specific information retrieval tools as well as to use new web-based technologies to share information. They have developed an understanding of the legal framework surrounding publications, information, and communication in an academic context and are able to use information responsibly.

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

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

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

a) written examination (approx. 60 minutes) or b) preparing and delivering a presentation with slides (approx. 10 minutes or approx. 5 minutes and approx. 1 page) or c) completing exercises (approx. 10 exercises) or d) presentation without slides (approx. 20 to 30 minutes) or e) preparing and delivering a presentation with slides (approx. 5 minutes) and completing exercises (approx. 5 exercises) or f) presentation without slides (approx. 10 to 15 minutes) and completing exercises (approx. 5 exercises)

Allocation of places

Number of places: 10 to 50. There is a restricted number of places. If necessary, places will be allocated as follows: Students of the degree programmes of the respective subject-specific focuses will be given preferential consideration. The remaining places, if and when any become available, will be allocated to students of the other natural sciences degree programmes. In each of the above-mentioned groups, 30% of places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. The remaining 70% of places will each be allocated by lot.

Additional information

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Workload

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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor' degree (1 major) Biochemistry (2011) Bachelor' degree (1 major) Biochemistry (2013) Bachelor' degree (1 major) Biochemistry (2009) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Module title			Abbreviation
Intercultural Competence (English, Advanced Level)			42-ENO-IK-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	42-ENM2 or 42-ENM3 or 42-ENM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with knowledge and skills that will enable them to act and communicate in intercultural situations. It familiarises them with criteria and options for action and equips them with knowledge that will allow them to adequately interpret intercultural situations and act appropriately.

Intended learning outcomes

Students develop advanced intercultural and language skills that will allow them to communicate, both verbally and in writing, in a globalised world, taking intercultural aspects into account. They are able to effectively and flexibly use the target language, both during study abroad periods and in the workplace. This module builds on level "B2 -- Vantage" and aims to enable students to reach level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: English

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Computer Science (2010)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
Cultural Studies (English, Advanced Level)			42-ENO-LK-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	42-ENM2 or 42-ENM3 or 42-ENM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module familiarises students with the culture and society of countries where the target language is spoken and thus enables them to act appropriately in the target language. It discusses the culture, geography, history, society, political system, and the economy of said countries.

Intended learning outcomes

Students develop highly advanced language skills and a thorough familiarity with the culture and society of countries where the target language is spoken. They are thus able to communicate, both verbally and in writing, in a variety of situations, taking into account aspects related to the culture and society of said countries. Students are able to effectively and flexibly use the target language, both during study abroad periods and in the workplace. This module builds on level "B2 -- Vantage" and aims to enable students to reach level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: English

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Computer Science (2010)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)

Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
English for the Natural Sciences 1 (Advanced Level)			42-ENO-NW1-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-ENM2 or 42-ENM3 or 42-ENM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, in science-oriented situations.

Intended learning outcomes

Students gain sound natural sciences-specific communication skills (written and oral) in the target language. They develop advanced natural sciences-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in scientific terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed natural sciences-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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 can be chosen to earn a bonus)

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: English
Assessment offered: once a year, winter semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Computer Science (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
English for the Natural Sciences 2 (Advanced Level)			42-ENO-NW2-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-ENM2 or 42-ENM3 or 42-ENM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, in science-oriented situations.

Intended learning outcomes

Students gain sound natural sciences-specific communication skills (written and oral) in the target language. They develop advanced natural sciences-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in scientific terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed natural sciences-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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 can be chosen to earn a bonus)

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: English
Assessment offered: once a year, summer semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)

No final examination Special study offering (2010)

Module title			Abbreviation
Advanced English Final Exam			42-ENO-PR-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Registration for assessment: as specified.	

Contents

Final exam in the upper level of the target language.

Intended learning outcomes

In this exam, students will be expected to demonstrate language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages. Students who passed the exam may obtain a UNIcert(R) Level III certificate once the university has been accredited.

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 can be chosen to earn a bonus)

written and oral examination (200 to 210 minutes total) testing the candidate's skills in the following four areas: reading and listening comprehension, writing and oral communication skills; only if all components have been successfully completed will assessment be considered successfully completed
Language of assessment: English
Assessment offered: once a year (autumn, semester break)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Computer Science (2010)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)

Module title			Abbreviation
French for the Humanities 1 (Advanced Level)			42-FRO-GW1-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-FRM2 or 42-FRM3 or 42-FRM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, at university and in business settings.

Intended learning outcomes

Students gain sound humanities-specific communication skills (written and oral) in the target language. They develop advanced humanities-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in humanities terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed humanities-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: French
Assessment offered: once a year, winter semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)

No final examination Special study offering (2010)

Module title			Abbreviation
French for the Humanities 2 (Advanced Level)			42-FRO-GW2-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-FRM2 or 42-FRM3 or 42-FRM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, at university and in business settings.

Intended learning outcomes

Students gain sound humanities-specific communication skills (written and oral) in the target language. They develop advanced humanities-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in humanities terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed humanities-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: French
Assessment offered: once a year, summer semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)

No final examination Special study offering (2010)

Module title			Abbreviation
Intercultural Competence (French, Advanced Level)			42-FRO-IK-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	42-FRM2 or 42-FRM3 or 42-FRM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with knowledge and skills that will enable them to act and communicate in intercultural situations. It familiarises them with criteria and options for action and equips them with knowledge that will allow them to adequately interpret intercultural situations and act appropriately.

Intended learning outcomes

Students develop advanced intercultural and language skills that will allow them to communicate, both verbally and in writing, in a globalised world, taking intercultural aspects into account. They are able to effectively and flexibly use the target language, both during study abroad periods and in the workplace. This module builds on level "B2 -- Vantage" and aims to enable students to reach level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: French

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
Intercultural Competence (French, Advanced Level)			42-FRO-LK-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	42-FRM2 or 42-FRM3 or 42-FRM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module familiarises students with the culture and society of countries where the target language is spoken and thus enables them to act appropriately in the target language. It discusses the culture, geography, history, society, political system, and the economy of said countries.

Intended learning outcomes

Students develop highly advanced language skills and a thorough familiarity with the culture and society of countries where the target language is spoken. They are thus able to communicate, both verbally and in writing, in a variety of situations, taking into account aspects related to the culture and society of said countries. Students are able to effectively and flexibly use the target language, both during study abroad periods and in the workplace. This module builds on level "B2 -- Vantage" and aims to enable students to reach level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: French

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
Advanced French Final Exam			42-FRO-PR-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Registration for assessment: as specified.	

Contents

Final exam in the upper level of the target language.

Intended learning outcomes

In this exam, students will be expected to demonstrate language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages. Students who passed the exam may obtain a UNIcert(R) Level III certificate once the university has been accredited.

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 can be chosen to earn a bonus)

written and oral examination (200 to 210 minutes total) testing the candidate's skills in the following four areas: reading and listening comprehension, writing and oral communication skills; only if all components have been successfully completed will assessment be considered successfully completed
Language of assessment: French
Assessment offered: once a year (autumn, semester break)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)

Module title			Abbreviation
French for Business 1 (Advanced Level)			42-FRO-W1-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-FRM2 or 42-FRM3 or 42-FRM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, at university and in business settings.

Intended learning outcomes

Students gain sound business- and economics-specific communication skills (written and oral) in the target language. They develop advanced business- and economics-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in business and economics terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed business- and economics-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: French
Assessment offered: once a year, winter semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
French for Business 2 (Advanced Level)			42-FRO-W2-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-FRM2 or 42-FRM3 or 42-FRM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, at university and in business settings.

Intended learning outcomes

Students gain sound business- and economics-specific communication skills (written and oral) in the target language. They develop advanced business- and economics-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in business and economics terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed business- and economics-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: French
Assessment offered: once a year, summer semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
Spanish for the Humanities 1 (Advanced Level)			42-SPO-GW1-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-SPM2 or 42-SPM3 or 42-SPM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, in situations involving humanistic topics.

Intended learning outcomes

Students gain sound humanities-specific communication skills (written and oral) in the target language. They develop advanced humanities-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in humanities terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed humanities-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: Spanish
Assessment offered: once a year, winter semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)

No final examination Special study offering (2010)

Module title			Abbreviation
Spanish for the Humanities 2 (Advanced Level)			42-SPO-GW2-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-SPM2 or 42-SPM3 or 42-SPM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, in situations involving humanistic topics.

Intended learning outcomes

Students gain sound humanities-specific communication skills (written and oral) in the target language. They develop advanced humanities-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in humanities terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed humanities-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: Spanish
Assessment offered: once a year, summer semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)

No final examination Special study offering (2010)

Module title			Abbreviation
Intercultural Competence (Spanish, Advanced Level)			42-SPO-IK-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	42-SPM2 or 42-SPM3 or 42-SPM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with knowledge and skills that will enable them to act and communicate in intercultural situations. It familiarises them with criteria and options for action and equips them with knowledge that will allow them to adequately interpret intercultural situations and act appropriately.

Intended learning outcomes

Students develop advanced intercultural and language skills that will allow them to communicate, both verbally and in writing, in a globalised world, taking intercultural aspects into account. They are able to effectively and flexibly use the target language, both during study abroad periods and in the workplace. This module builds on level "B2 -- Vantage" and aims to enable students to reach level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: Spanish

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
Cultural Studies (Spanish, Advanced Level)			42-SPO-LK-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	42-SPM2 or 42-SPM3 or 42-SPM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module familiarises students with the culture and society of countries where the target language is spoken and thus enables them to act appropriately in the target language. It discusses the culture, geography, history, society, political system, and the economy of said countries.

Intended learning outcomes

Students develop highly advanced language skills and a thorough familiarity with the culture and society of countries where the target language is spoken. They are thus able to communicate, both verbally and in writing, in a variety of situations, taking into account aspects related to the culture and society of said countries. Students are able to effectively and flexibly use the target language, both during study abroad periods and in the workplace. This module builds on level "B2 -- Vantage" and aims to enable students to reach level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: Spanish

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
Advanced Spanish Final Exam			42-SPO-PR-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Registration for assessment: as specified.	

Contents

Final exam in the upper level of the target language.

Intended learning outcomes

In this exam, students will be expected to demonstrate language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages. Students who passed the exam may obtain a UNIcert(R) Level III certificate once the university has been accredited.

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 can be chosen to earn a bonus)

written and oral examination (200 to 210 minutes total) testing the candidate's skills in the following four areas: reading and listening comprehension, writing and oral communication skills; only if all components have been successfully completed will assessment be considered successfully completed
Language of assessment: Spanish
Assessment offered: once a year (autumn, semester break)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
Magister Theologiae Catholic Theology (2009)

Module title			Abbreviation
Spanish for Business 1 (Advanced Level)			42-SPO-W1-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-SPM2 or 42-SPM3 or 42-SPM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, at university and in business settings.

Intended learning outcomes

Students gain sound business- and economics-specific communication skills (written and oral) in the target language. They develop advanced business- and economics-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in business and economics terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed business- and economics-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: Spanish
Assessment offered: once a year, winter semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
No final examination Special study offering (2010)

Module title			Abbreviation
Spanish for Business 2 (Advanced Level)			42-SPO-W2-072-m01
Module coordinator		**Module offered by**	
head of Language Centre (ZFS)		Language Centre (ZfS)	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	42-SPM2 or 42-SPM3 or 42-SPM4 or assessment test	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module equips students with advanced communication skills in the target language. These will allow them to communicate appropriately, in both written and oral form, at university and in business settings.

Intended learning outcomes

Students gain sound business- and economics-specific communication skills (written and oral) in the target language. They develop advanced business- and economics-specific language skills that will allow them to communicate about selected topics in corresponding situations, using language flexibly. Students are proficient in business and economics terminology and are able to communicate effectively within the discipline. At the end of the stage, they will have developed business- and economics-specific language skills that are equivalent to level "C1 -- Effective Operational Proficiency" of the Common European Framework of Reference for Languages.

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

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

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

option 1: written multi-component examination (approx. 90 minutes total) with 4 components (reading comprehension, listening comprehension, writing, communication skills) or option 2: oral assessment (approx. 10 minutes) and written multi-component examination (approx. 60 to 90 minutes total) with 3 components (reading comprehension, listening comprehension, writing) or option 3: 2 to 4 oral assessments (approx. 30 to 60 minutes total) as well as 2 to 4 written assessments (approx. 10 to 15 pages total), all components/assessments each weighted 1:1; options will be selected and examination dates be fixed at the beginning of the course
Language of assessment: Spanish
Assessment offered: once a year, summer semester

Allocation of places

Number of places: 5-25. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2009)
Bachelor' degree (1 major) Business Management and Economics (2009)
Bachelor' degree (1 major) Business Management and Economics (2010)
Bachelor' degree (1 major) Economathematics (2009)
Bachelor' degree (1 major) Economathematics (2008)
Bachelor' degree (1 major) Business Information Systems (2009)
Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2009)
No final examination Special study offering (2010)