

## Subdivided Module Catalogue for the Subject

# Nanostructure Technology

as a Master's with 1 major with the degree "Master of Science" (120 ECTS credits)

Examination regulations version: 2016 Responsible: Faculty of Physics and Astronomy

JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 88|224|-|-|H|2016

## **Learning Outcomes**

German contents and learning outcome available but not translated yet.

Nach erfolgreichem Abschluss des Studiums verfügen die Absolventinnen und Absolventen über die folgenden Kompetenzen:

- Die Absolventen bzw. Absolventinnen besitzen hohes Abstraktionsvermögen, analytisches Denken, hohe Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.
- Die Absolventen bzw. Absolventinnen verfügen über einen breiten Überblick über die Teilgebiete der Nanostrukturtechnologie und interdisziplinäre Zusammenhänge.
- Sie verfügen über vertiefte Kenntnisse der physikalischen und technischen Grundlagen der Nanostrukturtechnik sowie fundiertes Wissen über die theoretischen und experimentellen Methoden zur Erlangung neuer Erkenntnisse.
- Sie sind in der Lage, ihre Fähigkeiten und Kenntnisse in eigenen Projekten umzusetzen und verfügen über Kenntnisse des aktuellen Forschungsstandes in mindestens einem Spezialgebiet der Nanowissenschaften.
- Sie sind in der Lage, sich anhand von Primärliteratur, insbesondere in englischer Sprache, in den aktuellen Forschungsstand eines Spezialgebiets einzuarbeiten und physikalische und technische Methoden selbstständig auf konkrete Aufgabenstellungen anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.
- Sie sind in der Lage, auch bei unvollständigen Informationen Probleme der Nanostrukturtechnik wissenschaftlich und unter Beachtung der Regeln guter wissenschaftlicher Praxis selbstständig zu bearbeiten und die Ergebnisse und Folgen ihrer Arbeit darzustellen, zu bewerten und zu vertreten.
- Sie sind in der Lage, mit Fachvertretern auf dem aktuellen Stand der Forschung physikalische und technische Fragestellungen zu diskutieren und auch Nichtwissenschaftlern physikalische Fragen zu erläutern.
- Sie besitzen die Fähigkeit, als verantwortlicher Wissenschaftler bzw. verantwortliche Wissenschaftlerin in interdisziplinär und international zusammengesetzten Teams aus (Natur-) Wissenschaftlern bzw. (Natur-) Wissenschaftlerinnen und/oder Ingenieuren bzw. Ingenieurinnen in Forschung, Industrie und Wirtschaft mitzuwirken.

#### Wissenschaftliche Befähigung

- Die Absolventinnen und Absolventen verfügen über vertiefte Kenntnisse der physikalischen und technischen Grundlagen der Nanostrukturwissenschaften.
- Die Absolventinnen und Absolventen können ein fundiertes Wissen über die theoretischen und experimentellen Methoden zur Erlangung neuer Erkenntnisse abrufen.
- Die Absolventen bzw. Absolventinnen können auf einen breiten Überblick über das Gesamtgebiet der Nanostrukturwissenschaften zurückgreifen.
- Die Absolventen und Absolventinnen verfügen über einen Überblick über angrenzende Gebiete und interdisziplinäre Zusammenhänge.
- Die Absolventinnen und Absolventen besitzen Abstraktionsvermögen, analytisches Denken, hohe Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen wenden ihre Fähigkeiten und Kenntnisse in eigenen Projekten an und verfügen über Kenntnisse des aktuellen Forschungsstandes in mindestens einem Spezialgebiet der Nanostrukturwissenschaften.
- Die Absolventinnen und Absolventen sind in der Lage, mit Fachvertretern auf dem aktuellen Stand der Forschung physikalische Fragestellungen zu diskutieren.
- Die Absolventinnen und Absolventen können, physikalische und mathematische Methoden selbstständig auf konkrete experimentelle oder theoretische physikalische Aufgabenstellungen

Master's with 1 major Nanostructure Technology (2016)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. da- ta record Master (120 ECTS) Nanostrukturtechnik - 2016	page 2 / 101
(2010)		

anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.

• Die Absolventinnen und Absolventen sind in der Lage, sich anhand von Primärliteratur, insbesondere in englischer Sprache, in den aktuellen Forschungsstand eines Spezialgebiets der Nanostrukturwissenschaften einzuarbeiten.

#### Befähigung zur Aufnahme einer Erwerbstätigkeit

- Die Absolventinnen und Absolventen sind in der Lage, auch bei unvollständigen Informationen physikalische und technische Probleme wissenschaftlich und unter Beachtung der Regeln guter wissenschaftlicher Praxis selbstständig zu bearbeiten und die Ergebnisse und Folgen ihrer Arbeit darzustellen, zu bewerten und zu vertreten.
- Die Absolventinnen und Absolventen besitzen die Fähigkeit, als verantwortlicher Wissenschaftler bzw. verantwortliche Wissenschaftlerin in interdisziplinär und international zusammengesetzten Teams aus (Natur-) Wissenschaftlern bzw. (Natur-) Wissenschaftlerinnen und/oder Ingenieuren bzw. Ingenieurinnen in Forschung, Industrie und Wirtschaft mitzuwirken.
- Die Absolventinnen und Absolventen sind in der Lage, physikalische und technische Methoden selbstständig auf konkrete Aufgabenstellungen anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.
- Die Absolventinnen und Absolventen sind in der Lage, ihre Fähigkeiten und Kenntnisse in eigenen Projekten umzusetzen und verfügen über Kenntnisse des aktuellen Forschungsstandes in mindestens einem Spezialgebiet der Nanostrukturwissenschaften.

#### Persönlichkeitsentwicklung

UNIVERSITÄT

WÜRZBURG

- Die Absolventinnen und Absolventen sind in der Lage, auch bei unvollständigen Informationen Probleme der Nanostrukturwissenschaften wissenschaftlich selbstständig zu bearbeiten und die Ergebnisse und Folgen ihrer Arbeit darzustellen, zu bewerten und zu vertreten.
- Die Absolventinnen und Absolventen kennen die Regeln guter wissenschaftlicher Praxis und beachten sie.

#### Befähigung zum gesellschaftlichen Engagement

- Die Absolventinnen und Absolventen können naturwissenschaftliche und technische Entwicklungen kritisch reflektieren und deren Auswirkungen auf die Wirtschaft, Gesellschaft und die Umwelt erfassen. (Technikfolgenabschätzung).
- Die Absolventinnen und Absolventen haben ihr Wissen bezüglich wirtschaftlicher, gesellschaftlicher, naturwissenschaftlicher, kultureller etc. Fragestellungen erweitert und können begründet Position beziehen.
- Die Absolventinnen und Absolventen sind in der Lage auf dem aktuellen Stand der Forschung physikalische und technische Fragestellungen zu diskutieren und Nichtwissenschaftlern physikalische Fragen zu erläutern.
- Die Absolventinnen und Absolventen haben die Bereitschaft und Fähigkeit entwickelt, ihre Kompetenzen in partizipative Prozesse einzubringen und aktiv an Entscheidungen mitzuwirken.

## Abbreviations used

Course types:  $\mathbf{E}$  = field trip,  $\mathbf{K}$  = colloquium,  $\mathbf{O}$  = conversatorium,  $\mathbf{P}$  = placement/lab course,  $\mathbf{R}$  = project,  $\mathbf{S}$  = seminar,  $\mathbf{T}$  = tutorial,  $\ddot{\mathbf{U}}$  = exercise,  $\mathbf{V}$  = lecture

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B/NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: **A** = thesis, **LV** = course(s), **PL** = assessment(s), **TN** = participants, **VL** = prerequisite(s)

## Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

## Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

### In accordance with

the general regulations governing the degree subject described in this module catalogue:

#### ASPO2015

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

# 13-Apr-2016 (2016-67) except for mandatory electives 11-MRI-171, 11-SSC-172 added in Fast Track procedure at a later time

#### 14-Mar-2018 (2018-20)

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 Electives (60	ECTS credits)		•					
Subfield Nanostructure Technology (55 ECTS credits)								
Advanced Laboratory Course (9 ECTS credits)								
11-P-FM1-161-m01	Advanced Laboratory Course Master Part 1	3	B/NB	77				
11-P-FM2-161-m01	Advanced Laboratory Course Master Part 2	3	B/NB	78				
11-P-FM3-161-m01	Advanced Laboratory Course Master Part 3	3	B/NB	79				
11-P-FM4-161-m01	Advanced Laboratory Course Master Part 4	3	B/NB	80				
Advanced Seminar (5 EC	TS credits)		<u>.</u>					
11-OSN-A-161-m01	Advanced Seminar Nanostructure Technology A	5	NUM	75				
11-OSN-B-161-m01	Advanced Seminar Nanostructure Technology B	5	NUM	76				
Focus Nanostructure Te	chnology		•					
11-HNS-161-m01	Optical Properties of Semiconductor Nanostructures	6	NUM	61				
11-QTH-161-m01	Quantum Transport	6	NUM	87				
11-NOP-161-m01	Nano-Optics	6	NUM	71				
11-SPI-161-m01	Spintronics	6	NUM	91				
11-BSV-161-m01	Image and Signal Processing in Physics	6	NUM	32				
11-PMM-161-m01	Physics of Advanced Materials	6	NUM	81				
11-QUI-161-m01	Quantum Information Technology	6	NUM	89				
11-OHL-161-m01	Organic Semiconductors	6	NUM	73				
08-FU-SAM-161-m01	Sensor and Actor Materials - Functional Ceramics and Magne- tic Particles	5	NUM	14				
08-PCM4-161-m01	Ultrafast spectroscopy and quantum-control	5	NUM	15				
08-FU-EEW-152-m01	Electrochemical Energy Storage and Conversion	5	NUM	11				
08-FU-MW-161-m01	Structure and Properties of Modern Materials: Experiments vs. Simulations	5	NUM	13				
11-FPA-161-m01	Visiting Research	10	NUM	57				
11-EXN5-161-m01	Current Topics in Nanostructure Technology	5	NUM	38				
11-EXN6-161-m01	Current Topics in Nanostructure Technology	6	NUM	39				
11-EXN7-161-m01	Current Topics in Nanostructure Technology	7	NUM	41				
11-EXN8-161-m01	Current Topics in Nanostructure Technology	8	NUM	42				
11-EXN6A-161-m01	Current Topics in Nanostructure Technology	6	NUM	40				
11-CSFM-161-m01	Advanced Topics in Solid State Physics	6	NUM	34				
11-CSNM-161-m01	Advanced Topics in Nanostructure Technology	6	NUM	36				
11-CSPM-161-m01	Advanced Topics in Physics	6	NUM	37				
11-FK2-161-m01	Solid State Physics 2	8	NUM	53				
11-FKS-161-m01	Solid State Spectrocopy	6	NUM	55				
11-MAG-161-m01	Magnetism	6	NUM	63				
11-HLPH-161-m01	Semiconductor Physics	6	NUM	59				
11-TQP-161-m01	Topological Quantum Physics	6	NUM	100				
11-NDS-161-m01	Low Dimensional Structures	6	NUM	69				
11-TFK-161-m01	Theoretical Solid State Physics	8	NUM	98				
11-SUP-161-m01	Superconductivity	6	NUM	95				

11-QM2-161-m01	Quantum Mechanics II	8	NUM	85
11-QIC-161-m01	Quantum Information and Quantum Computing	6	NUM	83
11-TDO-161-m01	Thermodynamics and Economics	6	B/NB	96
11-MRI-171-m01	Advanced Magnetic Resonance Imaging	6	NUM	67
11-SSC-172-m01	Surface Science	6	NUM	93
11-EXP6-161-m01	Current Topics in Physik	6	NUM	45
11-EXP6A-161-m01	Current Topics in Physik	6	NUM	47
11-EXP5-161-m01	Current Topics in Physik	5	NUM	44
11-EXP7-161-m01	Current Topics in Physik	7	NUM	49
11-EXP8-161-m01	Current Topics in Physik	8	NUM	50
Subfield Non-technical	Minor			
10-M-VAN-152-m01	Advanced Analysis	7	NUM	25
10-M=VDIM-161-m01	Discrete Mathematics	5	NUM	23
10-I=PA-161-m01	Analysis and Design of Programs	5	NUM	19
10-l-00P-152-m01	Object oriented Programming	5	NUM	22
10-l-BS-152-m01	Operating Systems	5	NUM	21
10-l=Kl1-161-m01	Artificial Intelligence 1	5	NUM	17
02-EReWi-G-161-m01	Introduction to Law for Economists	5	NUM	7
02-N-P-W06-152-m01	German and European Trade Mark Law	3	NUM	9
02-N-P-W07-152-m01	Copyright Law and Fundamentals of Patent Law including refe- rences to EU Law	2	NUM	10
02-G&Hre-G-161-m01	Commercial and Business Law for Economists	5	NUM	8
11-AP-152-m01	Astrophysics	6	NUM	26
11-ASM-161-m01	Methods of Observational Astronomy	6	NUM	28
11-ASP-161-m01	Introduction to Space Physics	6	NUM	30
11-EXZ5-161-m01	Additional Qualifications	5	NUM	51
11-EXZ6-161-m01	Additional Qualifications	6	NUM	52
11-EXNT6-161-m01	Non-technical Minor Subject	6	NUM	43
Thesis (60 ECTS credits)				
11-FS-N-161-m01	Professional Specialization Nanostructure Technology	15	B/NB	58
11-MP-N-161-m01	Scientific Methods and Project Management Nanostructure Technology	15	B/NB	66
11-MA-N-161-m01	Master Thesis Nanostructure Technology	30	NUM	65
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Module	title				Abbreviation
Introdu	ction t	o Law for Economists			02-EReWi-G-161-m01
Module	Module coordinator			Module offered by	
Dean o	f the Fa	culty of Law		Faculty of Law	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
	ry, lega				ypes of laws, organization of the n (private law, public law, crimi-
Intende	ed learr	ning outcomes			
		as knowledge of the nation n and consequences of c			ormation and content as well as ture of legal systems.
Course	<b>s</b> (type,	, number of weekly conta	ct hours, language —	if other than Germa	un)
V (3) +	Ü (2)				
ster, in written	formati examir	on on whether module ca nation (approx. 120 minu	an be chosen to earn tes)		ition offered — if not every seme-
		ffered: Usually once a yea	ar, winter semester		
Allocat					
chelor's other su the nur dents o lows: S tial con	s stude ubjects nber of of other tudents siderat	nts with the minor Privat . 10 of these will be alloc available places exceed subjects. Should there b s applying after not havir	recht (Private Law). A ated to students of th the number of applic the more than 10 appli g successfully comp s will be allocated by	total of 20 places w ne Master's degree p cations, the remainin cations, the remaini leted assessment in	issenschaft (Law) as well as Ba- vill be allocated to students of programme Economics. Should ng places may be allocated to stu- ng places will be allocated as fol- past years will be given preferen- ill be maintained and places re-
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
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Module	e appea	irs in			
Master Master	's degre	ee (1 major) Nanostructur ee (1 major) Nanostructur ee (1 major) Quantum Teo	re Technology (2020)		

Module	e title				Abbreviation
Commercial and Business Law for Economists					02-G&Hre-G-161-m01
Module coordinator				Module offered by	
				Faculty of Law	
ECTS	1	culty of Law od of grading	Only after succ. com	,	
5		rical grade			
Duratio		Module level	Other prerequisites		
1 seme		undergraduate			
Conten	nts	5	I		
	-	rovides an introduction t	to German and Europe	ean corporate and co	ommercial law
		ning outcomes			
The stu tation,	udent h liability	as knowledge of compar			mpany forms, power of represen- the law of commercial transacti-
Course	<b>s</b> (type	, number of weekly conta	act hours, language —	if other than Germa	n)
V (3) +	Ü (2)				
		<b>sessment</b> (type, scope, la on on whether module c			tion offered — if not every seme-
		nation (approx. 120 minu ffered: Usually once a ye			
Allocat	tion of p	olaces			
chelor' other s the nur dents c lows: S tial cor	s stude subjects mber of of other Student nsidera	ents with the minor Privat 5. 10 of these will be allow available places exceed subjects. Should there b s applying after not having	recht (Private Law). A cated to students of th the number of applic be more than 10 appli ng successfully comples will be allocated by	total of 20 places w ne Master's degree p ations, the remainir cations, the remaini leted assessment in	issenschaft (Law) as well as Ba- ill be allocated to students of programme Economics. Should ng places may be allocated to stu- ng places will be allocated as fol- past years will be given preferen- ill be maintained and places re-
		ormation			
Worklo	ad		-		
WORKIO	/uu				
150 h		e			
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150 h <b>Teachi</b> 	ng cycl		lations for teaching-c	legree programmes)	
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150 h Teachin  Referre	ng cycl ed to in	LPOI (examination regu	llations for teaching-c	legree programmes)	
150 h Teachin  Referre  Module Master Bachel	ng cycl ed to in e appea 's degr or's de	LPOI (examination regu	re Technology (2016) Science (2017)	legree programmes)	

German and European Trade Mark Law         double coordinator         Module offered by           Module coordinator         Module offered by           Dean of Studies Faculty of Law         Faculty of Law           ECTS         Method of grading         Only after succ. compl. of module(s)           3         numerical grade          Duration         Module level         Other prerequisites           1 semester         undergraduate          Contents           The lecture provides an overview of German and European trademark kaw, In addition to the basics of the European community Trademark according to the Community Trademark kay according to the Community Trademark kay isous from the perspective of German and European law.           Contents         Students are able to analyze trademark law issues from the perspective of German and European law.           Courses (type, number of weekly contact hours, language – if other than German)         V (a)           Method of assessment (type, scope, language – if other than German, examination offered – if not every ser ster, information on whether module can be chosen to earn a bonus)         a) written examination (approx. 120 minutes) or b) oral examination (approx. 120 minutes) or b) oral examination (approx. 120 minutes)         Assessment offered: Usually once a year, summer semester           Allocaction of places         There are no restrictions wit	Module	e title				Abbreviation	
Dean of Studies Faculty of Law       Faculty of Law         ECTS       Method of grading       Only after succ. compl. of module(s)         3       numerical grade	Germa	n and E	uropean Trade Mark Law	1		02-N-P-W06-152-m01	
Dean of Studies Faculty of Law       Faculty of Law         ECTS       Method of grading       Only after succ. compl. of module(s)         3       numerical grade	Module coordinator				Module offered by		
ECTS         Method of grading         Only after succ. compl. of module(s)           3         numerical grade            Duration         Module level         Other prerequisites           isemester         undergraduate            Contents							
3       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           The lecture provides an overview of German and European trademark law. In addition to the basics of the tradmark concept and protection according to the German Trademark Act, the prerequisites and effects of the European community Trademark Regulation will be dealt with. Furthermor special regulations of the German Trademark Law, such as business designations, geographical indications a the trademark protection of Internet domains are discussed.         Intended learning outcomes          Students are able to analyze trademark law issues from the perspective of German and European law.         Courses (type, number of weekly contact hours, language — if other than German)         V (2)         Method of assessment (type, scope, language — if other than German, examination offered — if not every ser ster, information on whether module can be chosen to earn a bonus)         a) written examination (approx. 120 minutes) or         b) oral examination (approx. 120 minutes)         Assessment offered: Usually once a year, summer semester         Allocation of places         There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with he minor Privatrecht (Private Law). A total of 20 places will be allocated to students of other subjects. Should there whe more than 10 applications, the r			· · · · · · · · · · · · · · · · · · ·	Only after succ. com			
Duration         Module level         Other prerequisites           1 semester         undergraduate            Contents            The lecture provides an overview of German and European trademark law. In addition to the basics of the trad mark concept and protection according to the German Trademark Regulation will be dealt with. Furthermor pecial regulations of the German Trademark Law, such as business designations, geographical indications a the trademark protection of Internet domains are discussed.           Intended learning outcomes            Students are able to analyze trademark law uses from the perspective of German and European law.           Courses (type, number of weekly contact hours, language — if other than German, examination offered — if not every ser ster, information on whether module can be chosen to earn a bonus)           a) written examination (approx. 120 minutes) or b) oral examination (approx. 120 minutes) or b) oral examination (approx. 15 minutes)           Allocation of places           There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of the number of available places exceed the number of applications, the remaining places will be allocated to doest of other subjects. Should there be more than to applications, the remaining places will be allocated to doest of other subjects. Should there be more than to applications, the remaining places will be allocated to doest of other subjects. Should there be more than to applications, the remaining places will be allocated to doen							
1 semester       undergraduate       -         Contents         The lecture provides an overview of German and European trademark kaw. In addition to the basics of the trademark coording to the German Trademark Act, the prerequisites and effects of the European Community Trademark according to the Community Trademark Regulation will be dealt with. Furthermor special regulations of the German Trademark Law, such as business designations, geographical indications a the trademark protection of Internet domains are discussed.         Intended learning outcomes         Students are able to analyze trademark law issues from the perspective of German and European law.         Courses (type, number of weekly contact hours, language — if other than German)         V (2         Method fassessment (type, scope, language — if other than German, examination offered — if not every ser ster, information on whether module can be chosen to earn a bonus)         a) written examination (approx. 120 minutes) or         b) oral examination (approx. 120 minutes)         Assessment offered: Usually once a year, summer semester         Allocation of places         There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with the minor Privaterch (Private Law). A total of 20 places will be allocated to students of the subjects. Should there be more than 10 applications, the remaining places will be allocated as lows: Students applying after not having successfully comp		L		Other prerequisites			
Contents         The lecture provides an overview of German and European trademark law. In addition to the basics of the trac mark concept and protection according to the German Trademark Act, the prerequisites and effects of the European Community Trademark according to the Community Trademark Regulation will be delat with. Furthermor special regulations of the German Trademark Law, such as business designations, geographical indications a the trademark protection of Internet domains are discussed.         Intended learning outcomes       Intended learning outcomes         Students are able to analyze trademark law issues from the perspective of German and European law.       Courses (type, number of weekly contact hours, language — if other than German)         V (2)       Method of assessment (type, scope, language — if other than German, examination offered — if not every ser ster, information on whether module can be chosen to earn a bonus)         a) written examination (approx. 120 minutes) or       b) oral examination (approx. 150 minutes) or         b) are learnination (approx. 150 minutes) or       b) are learnination (approx. 150 minutes) or         b) are are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of ther subjects. Should there be more than to applications, the remaining places will be allocated to students of the subjects. Should there be more than to applications, the remaining places will be allocated as lows: Students applying after not having successfully completed assessment in past years will be given prefe tal locaside tyot tas suby the solud there be more than to app							
mark concept and protection according to the German Trademark Act, the prerequisites and effects of the Eur pean Community Trademark according to the Community Trademark Regulation will be dealt with. Furthermor special regulations of the German Trademark Law, such as business designations, geographical indications a the trademark protection of Internet domains are discussed. Intended learning outcomes Students are able to analyze trademark law issues from the perspective of German and European law. Courses (type, number of weekly contact hours, language — if other than German) V (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every ser ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 120 minutes) or b) oral examination (approx. 15 minutes) Assessment offered: Usually once a year, summer semester Allocation of places There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of the Master's degree programme Economics. Should the number of available places exceed the number of applications, the remaining places may be allocated to dents of other subjects. Should there be more than 100 applications, the remaining places will be allocated to students applying after not having successfully completed assessment in past years will be given prefe tial consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places r allocated by lot as they become available. Additional information - Module appears in Master's degree (1 major) Media Communication (2015) Bachelor's degree (1 major) Media Communication (2016) Master's degree (1 major) Media	Conten	ts		<u> </u>			
Students are able to analyze trademark law issues from the perspective of German and European law. Courses (type, number of weekly contact hours, language — if other than German) V (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every ser ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 120 minutes) or b) oral examination (approx. 120 minutes) Assessment offered: Usually once a year, summer semester Allocation of places There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of the number of available places exceed the number of applications, the remaining places may be allocated to dents of other subjects. Should there be more than 10 applications, the remaining places will be allocated as usens students applying after not having successfully completed assessment in past years will be given prefe tial consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places r allocated by lot as they become available. Additional information Workload go h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Media Communication (2015) Bachelor's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Manger Communication (2015) Master's degree (1 major) Media Communication (2016) Master's degree (1 major) Media Communication (2016)	mark co pean C special the trac	oncept ommur I regula demark	and protection according nity Trademark according tions of the German Trad protection of Internet do	g to the German Trade to the Community Tr emark Law, such as b	emark Act, the prere ademark Regulation ousiness designation	quisites and effects of the Euro- will be dealt with. Furthermore,	
Courses (type, number of weekly contact hours, language — if other than German) V (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every ser ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 120 minutes) or b) oral examination (approx. 15 minutes) Assessment offered: Usually once a year, summer semester Allocation of places There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of ther subjects. 10 of these will be allocated to students of the Master's degree programme Economics. Shoul the number of available places exceed the number of applications, the remaining places will be allocated to dents of other subjects. Should there be more than 10 applications, the remaining places will be allocated to dents of other subjects. Should there be more than 10 applications, the remaining places will be given prefe tial consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places r allocated by lot as they become available. Additional information Workload 90 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Media Communication (2015) Bachelor's degree (1 major) Amostructure Technology (2016) Master's degree (1 major) Media Communication (2016) Master's degree (1 major) Media Communication (2016)							
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Method of assessment (type, scope, language — if other than German, examination offered — if not every ser ster, information on whether module can be chosen to earn a bonus)         a) written examination (approx. 120 minutes) or         b) oral examination (approx. 15 minutes)         Assessment offered: Usually once a year, summer semester         Allocation of places         There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of other subjects. 10 of these will be allocated to students of the Master's degree programme Economics. Shoul the number of available places exceed the number of applications, the remaining places will be allocated to dents of other subjects. Should there be more than 10 applications, the remaining places will be allocated as lows: Students applying after not having successfully completed assessment in past years will be given prefet tal consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places reallocated by lot as they become available.         Additional information		<b>s</b> (type	, number of weekly conta	ict hours, language —	- if other than Germa	in)	
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There are no restrictions with regard to available places for students of Rechtswissenschaft (Law) as well as B chelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of other subjects. 10 of these will be allocated to students of the Master's degree programme Economics. Shoul the number of available places exceed the number of applications, the remaining places may be allocated to dents of other subjects. Should there be more than 10 applications, the remaining places will be allocated as lows: Students applying after not having successfully completed assessment in past years will be given prefe tial consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places r allocated by lot as they become available.  Additional information Workload 90 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Media Communication (2015) Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015) Master's degree (1 major) Media Communication (2016)	b) oral	examin	ation (approx. 15 minute	s)			
chelor's students with the minor Privatrecht (Private Law). A total of 20 places will be allocated to students of other subjects. 10 of these will be allocated to students of the Master's degree programme Economics. Should the number of available places exceed the number of applications, the remaining places may be allocated to dents of other subjects. Should there be more than 10 applications, the remaining places will be allocated as lows: Students applying after not having successfully completed assessment in past years will be given prefer allocated by lot as they become available.  Additional information Workload go h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Media Communication (2015) Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015) Master's degree (1 major) Media Communication (2016)	Allocat	ion of p	olaces				
<ul> <li></li> <li>Workload</li> <li>90 h</li> <li>Teaching cycle</li> <li></li> <li>Referred to in LPO I (examination regulations for teaching-degree programmes)</li> <li></li> <li>Module appears in</li> <li>Master's degree (1 major) Media Communication (2015)</li> <li>Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015)</li> <li>Master's degree (1 major) Nanostructure Technology (2016)</li> <li>Master's degree (1 major) Media Communication (2016)</li> <li>Master's degree (1 major) Media Communication (2016)</li> <li>Master's degree (1 major) Media Communication (2018)</li> </ul>	chelor' other s the nur dents c lows: S tial cor	s stude ubjects mber of of other itudent isiderat	nts with the minor Privat a 10 of these will be alloc available places exceed subjects. Should there b s applying after not havin tion. The remaining place	recht (Private Law). A cated to students of th the number of applic of more than 10 appli ng successfully comp es will be allocated by	total of 20 places w he Master's degree p cations, the remainir cations, the remaini leted assessment in	vill be allocated to students of programme Economics. Should ng places may be allocated to stu- ng places will be allocated as fol- past years will be given preferen-	
90 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Media Communication (2015) Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Media Communication (2016) Master's degree (1 major) Media Communication (2018)	Additio	onal info	ormation				
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Teaching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         Master's degree (1 major) Media Communication (2015)         Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015)         Master's degree (1 major) Nanostructure Technology (2016)         Master's degree (1 major) Media Communication (2018)							
Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         Master's degree (1 major) Media Communication (2015)         Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015)         Master's degree (1 major) Nanostructure Technology (2016)         Master's degree (1 major) Media Communication (2016)         Master's degree (1 major) Media Communication (2018)	-		e				
Module appears in         Master's degree (1 major) Media Communication (2015)         Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015)         Master's degree (1 major) Nanostructure Technology (2016)         Master's degree (1 major) Media Communication (2016)         Master's degree (1 major) Media Communication (2016)         Master's degree (1 major) Media Communication (2018)		3	-				
 Module appears in Master's degree (1 major) Media Communication (2015) Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Media Communication (2016) Master's degree (1 major) Media Communication (2018)	Referre	d to in	LPOI (examination regu	lations for teaching.	legree programmes)		
Master's degree (1 major) Media Communication (2015) Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Media Communication (2016) Master's degree (1 major) Media Communication (2018)							
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Bachelor's degree (1 major, 1 minor) Private Law (Minor, 2015) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Media Communication (2016) Master's degree (1 major) Media Communication (2018)				unication (2015)			
Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Media Communication (2016) Master's degree (1 major) Media Communication (2018)		-			5)		
Master's degree (1 major) Media Communication (2016) Master's degree (1 major) Media Communication (2018)							
Master's degree (1 major) Media Communication (2018)		-	-				
		-					
Master's degree (1 major) Media Communication (2019)		-					

Master's with 1 major Nanostructure Technology

(2016)

Module	e title				Abbreviation
		v and Fundamentals of	Patent Law including r	eferences to EU Law	02-N-P-W07-152-m01
		•			
Module				Module offered by	
	ï	es Faculty of Law		Faculty of Law	
ECTS		od of grading	Only after succ. con	npl. of module(s)	
2	I	rical grade			
Duratio		Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
	rman C	opyright Act. Furthermo			ers the protection of works under atent law and utility model law
Intend	ed lear	ning outcomes			
			owledge of intellectual e context of German an		pyright law. They are able to clas- ons.
Course	<b>s</b> (type	, number of weekly cor	ntact hours, language –	- if other than Germa	n)
V (1)					
			language — if other the can be chosen to earn		tion offered — if not every seme-
b) oral	examir	mination (approx. 120 nation (approx. 15 minu ffered: Usually once a		r	
Allocat	ion of <sub>l</sub>	olaces			
chelor' other s the nur dents c lows: S tial cor	s stude ubjects nber of of other itudent	nts with the minor Priv 5. 10 of these will be al available places exce subjects. Should ther s applying after not ha	vatrecht (Private Law). A located to students of t ed the number of appli e be more than 10 appli ving successfully comp lices will be allocated by	A total of 20 places w he Master's degree p cations, the remainir ications, the remaini leted assessment in	issenschaft (Law) as well as Ba- vill be allocated to students of programme Economics. Should ng places may be allocated to stu- ng places will be allocated as fol- past years will be given preferen- ill be maintained and places re-
Additio	onal inf	ormation			
Worklo	ad				
60 h					
Teachi	ng cvcl	e			
Referre	d to in	IPOI (examination ro	gulations for teaching-	degree programmoc)	
Referre					
 Module		arc in			
			munication (astr)		
	-	ee (1 major) Media Cor gree (1 major, 1 minor)	nmunication (2015) Private Law (Minor, 20:	LE)	
			ture Technology (2016)	-	
	-	-	nal Economic Policy (20		
	-	ee (1 major) Media Cor	•	<i>.,</i>	
	-	ee (1 major) Media Cor			
	•	ee (1 major) Media Cor			
			× 2/		

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page 10 / 101

Modul	e title				Abbreviation		
Electro	chemica	l Energy Storage and	Conversion		08-FU-EEW-152-m0	1	
Module coordinator				Module offered by	Module offered by		
holder of the Chair of Chemical Technology of Material Syn- Chair of Chemical Technology of Material Synthe						al Cunthacia	
thesis	or the Cr	fair of Chemical Tech	nology of Material Syn-	Chair of Chemical I	echnology of Materia	al Synthesis	
ECTS	Method	l of grading	Only after succ. con	npl. of module(s)			
5		cal grade					
Duratio		Module level	Other prerequisites				
1 seme		undergraduate					
Conten	!_						
um and cal dou	d nickel r uble laye	netal hydride, sodiur r capacitors, redox-fle	y systems (aqueous an n sulphur, sodium nick ow batteries, fuel cell sy e solar cell), thermoeled	el chloride, lithium io /stems (AFC, PEMFC,	on accumulators), el	ectrochemi-	
Intend	ed learni	ng outcomes					
		developed a knowled to research problem	ge of electrochemical e s.	nergy storage and co	onversion and are at	ole to apply	
Course	<b>s</b> (type, 1	number of weekly cor	ntact hours, language –	- if other than Germa	un)		
V (2) +	P (1) + E	(1)					
Metho	d of asse	ssment (type, scope,	language — if other the can be chosen to earn		tion offered — if not	every seme	
	tion of pl	ered: Once a year, su aces					
Additio	onal info	rmation					
 Worklo	ad						
150 h							
	ng cycle						
	3 - ,						
	ed to in l	<b>POI</b> (examination re	gulations for teaching-	legree programmes)			
			Sulations for teaching-	active programmes)			
		- !					
	e appear			>			
	-	-	ucture Technology (201)	5)			
	-	e (1 major) Physics (2 a (1 major) Nanostruc	016) ture Technology (2016)				
	-	e (1 major) Functional					
	-		ture Technology (2020)				
	-	e (1 major) Physics (2					
	-	e (1 major) Physics In					
Master	-						
	's degree	e (1 major) Quantum	(2020)				
Master	-	e (1 major) Quantum   ree (1 major) Nanostri	ucture Technology (202	o)			
Master Bachel	or's degi		ucture Technology (202	0)			
Master Bachel Bachel	or's degi or's degi	ree (1 major) Nanostr	ucture Technology (202 n Technology (2021)	0) generated 19-Apr-2025 • exa	am reg da-	page 11 / 101	



Master's degree (1 major) Quantum Technology (2021)

Module					Abbreviation
Structu	ure and	Properties of Modern	Materials: Experiments	s vs. Simulations	08-FU-MW-161-m01
Module	e coord	linator		Module offered by	1
			tionswerkstoffe (Func-		Fechnology of Material Synthesis
tional I					
ECTS	Meth	od of grading	Only after succ. com	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	nts	·			
Materia simula		erties of metals and ce	ramics: correlation of st	tructure/property re	lations through experiments and
Intend	ed lear	ning outcomes			
mance	ceram pecial	ics. They are introduce	d to measuring method	s and calculation m	uminium alloys and high-perfor- ethods using numerical simulati of materials and the resulting pro
Course	<b>s</b> (type	, number of weekly co	ntact hours, language —	- if other than Germa	an)
V (2) +		·			
a) talk b) oral c) oral Langua	(appro examin examir age of a	x. 30 minutes) or nation of one candidat		utes) or	
Allocat		· · · · · · · · · · · · · · · · · · ·			
Additic	onal inf	ormation			
Worklo	ad				
150 h					
Teachi		e			
	<u>5</u>				
	d to in	IPOL (overineties	mulations for tooshing	dograa programme -	
Referre			egulations for teaching-o	uegree programmes	)
 Modul		are in			
Modul			01()		
	-	ee (1 major) Physics (2 (1 major) Nanostruc	016) ture Technology (2016)		
	-	ee (1 major) Nanostruc ee (1 major) Functiona	•, · ·		
	-		ture Technology (2020)		
	-	ee (1 major) Nanostiuc			
	-	ee (1 major) Physics (2			
	-		temational (2020)		
Mactor		an (1 mainr) Augustum			
	-	ee (1 major) Quantum ee (1 major) Quantum	Engineering (2020)		

Module	title				Abbreviation
Sensor	and Ac	ctor Materials - Functiona	l Ceramics and Mag	netic Particles	08-FU-SAM-161-m01
Module	coord	inator		Module offered by	<u> </u>
degree tional N		mme coordinator Funktio als)	nswerkstoffe (Func-	Chair of Chemical 1	Fechnology of Material Synthesis
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	graduate			
Content	ts				
					s piezoelectrics, shape memory ogical fluids, magnetofluids.
Intende	d lear	ning outcomes			
Student	ts have	e developed fundamental	knowledge in the ar	ea of sensory and ac	ctuatory materials.
Courses	<b>s</b> (type	, number of weekly conta	ct hours, language —	· if other than Germa	an)
V (2) + F	P (2)				
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme-
Langua; Assessr	ge of a ment o table f	ation in groups (groups c ssessment: German and/ ffered: Once a year, sum or bonus blaces	or English		
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachin	ıg cycl	e			
 Referre	d to in	LPO I (examination regu	lations for teaching-o	legree programmes	)
Module	appea	ars in			
		ee (1 major) Physics (2010	6)		
	-	ee (1 major) Nanostructur			
	-	ee (1 major) Functional M			
	-	ee (1 major) Nanostructur			
	-	ee (1 major) Physics (202			
	-	ee (1 major) Physics Inter			
	-	ee (1 major) Quantum Eng ee (1 major) Quantum Teo			
	-	ee (1 major) Quantum Tec ee (1 major) Quantum Eng			
	-	ee (1 major) Physics Inter			
	0-		· · · · · · · · · · · · · · · · · · ·		

Module	e title			Abbreviation		
Ultrafa	st spectroscopy and quantur	n-control		08-PCM4-161-m01		
				· .		
	e coordinator		Module offered by			
	r of the seminar "Nanoskalig		· · · · · · · · · · · · · · · · · · ·	l and Theoretical Ch	emistry	
ECTS	Method of grading	Only after succ. con	npl. of module(s)			
5	numerical grade					
Duratio	on Module level	Other prerequisites				
1 seme	ster graduate	Prior completion of	modules o8-PCM1a a	and o8-PCM1b recor	nmended.	
Conten	ts					
	odule discusses advanced to ulses, time-resolved laser sp			control. It focuses o	n ultrashort	
Intende	ed learning outcomes					
Studen plain th	ts are able to describe the generation of the second s	er spectroscopy and na				
Course	<b>s</b> (type, number of weekly co	ntact hours, language –	- if other than Germa	in)		
S (2) +						
Module	e taught in: German or Englis	h				
	<b>d of assessment</b> (type, scope formation on whether modul			tion offered — if not	every seme-	
Langua	(approx. 30 minutes) ige of assessment: German a <b>ion of places</b>	nd/or English				
Allocal	ion of places					
Additio	onal information					
Worklo	ad					
150 h						
Teachir	ng cycle					
Poforro	ed to in LPO I (examination re	gulations for toaching	dogroo programmoc)			
Referre		-Salations for leaching-	active programmes)			
	e appears in					
	's degree (1 major) Chemistry					
	's degree (1 major) Mathema					
	's degree (1 major) Physics (2					
	's degree (1 major) Nanostruc					
	's degree (1 major) Computat 's toaching dogroo Cympasiu			ork Bayaria (END) (a	016)	
	Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)					
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Chemistry (2018)						
	's degree (1 major) Computat		a)			
	's degree (1 major) Mathema		21			
	's degree (1 major) Nanostruc					
	's degree (1 major) Physics (2					
	ith 1 major Nanostructure Technology		generated 19-Apr-2025 • exa		page 15 / 101	



Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Physics International (2020) Master's degree (1 major) Quantum Engineering (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Functional Materials (2022) Master's degree (1 major) Mathematics (2022) Master's degree (1 major) Quantum Engineering (2024) Master's degree (1 major) Physics International (2024) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Physics International (2024) Master's degree (1 major) Computational Mathematics (2024) Master's degree (1 major) Computational Mathematics (2024) Master's degree (1 major) Computational Mathematics (2024)

Modul	e title	Abbreviation				
Artificial Intelligence 1 10-I=KI1-161-m01						
Modul	e coordinator		Module offered by	<u> </u>		
	of the Chair of Computer Se	ionco VI	Institute of Comput			
ECTS	1	Only after succ. co				
5	Method of grading numerical grade					
Duratio		Other prorequicite	-			
1 seme		Other prerequisites				
Conter	1 -					
	ent agents, uninformed and	heuristic search constr	aint problem solving	search with partial	information	
	itional and predicate logic			, search man parala	internation,	
Intend	ed learning outcomes					
	dents possess theoretical and logic and are able to a	. –		gence in the area of	agents,	
	es (type, number of weekly of			an)		
V (2) +		, <u> </u>		,		
Metho	d of assessment (type, sco	be, language — if other th	an German, examina	ation offered — if not	every seme-	
	formation on whether mod					
	examination (approx. 60 t					
	unced by the lecturer at the					
	nation of one candidate eac 5 minutes per candidate).	ii (approx. 20 minutes) o	i dii oldi exdiiiiidlioi	i ili gloups ol 2 callu	iuales (ap-	
	age of assessment: German	and/or English				
	ble for bonus					
Allocat	tion of places					
Additio	onal information					
Focuse AT,SE,I	es available for students of S.HCI	he Master's programme	Informatik (Compute	r Science, 120 ECTS (	credits):	
Worklo						
150 h						
_	ng cycle					
Referre	ed to in LPO I (examination	regulations for teaching-	degree programmes)	1		
Modul	e appears in					
Master	's degree (1 major) Comput	er Science (2016)				
Master	's degree (1 major) Mathem	atics (2016)				
Master	's degree (1 major) Physics	(2016)				
Master	's degree (1 major) Nanostr	ucture Technology (2016)				
1	's degree (1 major) Comput					
1	Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)					
	Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)					
	's degree (1 major) Comput					
	's degree (1 major) Comput					
1	r's degree (1 major) Comput r's degree (1 major) Mathem		19)			
Master's w (2016)	ith 1 major Nanostructure Technology	_	• generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturted	-	page 17 / 101	

Master's degree (1 major) Information Systems (2019)

Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Aerospace Computer Science (2020)

Master's degree (1 major) Physics International (2020)

Master's degree (1 major) Quantum Engineering (2020)

Master's degree (1 major) Quantum Technology (2021)

Modul	Module title Abbreviation						
Analys	Analysis and Design of Programs 10-I=PA-161-m01						
Modul	e coordinator		Module offered by				
holder	of the Chair of Computer Scie	nce ll	Institute of Comput	er Science			
ECTS	Method of grading Only after succ. compl. of module(s)						
5	numerical grade						
Durati	on Module level	Other prerequisites					
1 seme	· · · · · · · · · · · · · · · · · · ·						
Conter		J					
Progra	m analysis, model creation in	software engineering, p	program quality, test	of programs, proces	s models.		
	ed learning outcomes		0 1 //				
	udents are able to analyse pro	grams to use testing fr	amoworks and motri	ics as well as to judg	o program		
quality				its as well as to judg	e program		
Course	<b>es</b> (type, number of weekly cor	ntact hours, language –	- if other than Germa	ın)			
V (2) +	Ü (2)						
Metho	d of assessment (type, scope,	language — if other th	an German, examina	tion offered — if not	every seme-		
	nformation on whether module				,		
lf anno examir prox. 1 Langua	n examination (approx. 60 to 1 bunced by the lecturer at the b nation of one candidate each ( 5 minutes per candidate). age of assessment: German ar able for bonus	eginning of the course, (approx. 20 minutes) or					
Allocat	tion of places						
Additio	onal information						
Focuse SE,IS,E	es available for students of the ES,GE	e Master's programme I	nformatik (Computer	r Science, 120 ECTS o	credits):		
Worklo	oad						
150 h							
-	ing cycle						
Teacin							
Referre	ed to in LPO I (examination re	gulations for teaching-	degree programmes)				
Modul	e appears in						
Master	r's degree (1 major) Computer	Science (2016)					
	r's degree (1 major) Mathemat						
	r's degree (1 major) Physics (2						
	r's degree (1 major) Nanostruc						
1	r's degree (1 major) Computati						
	Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)						
	r's degree (1 major) Computer		ivetwork Davalla (EN	0) (2010)			
	r's degree (1 major) Computer						
	r's degree (1 major) Computer		9)				
	r's degree (1 major) Mathemat		<i>,</i> ,				
	r's degree (1 major) Informatio						
Master's w (2016)	vith 1 major Nanostructure Technology	-	e generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 19 / 101		

Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Physics International (2020) Master's degree (1 major) Quantum Engineering (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Computational Mathematics (2022)

Master's degree (1 major) Mathematics (2022)

Module title Abbreviation					Abbreviation	
Operating Systems 10-I-BS-152-m01					10-l-BS-152-m01	
Module coordinator				Module offered by		
holder of the Chair of Computer Science II			e ll	Institute of Comput	er Science	
ECTS	1	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio		Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
sing in	operat		nd threads, CPU sche	eduling, synchronisa	ure principles, interrupt proces- tion and communication, memo-	
Intende	ed lear	ning outcomes				
The stu	dents	possess knowledge and p	practical skills in buil	ding and using esse	ntial parts of operating systems.	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) +	Ü (2)					
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-	
examin prox. 1	ation c 5 minut 1ge of a	of one candidate each (ap tes per candidate). ssessment: German and,	prox. 20 minutes) or		tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocat	ion of <sub>l</sub>	olaces				
Additio	onal inf	ormation				
Worklo	ad					
150 h			,			
Teachi	ng cvcl	e				
Referre	ed to in	LPOI (examination regu	lations for teaching-c	legree programmes)		
			0			
Module appears in						
Bachele Bachele Bachele Master Master Bachele	Module appears in Bachelor's degree (1 major) Computer Science (2015) Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Computational Mathematics (2015) Bachelor's degree (1 major) Aerospace Computer Science (2015) Master's degree (1 major) Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Bachelor's degree (1 major) Aerospace Computer Science (2017)					
Bachel	or's de	gree (1 major) Computer S	Science (2017)			

Modul	Module title Abbreviation					
Object	Object oriented Programming 10-I-OOP-152-mo1					
Modul	e coord	inator		Module offered by		
Dean c	of Studie	es Informatik (Compute	er Science)	Institute of Comput	er Science	
ECTS Method of grading Only after succ. compl. of module(s)						
5		rical grade				
Duratio	·	Module level	Other prerequisites			
1 seme		undergraduate				
Conter	its					
Polymo ment.	orphism	ı, generic programming	g, meta programming, v	veb programming, te	mplates, document	manage-
Intend	ed learı	ning outcomes				
	udents a ractical		ferent paradigms of ob	ject-oriented prograr	nming and have exp	erience in
			itact hours, language –	- if other than Germa	n)	
V (2) +		, number of weekly cor		n other than oenna	11)	
		essment (type, scope,	language — if other th	an German. examina	tion offered — if not	everv seme-
			can be chosen to earn			,,
		nation (approx. 60 to 1	-			
			eginning of the course, approx. 20 minutes) or			
		es per candidate).				iduics (ap
		ssessment: German ar	ıd/or English			
credita	ble for	bonus	_			
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination re	gulations for teaching-	degree programmes)		
§ 22	Nr. 3 b)					
Modul	e appea	ars in				
Bachel	or's de	gree (1 major) Compute	er Science (2015)			
		gree (1 major) Mathem				
			s Information Systems	-		
			ational Mathematics (2	-		
			ce Computer Science (2	-	``	
			ng degree Gymnasium	Computer Science (2	2015)	
	-	ee (1 major) Physics (20				
	-		ture Technology (2016)			
			s Information Systems n MINT Teacher Educat		ork Bayaria (FNR) (a	o16)
			Education PLUS, Elite			,
		•	Information Systems		_, (2010)	
			·			
Master's w (2016)	nin 1 majoi	Nanostructure Technology	-	e generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 22 / 101

Module title Abbreviation							
Discret	Discrete Mathematics 10-M=VDIM-161-m01					)1	
Module	e coord	inator		Module offered by	<u> </u>		
Dean o	Dean of Studies Mathematik (Mathematics)			Institute of Mathem	nstitute of Mathematics		
ECTS	Metho	od of grading	Only after succ. compl. of module(s)				
5	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	Its						
		hods and results in a s or combinatorics)	selected field of discret	e mathematics (e. g.	coding theory, crypt	ography,	
		d previous knowledge: lge of the contents of t	he module "Introductio	n to Discrete Mather	matics" is required.		
Intend	ed learı	ning outcomes					
The stu	udent is	acquainted with adva	nced results in a select	ed topic in discrete i	mathematics.		
Course	<b>s</b> (type	, number of weekly cor	ntact hours, language –	- if other than Germa	ın)		
V (3) + Module		t in: German and/or En	glish				
			language — if other the can be chosen to earn		ition offered — if not	every seme-	
Langua Assess credita	age of a	ssessment: German or ffered: In the semester bonus	s of 2, approx. 10 minu English in which the course is	·	ubsequent semester		
Additio	onal inf	ormation					
Worklo	ad						
150 h							
Teachi	ng cycl	e					
Referre	ed to in	LPOI (examination re	gulations for teaching-	degree programmes)			
	e appea						
	0	ee (1 major) Mathemat	. ,				
	-	ee (1 major) Physics (2)					
	Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Economathematics (2016)						
	Master's degree (1 major) Economathematics (2016) Master's degree (1 major) Mathematical Physics (2016)						
	Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)						
		•	Education PLUS, Elite	Network Bavaria (EN	B) (2016)		
	-	ee (1 major) Mathemat	-				
Master	's degr	ee (1 major) Nanostruc	ture Technology (2020)				
Master's w (2016)	ith 1 major	Nanostructure Technology	-	e generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 23 / 101	

Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Mathematical Physics (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Economathematics (2021) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Mathematics (2022) Master's degree (1 major) Mathematical Physics (2022) Master's degree (1 major) Economathematics (2022) exchange program Mathematics (2023) Master's degree (1 major) Computational Mathematics (2024) Master's degree (1 major) Mathematics (2024) Master's degree (1 major) Economathematics (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Master's degree (1 major) Mathematical Data Science (2025) Master's degree (1 major) Economathematics (2025)

Module title Abbreviation					
Advanced Analysis 10-M-VAN-152-m01					
Module	e coord	inator		Module offered by	
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
7	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
Continu	uation	of analysis in several vari	ables, integration the	eorems.	
		ning outcomes			
					of the Lesbegue integral, he or
		understand the construct	•	•	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
		<b>sessment</b> (type, scope, la ion on whether module ca			tion offered — if not every seme-
b) oral c) oral	examir examin age of a	mination (approx. 90 to 1 nation of one candidate e nation in groups (groups c ssessment: German and, bonus	ach (15 to 30 minutes of 2, 10 to 15 minutes	5) or	
Allocat	ion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
210 h					
Teachi	ng cvcl	e			
	0 . )				
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module	annes	ars in			
		gree (1 major) Mathemati	cc (2015)		
		gree (1 major) Mathemati gree (1 major) Mathemati			
		gree (1 major) Computatio	,	015)	
		gree (1 major) Mathemati			
		ee (1 major) Physics (201			
	-	ee (1 major) Nanostructur	-		
	-	ee (1 major) Nanostructur	•, · ·		
	-	ee (1 major) Physics (202			
	-	ee (1 major) Physics Inter			
	-	ee (1 major) Quantum Eng			
		ee (1 major) Quantum Teo			
	-	gree (1 major) Mathemati			

Module	Module title							
Astrop	Astrophysics 11-AP-152-mo1							
Module coordinator Module offe								
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy and Astrophysics								
ECTS								
6	nume	rical grade						
Duratio	on	Module level	Other prerequisites	5				
1 seme	ster	undergraduate						
Conten	Its							
telesco um, mo	pes an plecula	onomy, coordinates an d detectors, stellar stru r clouds, structure of th arge-scale structures, o	ucture and atmosphere ie milky way, the local	s, stellar evolution a	nd end stages, inter	stellar medi-		
Intend	ed lear	ning outcomes						
physica	al obse	are familiar with the mo rvations and evaluation familiar with the physio	ns. They are able to use	e these methods to p	olan and analyse owr	n observati-		
Course	s (type	, number of weekly con	itact hours, language –	- if other than Germa	ın)			
V (2) +		· · · · ·						
		t in: German or English						
		<b>essment</b> (type, scope, on on whether module			ition offered — if not	every seme-		
<ul> <li>b) oral</li> <li>c) oral</li> <li>d) proje</li> <li>e) pres</li> <li>lf a write</li> <li>stead t</li> <li>of assess</li> <li>nation</li> </ul>	examir examin ect repo entatio tten exa ake the essmen date at	mination (approx. 90 to nation of one candidate ation in groups (group) ort (approx. 8 to 10 pag n/talk (approx. 30 min amination was chosen torm of an oral examin t is changed, the lectur the latest.	e each (approx. 30 minu s of 2, approx. 30 minu es) or utes) as method of assessm nation of one candidate rer must inform student	ites per candidate) o ent, this may be cha e each or an oral exa	nged and assessmer mination in groups.	If the method		
	<u> </u>	ssessment: German ar						
Allocat	ion of p	Diaces						
Additio	onal inf	ormation						
	-							
Worklo	ad							
180 h	-							
Teachi	Teaching cycle							
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)								
§ 22								
-	§ 22    Nr. 2 f)							
§ 22 II Nr. 3 f)								
Module appears in								
Bachel	or's de	gree (1 major) Physics (	2015)					
Master's w (2016)	ith 1 majo	r Nanostructure Technology	-	• generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 26 / 101		

Bachelor's degree (1 major) Mathematical Physics (2015) Bachelor's degree (1 major) Aerospace Computer Science (2015) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2015) First state examination for the teaching degree Grundschule Physics (2015) First state examination for the teaching degree Grundschule Didactics in Physics (Primary School) (2015) First state examination for the teaching degree Realschule Physics (2015) First state examination for the teaching degree Gymnasium Physics (2015) First state examination for the teaching degree Sonderpädagogik Didactics in Physics (Middle School) (2015) First state examination for the teaching degree Mittelschule Physics (2015) First state examination for the teaching degree Mittelschule Didactics in Physics (Middle School) (2015) Bachelor's degree (1 major) Mathematical Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Bachelor's degree (1 major) Aerospace Computer Science (2017) First state examination for the teaching degree Grundschule Physics (2018) First state examination for the teaching degree Grundschule Didactics in Physics (Primary School) (2018) First state examination for the teaching degree Realschule Physics (2018) First state examination for the teaching degree Gymnasium Physics (2018) First state examination for the teaching degree Mittelschule Physics (2018) First state examination for the teaching degree Sonderpädagogik Didactics in Physics (Middle School) (2018) First state examination for the teaching degree Mittelschule Didactics in Physics (Middle School) (2018) Master's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major) Physics (2020) Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) First state examination for the teaching degree Grundschule Didactics in Physics (Primary School) (2020) First state examination for the teaching degree Grundschule Physics (2020) First state examination for the teaching degree Gymnasium Physics (2020) First state examination for the teaching degree Realschule Physics (2020) First state examination for the teaching degree Sonderpädagogik Didactics in Physics (Middle School) (2020) First state examination for the teaching degree Mittelschule Didactics in Physics (Middle School) (2020) First state examination for the teaching degree Mittelschule Physics (2020) Master's degree (1 major) Quantum Technology (2021) exchange program Physics (2023) Bachelor's degree (1 major) Mathematical Physics (2024)

Module title Abbreviation						
Method	Methods of Observational Astronomy 11-ASM-161-m01					
Module coordinator				Module offered by		
Managi and Ast		ector of the Institute of sics	Theoretical Physics	Faculty of Physics a	nd Astronomy	
ECTS Method of grading Only after succ. compl. of module(s)						
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
		oservational astronomy tical, X-ray and gamma		netic spectrum. Eval	uation of observatio	nal data
Intende	ed leari	ning outcomes				
dio, opt	tical, X	e methods used in obs -ray and gamma-ray en luct astronomical obse	ergies). Knowledge of I			
Course	<b>s</b> (type	, number of weekly con	tact hours, language –	- if other than Germa	n)	
V (3) + I Module		t in: German or English				
Method	l of ass	sessment (type, scope,	language — if other th	an German, examina	tion offered — if not	every seme-
ster, inf	formati	on on whether module	can be chosen to earn	a bonus)		
c) oral e d) proje e) prese If a writ stead ta of asse nation o Langua Assess	examin ect repo entatio ten exa ake the ssmen date at ge of a ment o	ation of one candidate ation in groups (groups ort (approx. 8 to 10 pag n/talk (approx. 30 minuta amination was chosen a form of an oral examinat is changed, the lectur the latest. ssessment: German an affered: In the semester	s of 2, approx. 30 minu es) or utes). as method of assessm nation of one candidate er must inform student d/or English	tes per candidate) of ent, this may be char e each or an oral exa ts about this by four	nged and assessmer mination in groups. I weeks prior to the or	If the method riginal exami-
Allocat	ion of p	olaces				
 Additio 	nal inf	ormation				
Worklo	ad					
180 h						
Teachir	ng cycl	٩				
reacini	is cycl	6				
	a to in	LPO I (examination reg	ulations for teaching-	degree programmes)		
Module	appea	ars in				
Master' Master' Master' Master'	Module appears in         Master's degree (1 major) Mathematics (2016)         Master's degree (1 major) Physics (2016)         Master's degree (1 major) Nanostructure Technology (2016)         Master's degree (1 major) Computational Mathematics (2016)         Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)					
Master's wi (2016)	tn 1 majoi	r Nanostructure Technology	-	e generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 28 / 101

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Master's degree (1 major) Computational Mathematics (2019)

Master's degree (1 major) Mathematics (2019)

Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Quantum Technology (2021)

Master's degree (1 major) Computational Mathematics (2022)

Master's degree (1 major) Mathematics (2022)

exchange program Physics (2023)

Master's degree (1 major) Computational Mathematics (2024)

Master's degree (1 major) Mathematics (2024)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title					Abbreviation	
Introdu	Introduction to Space Physics 11-ASP-161-m01					
Module coordinator Module o				Module offered by		
Managing Director of the Institute of Theoretical Physics Facult and Astrophysics				Faculty of Physics a	ind Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	graduate				
Conten	ts					
3. Elem 4. The s 5. Accel	mics o ents of sun and leration	f charged particles in ma space physics heliosphere and transport of energe to measure energetic pa	tic particles in the he	eliosphere		
		ning outcomes				
The stu mics of	dents a charge	acquire basic knowledge	the heliosphere. The		the characterisation of the dyna- ameters and theoretical concepts	
Courses	<b>s</b> (type,	, number of weekly conta	ct hours, language –	- if other than Germa	in)	
V (3) + I Module		t in: German or English				
					tion offered — if not every seme-	
ster, inf	formati	on on whether module ca	an be chosen to earn	a bonus)		
b) oral e c) oral e d) proje e) prese lf a writ stead ta of asse nation e Langua Assessi	examin examin ect repo entatio ten exa ake the ssmen date at ge of a ment o	form of an oral examina t is changed, the lecturer the latest. ssessment: German and, ffered: In the semester in	ach (approx. 30 minu of 2, approx. 30 minu o) or es). method of assessmu tion of one candidate must inform student /or English	tes per candidate) of ent, this may be char e each or an oral exa is about this by four	nged and assessment may in- mination in groups. If the method weeks prior to the original exami-	
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Workload						
180 h						
Teachir	ng cycl	e				
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)		
	-					
Module appears in						
Master's degree (1 major) Mathematics (2016)						

Master's degree (1 major) Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Computational Mathematics (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019) Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Mathematics (2022) exchange program Physics (2023) Master's degree (1 major) Computational Mathematics (2024) Master's degree (1 major) Mathematics (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title					Abbreviation		
Image and Signal Processing in Physics     11-BSV-161-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	<u> </u>	rical grade					
Duratio		Module level	Other prerequisites				
1 seme		graduate					
<b>Contents</b> Periodic and aperiodic signals; principles of discreet and exact Fourier transformation; principles of digital signal and image processing; discretisation of signals/sampling theorem (Shannon); homogeneous and linear filters, convolution product; tapering functions and interpolation of images; the Parsival theorem, correlation and energetic observation; statistical signals, image noise, moments, stationary signals; tomography: Hankel and Radon transformation.							
Intende	ed learr	ning outcomes					
les of i	mage p	nave advanced knowled rocessing and are fami s and to implement the	liar with different meth	ods of signal proces			
Course	<b>s</b> (type,	number of weekly con	tact hours, language –	- if other than Germa	n)		
V (2) + Module	• •	t in: German or English					
		essment (type, scope, on on whether module			tion offered — if not	every seme-	
<ul> <li>b) oral</li> <li>c) oral</li> <li>d) projeting</li> <li>e) pression</li> <li>lf a write stead t</li> <li>of assesting</li> <li>nation</li> <li>Languation</li> </ul>	examin examin ect repo entatio tten exa ake the ssment date at ge of a	nination (approx. 90 to ation of one candidate ation in groups (groups ort (approx. 8 to 10 pag n/talk (approx. 30 minu mination was chosen a form of an oral examin t is changed, the lecture the latest. ssessment: German an ffered: In the semester	each (approx. 30 minu s of 2, approx. 30 minu es) or utes). as method of assessmu ation of one candidate er must inform student d/or English	tes per candidate) of ent, this may be char e each or an oral exa s about this by four	nged and assessmer mination in groups. I weeks prior to the or	If the method riginal exami-	
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Additio	nal info	ormation					
Worklo	ad						
180 h							
Teachi	ng cycle	9					
Referre	ed to in	LPOI (examination reg	gulations for teaching-	degree programmes)			
Module	e appea	rs in					
	-	ee (1 major) Mathemati					
	-	ee (1 major) Physics (20 ee (1 major) Nanostruct					
		Nanostructure Technology		generated 19-Apr-2025 • exa	am. reg. da-	page 32 / 101	
(2016)	, 51		-	r (120 ECTS) Nanostrukturtec	-		

Master's degree (1 major) Computational Mathematics (2016) Master's degree (1 major) Functional Materials (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019) Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Functional Materials (2022) Master's degree (1 major) Mathematics (2022) exchange program Physics (2023) Master's degree (1 major) Computational Mathematics (2024) Master's degree (1 major) Mathematics (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Master's degree (1 major) Functional Materials (2025)

	e title				Abbreviation	
Advanced Topics in Solid State Physics					11-CSFM-161-m01	
Module coordinator				Module offered by		
		ector of the Institute of T	hearetical Physics	Faculty of Physics a	and Astronomy	
and As	-				and Astronomy	
ECTS		od of grading	Only after succ. co	mpl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate	Approval from exam	nination committee r	equired.	
Conten	Its					
vered in	n any o	vill enable the lecturers of If the other modules. The In the regular curriculum	ese topics may relate			
Intend	ed lear	ning outcomes				
		advance their knowledg nsights into the connecti			of Condensed Matt	er Physics
Course	<b>s</b> (type	, number of weekly cont	act hours, language -	– if other than Germa	un)	
V (3) +	R (1)					
Metho	d of as	sessment (type, scope, l	 anguage — if other th	nan German, examina	ition offered — if not	t every seme-
		ion on whether module of				,
e) presentation/talk (approx. 30 minutes) If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami- nation date at the latest. Language of assessment: German and/or English						
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#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Module studies (Master) Quantum Technology (2021) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Modul	e title				Abbreviation	
Advanced Topics in Nanostructure Technology					11-CSNM-161-m01	
Module coordinator				Module offered by		
		ector of the Institute of Th	eoretical Physics	Faculty of Physics a	and Astronomy	
and Astrophysics       ECTS     Method of grading       Only after succ. compl. of module(s)						
6		rical grade		mpl. or module(s)		
Duration Module level Other prerequisites						
1 seme		graduate		nination committee r	equired.	
Conter	nts					
can no with to	t be cov pics the	vered by any other modul at are not included in the	e. These lectures ma	y either reflect new o	ctures on advanced topics that developments in research or deal	
Intend	ed lear	ning outcomes				
		advance their knowledge ts into the connections b			c of nanostructure technology and	
Course	<b>es</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)	
V (3) +	R (1)					
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Additio	onal inf	ormation				
Worklo	bad					
180 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regu	lations for teaching-	degree programmes)		
Module appears in						
Master	r's degr	ee (1 major) Nanostructur ee (1 major) Nanostructur				

Advand	e title				Abbreviation
Advanced Topics in Physics					11-CSPM-161-m01
Module coordinator				Module offered by	
		f examination committee		Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. con	· · · ·	
6		rical grade			
Duratio		Module level	Other prerequisites		
1 seme		graduate	Approval from exam		equired.
Conten		3			- 1
This mo	odule w es. The	se topics may relate eithe			cs not covered in any of the other subjects not included in the regu-
Intende	ed lear	ning outcomes			
		advance their knowledge ts into the connections b			c of nanostructure technology and
Course	<b>s</b> (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)
V (3) +	R (1)				
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami nation date at the latest. Language of assessment: German and/or English Allocation of places					
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Module title				Abbreviation
Current Topics in Nanostructure Technology				11-EXN5-161-m01
Module coordinator			Module offered by	
chairperso	n of examination committee		Faculty of Physics a	and Astronomy
ECTS Me	thod of grading	Only after succ. com	pl. of module(s)	
5 nu	merical grade			
Duration	Module level	Other prerequisites		
1 semester	graduate	Approval from exam	ination committee re	equired.
Contents				
	ics in Experimental or Theor or study abroad.	retical Physics. Credit	ed academic achiev	rements, e.g. in case of change of
Intended le	earning outcomes			
subdiscipli knowledge		nd the measuring and e subject-specific co	l/or calculation mether ntexts and know the	• •
V (2) + R (2				
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Allocation		0. 2.13.1011		
Additional	information			
Workload				
150 h				
Teaching c	ycle			
Referred to	in LPO I (examination regu	lations for teaching-o	legree programmes)	
Module ap	pears in			
Master's de	egree (1 major) Nanostructu	re Technology (2016)		
Master's degree (1 major) Nanostructure Technology (2020)				

Module title				Abbreviation	
Current Topics in Nanostructure Technology			ology		11-EXN6-161-m01
Module coordinator				Module offered by	<u> </u>
chairpe	erson of	f examination committee		Faculty of Physics a	nd Astronomy
ECTS		od of grading	Only after succ. com	pl. of module(s)	
6	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 seme	ster	graduate	Approval from exam	ination committee re	equired.
Conten	ts				
		in Experimental or Theor tudy abroad.	etical Physics. Credit	ed academic achiev	ements, e.g. in case of change of
Intende	ed learr	ning outcomes			
knowle	dge. Th	of Physics and understar ley are able to classify th , number of weekly conta	e subject-specific cor	ntexts and know the	
V (3) +	R (1)				
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Additio	nal info	ormation			
Worklo	ad				
180 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module					
	-	ee (1 major) Nanostructur	•, · ·		
Master	's degre	ee (1 major) Nanostructur	e lechnology (2020)		

Module title				Abbreviation	
Current Topics in Nanostructure Technology			ology		11-EXN6A-161-m01
Module coordinator				Module offered by	
chairpe	erson of	f examination committee		Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. com	pl. of module(s)	
6	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 seme	ster	graduate	Approval from exam	ination committee re	equired.
Conten	ts				
		in Experimental or Theor tudy abroad.	retical Physics. Credit	ed academic achiev	ements, e.g. in case of change of
Intende	ed learr	ning outcomes			
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		e <b>ssment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
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Additio	nal inf	ormation			
Worklo	ad				
180 h					
Teachir	ng cycl	9			
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
Module	e appea	in and a second s			
	-	ee (1 major) Nanostructu	•,		
Master'	's degre	ee (1 major) Nanostructui	re Technology (2020)		

Module title				Abbreviation	
Current Topics in Nanostructure Technology			ology		11-EXN7-161-m01
Module coordinator				Module offered by	
chairpe	erson of	f examination committee		Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. com	pl. of module(s)	
7	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 seme	ster	graduate	Approval from exam	ination committee re	equired.
Conten	ts				
		in Experimental or Theor tudy abroad.	etical Physics. Credit	ed academic achiev	ements, e.g. in case of change of
Intende	ed learr	ning outcomes			
subdiso knowle	cipline dge. Th		nd the measuring and e subject-specific cor	l/or calculation mether ntexts and know the	
V (3) + I	R (1)				
		e <b>ssment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
pages) If a writ stead ta of asse nation	or pres ten exa ake the ssment date at	entation/talk (approx. 30 amination was chosen as form of an oral examina	o minutes). method of assessme tion of one candidate must inform student	ent, this may be chan each or an oral exa	r project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method weeks prior to the original exami-
Allocat					
Additio	nal info	ormation			
Worklo	ad				
210 h					
Teachir	ng cycl	9			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module	e appea	irs in			
	-	ee (1 major) Nanostructu	•, · ·		
Master's degree (1 major) Nanostructure Technology (2020)					

Current	Module title				Abbreviation	
Current Topics in Nanostructure Technology			ology		11-EXN8-161-m01	
Module coordinator				Module offered by	Module offered by	
chairpe	erson o	f examination committee		Faculty of Physics a	ind Astronomy	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
8	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate	Approval from exam	ination committee r	equired.	
Conten	ts					
		in Experimental or Theor tudy abroad.	retical Physics. Credit	ed academic achiev	ements, e.g. in case of change of	
Intende	ed learı	ning outcomes				
subdise knowle	cipline dge. Th		nd the measuring and e subject-specific cor	l/or calculation mether ntexts and know the		
V (4) +	R (2)		-			
		<b>essment</b> (type, scope, la on on whether module c			tion offered — if not every seme-	
written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.						
		the latest.	r must inform student		mination in groups. If the method	
Langua	ige of a	the latest. ssessment: German and	r must inform student		mination in groups. If the method	
	ige of a	the latest. ssessment: German and	r must inform student		mination in groups. If the method	
Langua Allocat 	age of a <b>ion of p</b>	the latest. ssessment: German and <b>blaces</b>	r must inform student		mination in groups. If the method	
Langua Allocat 	age of a <b>ion of p</b>	the latest. ssessment: German and	r must inform student		mination in groups. If the method	
Langua Allocat 	ige of a ion of p onal info	the latest. ssessment: German and <b>blaces</b>	r must inform student		mination in groups. If the method	
Langua Allocat  Additio 	ige of a ion of p onal info	the latest. ssessment: German and <b>blaces</b>	r must inform student		mination in groups. If the method	
Langua Allocat  Additio  Worklo	ion of ponal info	the latest. ssessment: German and places ormation	r must inform student		mination in groups. If the method	
Langua Allocat  Additio  Worklo 240 h	ion of ponal info	the latest. ssessment: German and places ormation	r must inform student		mination in groups. If the method	
Langua Allocat  Additio  Worklo 240 h Teachin 	age of a ion of p onal info pad	the latest. ssessment: German and places ormation	rmust inform student /or English	s about this by four	mination in groups. If the method weeks prior to the original exami-	
Langua Allocat  Additio  Worklo 240 h Teachin 	age of a ion of p onal info pad	the latest. ssessment: German and places ormation e	rmust inform student /or English	s about this by four	mination in groups. If the method weeks prior to the original exami-	
Langua Allocat  Additio  Worklo 240 h Teachin 	ige of a ion of p onal info pad ng cyclo ed to in	the latest. ssessment: German and places ormation e LPO I (examination regu	rmust inform student /or English	s about this by four	mination in groups. If the method weeks prior to the original exami-	
Langua Allocat  Additio  240 h Teachin  Referre  Module	ige of a ion of p onal info pad ng cyclo ed to in	the latest. ssessment: German and places ormation e LPO I (examination regu	must inform student /or English lations for teaching-c	s about this by four	mination in groups. If the method weeks prior to the original exami-	

Module title				Abbreviation	
Non-technical Minor Subject					11-EXNT6-161-m01
Module	coord	inator		Module offered by	
chairpe	rson o	f examination committee		Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. com	pl. of module(s)	
6	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 seme	ster	graduate	Approval from exam	ination committee re	equired.
Conten	ts				
Non-teo	chnical	minor. Crediting for acad	lemic achievements,	e.g. from university	change or study abroad
Intende	ed lear	ning outcomes			
					ond to the requirements of a mo- law, business sciences).
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	ın)
V (3) + I	R (1)				
ster, inf	formati	on on whether module ca	an be chosen to earn	a bonus)	tion offered — if not every seme-
or oral o pages) If a writ stead ta of asse nation o	examin or pres ten exa ake the ssmen date at	ation in groups (groups of entation/talk (approx. 30 amination was chosen as e form of an oral examination	of 2, approx. 30 minuto minutes). method of assessme tion of one candidate must inform student	tes per candidate) o ent, this may be chai each or an oral exa	didate each (approx. 30 minutes) r project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method weeks prior to the original exami-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
180 h					
Teachir	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)	
Module	appea	irs in			
		ee (1 major) Nanostructur	e Technology (2016)		
	-	ee (1 major) Nanostructur			
Master'	Master's degree (1 major) Quantum Technology (2021)				

Module title				Abbreviation	
	Current Topics in Physik 11-EXP5-161-m01				
Module coordinator				Module offered by	
chairpe	erson o	f examination committee		Faculty of Physics a	nd Astronomy
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate	Approval from exam	ination committee re	equired.
Conten	Its				
		in Experimental or Theor tudy abroad.	retical Physics. Credit	ed academic achiev	ements, e.g. in case of change of
Intend	ed lear	ning outcomes			
Theore subdis	tical Ph cipline	nysics of the Master's pro	gramme of Nanostruc nd the measuring and	cture Technology. Th I/or calculation meth	of a module of Experimental or ey have knowledge of a current nods necessary to acquire this application areas.
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)
		· · · ·			
ster, in written or oral pages) If a writ stead t of asse nation Langua Allocat  Additio	V (2) + R (2)  Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)  written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami- nation date at the latest. Language of assessment: German and/or English Allocation of places Additional information				
150 h	-				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
		5			
Module	e appea	ars in			
Master Master Master	Module appears inMaster's degree (1 major) Nanostructure Technology (2016)Master's degree (1 major) Nanostructure Technology (2020)Master's degree (1 major) Quantum Technology (2021)Module studies (Master) Quantum Technology (2021)				

Module title				Abbreviation		
Current	Current Topics in Physik 11-EXP6-161-m01					
Module	e coord	inator		Module offered by	<u> </u>	
chairperson of examination committee			Faculty of Physics a	nd Astronomy		
ECTS	ECTS Method of grading Only after succ. compl. of module(s)					
6	nume	rical grade		•		
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate		ination committee re	equired.	
Conten	its					
	•	in experimental or the tudy abroad.	oretical physics. Credit	ed academic achieve	ements, e.g. in case	of change of
Intende	ed learr	ning outcomes				
Theore subdis knowle	tical Ph cipline edge. Th	nave advanced compet ysics of the Master's p of Physics and underst ney are able to classify	rogramme of Nanostru and the measuring and the subject-specific co	cture Technology. Th d/or calculation mether ntexts and know the	ey have knowledge on the second se second second seco	of a current
		number of weekly con	tact hours, language –	- if other than Germa	n)	
V (3) +	R (1)					
		essment (type, scope, on on whether module			tion offered — if not	every seme-
d) proje e) pres If a writ stead t of asse nation	ect repo entatio tten exa ake the essment date at	ation in groups (groups ort (approx. 8 to 10 pag n/talk (approx. 30 min mination was chosen a form of an oral examir t is changed, the lectur the latest. ssessment: German an	es) or utes) as method of assessm nation of one candidate er must inform student	ent, this may be char e each or an oral exa	nged and assessmer mination in groups.	If the method
Allocat	ion of p	olaces				
Additio	onal info	ormation				
Worklo	ad					
180 h						
Teachi	ng cycl	2				
	0 . 7	-				
Referre	ed to in	LPOI (examination reg		degree programmes)		
Module	e appea	rs in				
Master Master Supple Module Master Master	Module appears inMaster's degree (1 major) Physics (2016)Master's degree (1 major) Nanostructure Technology (2016)Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)Module studies (Master) Physics (2019)Master's degree (1 major) Nanostructure Technology (2020)Master's degree (1 major) Physics (2020)Waster's with 1 major Nanostructure TechnologyJMU Würzburg • generated 19-Apr-2025 • exam. reg. da-page 45 / 101					
(2010)				r (120 ECTS) Nanostrukturtec	11111K - 2010	

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Module studies (Master) Quantum Technology (2021) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title				Abbreviation		
Curren	Current Topics in Physik 11-EXP6A-161-m01					
Module	e coord	inator		Module offered by		
chairperson of examination committee			Faculty of Physics a	nd Astronomy		
ECTS						
6	·	rical grade		1		
Duratio	on	Module level	Other prerequisites			
1 seme		graduate		ination committee re	equired.	
Conten	ts	•				
	•	in Experimental or The tudy abroad.	oretical Physics. Credi	ted academic achiev	ements, e.g. in case	of change of
Intend	ed learr	ning outcomes				
Theore subdis	tical Ph cipline	ysics of the Master's p of Physics and underst	encies corresponding rogramme of Nanostru and the measuring and the subject-specific co	cture Technology. Th d/or calculation meth	ey have knowledge of nods necessary to ac	of a current
Course	<b>s</b> (type,	number of weekly con	tact hours, language –	- if other than Germa	n)	
V (3) +	R (1)					
			language — if other th can be chosen to earn		tion offered — if not	every seme-
c) oral d) proje e) pres If a writ stead t of asse nation	examin ect repo entatio tten exa ake the essment date at age of a	ation in groups (groups ort (approx. 8 to 10 pag n/talk (approx. 30 min amination was chosen form of an oral examin t is changed, the lectur the latest. ssessment: German an	utes) as method of assessm nation of one candidate er must inform student	tes per candidate) o ent, this may be char e each or an oral exa	nged and assessmer mination in groups.	If the method
Allocal						
Additio	onal info	ormation				
			_			
Worklo	ad					
180 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination res	gulations for teaching-	degree programmes)		
Module	e appea	rs in				
Module appears in         Master's degree (1 major) Physics (2016)         Master's degree (1 major) Nanostructure Technology (2016)         Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)         Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)         Module studies (Master) Physics (2019)         Master's degree (1 major) Nanostructure Technology (2020)         Master's degree (1 major) Physics (2020)         Master's with 1 major Nanostructure Technology         JMU Würzburg • generated 19-Apr-2025 • exam. reg. da-						
(2016)			ta record Maste	er (120 ECTS) Nanostrukturtec	hnik - 2016	

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Module studies (Master) Quantum Technology (2021) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title			Abbreviation		
Current Topics in Physik				11-EXP7-161-m01	
Module	e coord	inator		Module offered by	
chairpe	erson o	f examination committee		Faculty of Physics a	nd Astronomy
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
7	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate	Approval from exam	ination committee re	equired.
Conten	ts				
		of Experimental and The versity or study abroad.	oretical Physics. Acci	redited academic acl	hievements, e.g. in case of
Intende	ed lear	ning outcomes			
Theore subdis	tical Ph cipline	ysics of the Master's pro	gramme of Nanostruc nd the measuring and	cture Technology. Th I/or calculation meth	of a module of Experimental or ey have knowledge of a current nods necessary to acquire this application areas.
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)
V (3) +	R (1)				
ster, in written or oral pages) If a writ stead t of asse nation Langua Allocat  Additio	V (3) + R (1) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami- nation date at the latest. Language of assessment: German and/or English Allocation of places  Additional information 				
210 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module	e appea	irs in			
Master Master	Module appears in Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Quantum Technology (2021) Module studies (Master) Quantum Technology (2021)				

Module title				Abbreviation	
					11-EXP8-161-m01
Module	e coord	inator		Module offered by	
chairpe	erson o	f examination committee		Faculty of Physics a	nd Astronomy
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
8	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate	Approval from exam	ination committee re	equired.
Conten	ts				
		of Experimental and The versity or study abroad.	oretical Physics. Acci	redited academic ac	hievements, e.g. in case of
Intende	ed learı	ning outcomes			
Theoret subdise	tical Ph cipline	ysics of the Master's pro	gramme of Nanostruc nd the measuring and	ture Technology. Th /or calculation meth	of a module of Experimental or ey have knowledge of a current nods necessary to acquire this application areas.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
ster, in written or oral ( pages) If a writ stead ta of asse nation ( Langua Allocat  Additio	V (4) + R (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami- nation date at the latest. Language of assessment: German and/or English Allocation of places  Additional information 				
240 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
Module	e appea	urs in			
Master Master	Module appears in Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Quantum Technology (2021) Module studies (Master) Quantum Technology (2021)				

A J J	e title				Abbreviation
Additional Qualifications					11-EXZ5-161-m01
Module	e coord	inator		Module offered by	<u> </u>
		f examination committee		Faculty of Physics and Astronomy	
ECTS	-	od of grading	Only after succ. con	· · · ·	
5		rical grade			
Duration Module level Other prerequisi			Other prerequisites		
1 seme	ster	graduate	Approval from exam	ination committee r	equired.
Conten	Its				
Additio abroad		lls for engineers. Accredi	ted academic achiev	ements, e.g. in case	of change of university or study
Intende	ed lear	ning outcomes			
gree pr	ogramr	•	• •	•	of a module of the Master's de- for an occupation in the industry
Course	<b>s</b> (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)
V (2) +	R (2)	· · · · ·			
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami- nation date at the latest. Language of assessment: German and/or English Allocation of places					
pages) If a writ stead ta of asse nation Langua Allocat	or pres tten exa ake the essmen date at age of a <b>ion of p</b>	entation/talk (approx. 3 amination was chosen as form of an oral examina t is changed, the lecturer the latest. ssessment: German and	of 2, approx. 30 minu o minutes). o method of assessmo tion of one candidate must inform student	ites per candidate) o ent, this may be cha e each or an oral exa	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method
pages) If a writ stead ta of asse nation Langua Allocat  Additio	or pres tten exa ake the ssmen date at age of a <b>ion of p</b>	entation/talk (approx. 3 amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and <b>blaces</b>	of 2, approx. 30 minu o minutes). o method of assessmo tion of one candidate must inform student	ites per candidate) o ent, this may be cha e each or an oral exa	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method
pages) If a writ stead ta of asse nation Langua Allocat  Additio  Worklo	or pres tten exa ake the ssmen date at age of a <b>ion of p</b>	entation/talk (approx. 3 amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and <b>blaces</b>	of 2, approx. 30 minu o minutes). o method of assessmo tion of one candidate must inform student	ites per candidate) o ent, this may be cha e each or an oral exa	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method
pages) If a writ stead ta of asse nation Langua Allocat  Additio  Worklo 150 h	or pres tten exa ake the essmen date at age of a <b>ion of p</b> onal info	entation/talk (approx. 3 amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and <b>blaces</b>	of 2, approx. 30 minu o minutes). o method of assessmo tion of one candidate must inform student	ites per candidate) o ent, this may be cha e each or an oral exa	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method
pages) If a writ stead ta of asse nation Langua Allocat  Additio  Worklo	or pres tten exa ake the essmen date at age of a <b>ion of p</b> onal info	entation/talk (approx. 3 amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and <b>blaces</b>	of 2, approx. 30 minu o minutes). o method of assessmo tion of one candidate must inform student	ites per candidate) o ent, this may be cha e each or an oral exa	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method
pages) If a writ stead ta of asse nation Langua Allocat  Additio  Worklo 150 h Teachin 	or pres tten exa ake the ssmen date at age of a <b>ion of p</b> <b>onal inf</b> <b>onal inf</b>	entation/talk (approx. 3 amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and olaces ormation	of 2, approx. 30 minu o minutes). s method of assessmo tion of one candidate must inform student /or English	ites per candidate) o ent, this may be cha e each or an oral exa is about this by four	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method weeks prior to the original exami
pages) If a writ stead ta of asse nation Langua Allocat  Additio  Worklo 150 h Teachin 	or pres tten exa ake the ssmen date at age of a <b>ion of p</b> <b>onal inf</b> <b>onal inf</b>	entation/talk (approx. 3 amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and <b>blaces</b>	of 2, approx. 30 minu o minutes). s method of assessmo tion of one candidate must inform student /or English	ites per candidate) o ent, this may be cha e each or an oral exa is about this by four	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method weeks prior to the original exami
pages) If a writ stead ta of asse nation Langua Allocat  Morklo 150 h Teachin  Referre 	or pres tten exa ake the essmen date at age of a <b>ion of p</b> onal info pad	entation/talk (approx. 30 amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and olaces ormation e LPO I (examination regu	of 2, approx. 30 minu o minutes). s method of assessmo tion of one candidate must inform student /or English	ites per candidate) o ent, this may be cha e each or an oral exa is about this by four	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method weeks prior to the original exami
pages) If a writ stead ta of asse nation Langua Allocat  Additio  Worklo 150 h Teachin  Referre  Module	or pres tten exa ake the essmen date at age of a ion of p onal info pad	entation/talk (approx. 3) amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and olaces ormation e LPO I (examination regu	of 2, approx. 30 minu o minutes). s method of assessmo tion of one candidate must inform student /or English	ites per candidate) o ent, this may be cha e each or an oral exa is about this by four degree programmes)	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method weeks prior to the original exami
pages) If a writ stead ta of asse nation Langua Allocat  Worklo 150 h Teachin  Referre Module	or pres tten exa ake the essmen date at age of a ion of p onal info onal info ad ed to in e appea	entation/talk (approx. 30 amination was chosen as e form of an oral examina t is changed, the lecturer the latest. ssessment: German and olaces ormation e LPO I (examination regu	of 2, approx. 30 minu o minutes). s method of assessmo tion of one candidate must inform student /or English /or English 	ites per candidate) o ent, this may be cha e each or an oral exa is about this by four degree programmes)	or project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method weeks prior to the original exami

Module title					Abbreviation
Additional Qualifications					11-EXZ6-161-m01
Module	coordi	nator		Module offered by	
chairpe	rson of	examination committee		Faculty of Physics a	nd Astronomy
ECTS		od of grading	Only after succ. com	pl. of module(s)	
6	n	rical grade			
Duratio		Module level	Other prerequisites		
1 seme		graduate	Approval from exam	ination committee re	equired.
Conten	ts				
Additio abroad	nal skil	ls for engineers. Accredi	ted academic achieve	ements, e.g. in case	of change of university or study
Intende	ed learr	ning outcomes			
gree pr	ogramn				of a module of the Master's de- for an occupation in the industry
Course	<b>s</b> (type,	number of weekly conta	ct hours, language —	· if other than Germa	n)
V (3) +	R (1)				
ster, inf written or oral o pages) If a writ stead ta of asse nation Langua Allocat	formati examir examin or pres ten exa ake the ssment date at ge of as <b>ion of p</b>	on on whether module ca nation (approx. 90 to 120 ation in groups (groups of entation/talk (approx. 30 mination was chosen as form of an oral examina- is changed, the lecturer the latest. ssessment: German and	an be chosen to earn minutes) or oral example of 2, approx. 30 minuto minutes). method of assessme tion of one candidate must inform student	a bonus) mination of one cano tes per candidate) o ent, this may be char e each or an oral exar	tion offered — if not every seme- didate each (approx. 30 minutes) r project report (approx. 8 to 10 nged and assessment may in- mination in groups. If the method weeks prior to the original exami-
Worklo	ad				
180 h					
Teachir	ng cycle	9			
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
Module	appea	rs in			
	-	ee (1 major) Nanostructur			
	-	ee (1 major) Nanostructur			
master	s aegre	ee (1 major) Quantum Teo	2021) innology		

Module title					Abbreviation	
Solid S	itate Ph	ysics 2			11-FK2-161-m01	
Module	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics and Astronomy		
ECTS	i	od of grading	Only after succ. compl. of module(s)			
8	L	rical grade				
Duration Module level Other prerequisites						
	1 semester graduate					
Conten						
and ex gation gnetic	citation of mag and ele tations	ring methods; neutron s such as phonons and netic, orbital and charg ctronic properties of th in solids and thin films	d magnetic waves; reso e order; X-ray and neu in films and superlattio	onant elastic X-ray sc tron reflectometry; in ces; resonant inelast	attering and absorpt westigation of the st ic X-ray scattering; ir	tion; investi- ructural, ma- nvestigation
Intend	ed learı	ning outcomes				
tering,	moderr	know different modern n scattering theory, X-ra th the theoretical princ	ay and neutron reflecto	metry and resonant i		
Course	<b>s</b> (type	, number of weekly con	tact hours, language –	- if other than Germa	n)	
V (4) + Module		t in: German or English				
		essment (type, scope, on on whether module			tion offered — if not	every seme-
<ul> <li>b) oral</li> <li>c) oral</li> <li>d) projection</li> <li>e) pression</li> <li>lf a write stead to a s</li></ul>	examin examin ect repo entatio tten exa ake the essmen date at age of a	nination (approx. 90 to ation of one candidate ation in groups (group) ort (approx. 8 to 10 pag n/talk (approx. 30 min amination was chosen form of an oral examin t is changed, the lectur the latest. ssessment: German ar ffered: In the semester	e each (approx. 30 minu s of 2, approx. 30 minu es) or utes). as method of assessm nation of one candidate er must inform student d/or English	ites per candidate) o ent, this may be char e each or an oral exa ts about this by four	nged and assessmer mination in groups. I weeks prior to the or	If the method iginal exami-
Allocat	ion of p	olaces				
Additio	onal info	ormation				
Worklo	ad					
240 h						
Teachi	ng cycl	9				
Referre	ed to in	LPOI (examination reg	gulations for teaching-	degree programmes)		
	e appea					
		ee (1 major) Mathemati ee (1 major) Physics (20				
	ith 1 majoı	Nanostructure Technology		• generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec		page 53 / 101
(2016)					1111K - 2010	(

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Computational Mathematics (2016) Master's degree (1 major) Functional Materials (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019)

Module	e title		Abbreviation			
		ectrocopy			11-FKS-161-m01	
Module	e coord	inator		Module offered by		
Managi	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	nd Astronomy	
ECTS	· · · · · · · · · · · · · · · · · · ·	od of grading	Only after succ. compl. of module(s)			
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
-		any-particle pictures of -ray spectroscopy.	electrons in solids, lig	ht-matter interaction	, optical spectrosco	py, electron
Intende	ed learr	ning outcomes				
types o develoj	f spect pments	nave specific and adva roscopy and their fields in research.	s of application. They u	nderstand the theor	etical principles and	
Course	<b>s</b> (type	, number of weekly con	tact hours, language –	- if other than Germa	n)	
V (3) + Module		t in: German or English				
		e <b>ssment</b> (type, scope, on on whether module			tion offered — if not	every seme-
e) prese If a writ stead ta of asse nation Langua	entatio ten exa ake the ssment date at ge of a	ort (approx. 8 to 10 pag n/talk (approx. 30 min amination was chosen a form of an oral examir t is changed, the lectur the latest. ssessment: German an ffered: In the semester	utes) as method of assessm aation of one candidate er must inform student d/or English	e each or an oral exa s about this by four	mination in groups. weeks prior to the o	If the method riginal exami-
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
180 h						
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination reg	ulations for teaching-	degree programmes)		
			<u> </u>	<u> </u>		
Module	e appea	rs in				
Master Master Master Master Master Supple	Module appears in         Master's degree (1 major) Mathematics (2016)         Master's degree (1 major) Physics (2016)         Master's degree (1 major) Nanostructure Technology (2016)         Master's degree (1 major) Computational Mathematics (2016)         Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)         Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)					
Master's wi (2016)	ith 1 major	Nanostructure Technology	-	generated 19-Apr-2025 • exa r (120 ECTS) Nanostrukturtec	-	page 55 / 101
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Master's degree (1 major) Computational Mathematics (2019)

Master's degree (1 major) Mathematics (2019)

Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Quantum Technology (2021)

Master's degree (1 major) Computational Mathematics (2022)

Master's degree (1 major) Mathematics (2022)

exchange program Physics (2023)

Master's degree (1 major) Computational Mathematics (2024)

Master's degree (1 major) Mathematics (2024)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Modul					Abbreviation
Visiting	g Resea	arch			11-FPA-161-m01
Modul	e coord	inator		Module offered by	
		f examination committee	<u></u>	Faculty of Physics a	and Actronomy
ECTS	1	od of grading	Î.	· · · · · ·	
10		rical grade			
Duratio	I	Module level	Other prerequisites		
Durutit				, nination committee r	equired.
Conter	nts		<u> </u>		1
		work on a current researc	h tonic of Experimen	tal and Theoretical P	hysics. Implementation of scien-
					y in the context of research visits
		rsities or research institu		· ·	,
Intend	ed lear	ning outcomes			
The stu	dents	are able to independentl	y work on a current re	esearch area of Expe	rimental or Theoretical Physics, t
conduc	ct and a	analyse scientific experin	nents and to docume	nt the results.	
Course	<b>s</b> (type	, number of weekly conta	act hours, language –	– if other than Germa	ın)
R (o)					
					tion offered — if not every seme
ster, in	formati	ion on whether module c	an be chosen to earn	a bonus)	
		(10 to 20 pages)			
		ssessment: German and	/or English		
Allocat	tion of p	places			
Additio	onal inf	ormation			
Worklo	oad				
300 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)	
Modul	e appea	ars in			
		ee (1 major) Physics (201	6)		
	-	ee (1 major) Nanostructu			
	-				ork Bavaria (ENB) (2016)
		ry course MINT Teacher E			
		ee (1 major) Nanostructu			
Master	's degr	ee (1 major) Physics (202	20)		
					ork Bavaria (ENB) (2020)
		ry course MINT Teacher E		Network Bavaria (EN	B) (2020)
	-	ee (1 major) Quantum Te			
					ork Bavaria (ENB) (2025)
Supple	ementai	ry course MINT Teacher E	ducation PLUS, Elite	Network Bavaria (EN	B) (2025)

Module	e title				Abbreviation
Profess	sional	Specialization Nanostruc	ture Technology		11-FS-N-161-m01
Module	e coord	inator		Module offered by	
chairperson of examination committee				Faculty of Physics a	nd Astronomy
ECTS			,		
15	(not) s	successfully completed			
Duratio	Duration Module level Other prerequisite		Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
special	releva				of nanostructure technology with equired fundamental topics in a
Intende	ed lear	ning outcomes			
gineeri	ng sub		re technology with sp	Decial relevance to th	experimental, theoretical or en- ne intended topic of the Master's
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)
S (4) Module	e taugh	t in: German or English			
		<b>sessment</b> (type, scope, la ion on whether module ca			tion offered — if not every seme-
		ussion (30 to 45 minutes) ssessment: German and,			
Allocat	ion of <sub>l</sub>	places			
Additio	onal inf	ormation			
Worklo	ad				
450 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)	
Module	e appea	ars in			
	-	ee (1 major) Nanostructur			
Master	's degr	ee (1 major) Nanostructur	e Technology (2020)		

Module	e title			Abbreviation		
		r Physics			11-HLPH-161-m01	
Module	e coord	nator		Module offered by		
_		ctor of the Institute of A	<u>'</u>	Faculty of Physics and Astronomy		
ECTS Method of grading Only after succ. compl. of module(s)						
6	L	rical grade				
Duratio		Module level	Other prerequisites			
1 seme	I	graduate				
2. Cryst 3. Optio 4. Elect 5. Temp	al form al exci ron-ph perature	roperties ation and electronic ba tations and their coupl onon coupling e-dependent transport emiconductors	ing effects			
Intende	ed learr	ing outcomes				
		are familiar with the prin d know their physical p	•			re of semi-
Course	<b>s</b> (type,	number of weekly con	tact hours, language –	- if other than Germa	n)	
V (3) + Module		in: German or English				
		essment (type, scope, on on whether module			tion offered — if not	every seme-
b) oral c) oral d d) proje e) prese If a writ stead ta of asse nation Langua	examin examin ect repo entatio ten exa ake the ssment date at ge of a	nination (approx. 90 to ation of one candidate ation in groups (groups ort (approx. 8 to 10 page n/talk (approx. 30 minu mination was chosen a form of an oral examin is changed, the lecture the latest. ssessment: German an ffered: In the semester	each (approx. 30 minu of 2, approx. 30 minu es) or utes). as method of assessme ation of one candidate er must inform student d/or English	tes per candidate) o ent, this may be chan e each or an oral exa is about this by four	nged and assessmer mination in groups. I weeks prior to the or	If the method riginal exami-
Allocat						
Additio	nal info	ormation				
Worklo	ad					
180 h						
Teachi	ng cycle	9				
Referre	d to in	LPOI (examination reg	ulations for teaching-	degree programmes)		
			<b>_</b>			
Module	appea	rs in				
		ee (1 major) Mathemati	cs (2016)			
Master	's degre	ee (1 major) Physics (20	16)			
Master	's degre	ee (1 major) Nanostruct	ure Technology (2016)			
Master's wi (2016)	th 1 major	Nanostructure Technology	-	generated 19-Apr-2025 • exa r (120 ECTS) Nanostrukturtec	-	page 59 / 101



Master's degree (1 major) Computational Mathematics (2016) Master's degree (1 major) Functional Materials (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019)

Module	e title				Abbreviation	
Optica	l Prope	rties of Semiconducto	r Nanostructures		11-HNS-161-m01	
Module	o coord	inator		Module offered by		
		ector of the Institute of	Applied Physics	Faculty of Physics and Astronomy		
ECTS	1	od of grading	Only after succ. co	· · ·		
6		rical grade				
Duratio	n	Module level	Other prerequisite	25		
1 seme	ster	graduate				
Conten	ts		<b>I</b>			
or mac ging th tures o with a f of nove for qua	roscopi eir size f varyin focus o el optoe ntum c	ic crystals, their electro . The lecture addresse og dimensions (2D, 1D, n optical properties ar electronic and quantur	onic, optical and magr s technological challe , oD). It provides the b nd light-matter couplin	netic properties can b nges in the preparation asic theoretical conce og. Moreover, it discus sed on such nanostru	". In contrast to atoms, molecules e systematically tailored by chan- on of semiconductor nanostruc- epts to describe their properties, sses the challenges and concepts actures, including building blocks	
			rinciplos and characte	victics of comicondus	tor nanostructures. They have	
knowle	dge of	the technological met		structures, and of th	eir applications to novel photonic	
Course	<b>s</b> (type	, number of weekly co	ntact hours, language	— if other than Germa	an)	
V (3) + Module		t in: German or Englisl	h			
				han German, examina	ation offered — if not every seme-	
			e can be chosen to ear			
<ul> <li>b) oral</li> <li>c) oral</li> <li>d) proje</li> <li>e) pres</li> <li>If a write</li> <li>stead te</li> <li>of assess</li> <li>nation</li> <li>Langua</li> </ul>	examir examin ect repo entatio tten exa ake the essmen date at age of a	ation in groups (group ort (approx. 8 to 10 pa n/talk (approx. 30 mir amination was chosen e form of an oral exami t is changed, the lectu t the latest. ssessment: German a	e each (approx. 30 min os of 2, approx. 30 min ges) or nutes). as method of assessr ination of one candida rer must inform stude	utes per candidate) o nent, this may be cha te each or an oral exa nts about this by four	inged and assessment may in- amination in groups. If the method weeks prior to the original exami-	
Allocat					·	
Additio	onal inf	ormation				
Worklo	ad					
180 h						
Teachi		ρ				
	SUJU	-				
Poforra	d to in	IPOL (ovamination r	egulations for teaching	dograa programmas	)	
Referre				-uegree programmes	)	
Module			tics(2016)			
master	s aegr	ee (1 major) Mathemat	ulus (2016)			

# UNIVERSITÄT WÜRZBURG

Master's degree (1 major) Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Computational Mathematics (2016) Master's degree (1 major) Functional Materials (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019) Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Functional Materials (2022) Master's degree (1 major) Mathematics (2022) exchange program Physics (2023) Master's degree (1 major) Computational Mathematics (2024) Master's degree (1 major) Mathematics (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Master's degree (1 major) Functional Materials (2025)

Module title					Abbreviation		
Magne					11-MAG-161-m01		
Module	e coord	inator		Module offered by	·		
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics and Astronomy			
ECTS	<u> </u>	od of grading	Only after succ. con	npl. of module(s)			
6	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 semester graduate							
Conten	Contents						
	Dia- and paramagnetism, exchange interaction, ferromagnetism, antiferromagnetism, anisotropy, domain struc- ture, nanomagnetism, superparamagnetism, experimental methods to measure magnetic properties, Kondo ef- fect.						
Intende	ed learr	ning outcomes					
experir ches ar	nents; I nd are a	they are skilled in simp able to apply them to ta	epts and phenomena de model building and asks in the stated areas able to evaluate the a	in the formulation of s; they have compete	f mathematical-phys encies in independer	ical approa-	
Course	<b>s</b> (type	, number of weekly cor	tact hours, language –	- if other than Germa	n)		
V (3) + Module		t in: German or English					
			language — if other th can be chosen to earn		tion offered — if not	every seme-	
b) oral c) oral d) proje e) pres lf a writ stead t of asse nation Langua Assess	examin examin ect repo entatio tten exa ake the essmen date at age of a ment o	ation in groups (group ort (approx. 8 to 10 pag n/talk (approx. 30 min amination was chosen form of an oral examin t is changed, the lectur the latest. ssessment: German ar ffered: In the semester	e each (approx. 30 minu s of 2, approx. 30 minu es) or utes). as method of assessm nation of one candidate er must inform student	ites per candidate) o ent, this may be char e each or an oral exa ts about this by four	nged and assessmer mination in groups. weeks prior to the or	If the method riginal exami-	
Allocat	ion of p	olaces					
Additio	onal info	ormation					
Worklo	ad						
180 h							
Teachi	ng cycl	e					
Referre	d to in	LPO I (examination re	gulations for teaching-	degree programmes)			
			5				
Module	e appea	irs in					
		ee (1 major) Mathemati	cs (2016)				
	-	ee (1 major) Physics (2					
	-	-	ture Technology (2016)				
Master	's degre	ee (1 major) Computati	onal Mathematics (201	.6)			
Master's w (2016)	ith 1 major	Nanostructure Technology	-	• generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 63 / 101	

# UNIVERSITÄT WÜRZBURG

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019) Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Mathematics (2022) exchange program Physics (2023) Master's degree (1 major) Computational Mathematics (2024) Master's degree (1 major) Mathematics (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module tit	e			Abbreviation
Master The	sis Nanostructure Technolo	ogy		11-MA-N-161-m01
Module co	ordinator		Module offered by	
chairperso	n of examination committee	2	Faculty of Physics a	and Astronomy
ECTS Me	thod of grading	Only after succ. con	· · · ·	
30 numerical grade				
Duration Module level Other prerequisites				
1 semester	graduate			
Contents				
	ependent processing of an e , especially according to kn			ask in the field of nanostructure rriting of the thesis.
Intended l	arning outcomes			
structure t				d engineering task from nano- fic aspects and to summarise
Courses (ty	pe, number of weekly conta	act hours, language –	- if other than Germa	an)
No courses	assigned to module			
	assessment (type, scope, la ation on whether module c			ation offered — if not every seme-
	esis (750 to 900 hours tota f assessment: German and			
Allocation	of places			
Additional	information			
Time to co	nplete: 6 months.			
Workload				
900 h				
Teaching o	/cle			
Referred to	in LPO I (examination regu	llations for teaching-	degree programmes)	
	. 0			
Module ap	pears in			
-	egree (1 major) Nanostructu	re Technology (2016)		
	egree (1 major) Nanostructu			

Scientif	title				Abbreviation
Scientific Methods and Project Management Nanostructur			ement Nanostructure	Technology	11-MP-N-161-m01
Module	coord	inator		Module offered by	
chairperson of examination committee			Faculty of Physic	s and Astronomy	
ECTS	Meth	od of grading	Only after succ. com	nly after succ. compl. of module(s)	
15	(not)	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	graduate			
Content	ts				
theoreti	ical, e				f project planning. Application to gy. Writing of a scientific project
Intende	ed lear	ning outcomes			
plannin special	ig of a releva	current experimental, the	eoretical or engineering of the Master's thesis	g subdiscipline of and are able to	work and the methods of project of nanostructure technology with develop a project plan for the Ma- an oral presentation.
Courses	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Ger	man)
R (4) Module	taugh	t in: German or English			
		<b>sessment</b> (type, scope, la ion on whether module c			ination offered — if not every seme-
		ussion (30 to 45 minutes) ssessment: German and			
	ion of				
Allocati		places			
Allocati 		places			
		ormation			
	nal inf				
 Additio  Workloa	nal inf				
 Additio	nal inf ad	ormation			
 Additio  Workloa 450 h	nal inf ad	ormation			
 Addition  Workloa 450 h Teachin	nal inf ad ng cycl	ormation	lations for teaching-de	egree programm	es)
 Addition  Workloa 450 h Teachin	nal inf ad ng cycl	ormation	lations for teaching-de	egree programm	es)
 Addition  Workloa 450 h Teachin  Referree	nal inf ad ng cycl d to in	ormation e LPOI (examination regu	lations for teaching-de	egree programm	es)
 Addition  450 h Teachin  Referre  Module	nal inf ad ng cycl d to in	ormation e LPOI (examination regu		egree programm	es)

Modul	e title		Abbreviation				
Advan	ced Ma	gnetic Resonance Imag	ging		11-MRI-171-m01		
Modul	e coord	inator		Module offered by	·		
Manag	ging Dire	ctor of the Institute of	Applied Physics	Faculty of Physics a	and Astronomy		
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)			
6	nume	rical grade					
Durati	on	Module level	Other prerequisites	;			
1 semester graduate							
Conte	nts						
imagir fundar this co 1) the 2) the and m 3) the 4) the	<ul> <li>Nuclear magnetic resonance (NMR) is a quantum mechanical phenomenon that, through magnetic resonance imaging (MRI), has played a major role in the revolution of medical imaging over the last 30 years. Based on the fundamental principles of nuclear magnetic resonance (resonance principle, relaxation times, chemical shift) this course covers:</li> <li>1) the NMR signal theory and signal evolution (Bloch equations),</li> <li>2) the principles of spatial encoding, magnetic resonance imaging (MRI) and corresponding imaging sequences and measurement parameters,</li> <li>3) the concept of k-space and Fourier imaging, and</li> <li>4) the physical, methodological and technical possibilities and limits of MRI. As a last point, exemplary application on fields of MRI of biomedical research, clinical imaging and non-destructive testing are introduced.</li> </ul>						
Intend	ed learr	ning outcomes					
ging m	agnetic		dge of the mathematic eration and processing				
		, ,	· ·	if other then Corme	(m)		
		Internation weekly con	itact hours, language -		(11)		
V (3) + Modul		t in: English					
			language — if other th		ntion offered — if not	every seme-	
			can be chosen to earn	a bonus)			
b) oral c) oral d) proj	examin examin ect repo		e each (approx. 30 min s of 2, approx. 30 minu ges) or		r		
If a wri stead of asso nation Langua	tten exa take the essment date at age of a	form of an oral exami form of an oral exami t is changed, the lectur the latest. ssessment: German ar	as method of assessm nation of one candidat rer must inform studen nd/or English	e each or an oral exa ts about this by four	mination in groups. weeks prior to the o	If the method riginal exami-	
Assess	sment o	ffered: In the semester	in which the course is	offered and in the su	ubsequent semester		
Alloca	tion of p	olaces					
Additi	onal info	ormation					
Workle	oad						
180 h							
Teachi	ng cycl	9					
Referr	ed to in	LPOI (examination re	gulations for teaching-	degree programmes)			
Master's v (2016)	vith 1 major	Nanostructure Technology	-	• generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturted	-	page 67 / 101	

# Module appears in

Master's degree (1 major) Physics (2016)

Master's degree (1 major) Nanostructure Technology (2016)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Quantum Technology (2021)

exchange program Physics (2023)

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

	e title			Abbreviation		
	mensional Structures			11-NDS-161-m01		
Module coordinator			Module offered by			
Manag	Managing Director of the Institute of Applied P		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 seme	ster graduate	Approval from exan	pproval from examination committee required.			
Conten	its					
	uctures. Comparison between th			wth techniques of low-dimensio- liffractometry. Molecular beam		
Intend	ed learning outcomes					
semico odes. T evalua dimens band s familia free ele tor and and are two-dir	onductors as well as the fabricat They are familiar with the subba te the importance of many-parti sion by applying Poisson's equa tructure from the bulk band stru r with the 2D hydrogen atom. The ectron gas in 2D. They have bas I Landau degeneracy. They unde	tion and characteristi nd structure of semic cle effects. They are ation. They know the ucture. They have kno ney understand how a ic knowledge of the n erstand the depender s via numerical metho	ics of semiconductor conductor heterostru able to solve problen k*p perturbation the owledge of the mean an external magnetic neaning of gauging, l nce of various physic ods. They are familia	ctures and MOS-diodes and can		
			if other than Gorma	n		
		act nours, language -	– if other than Germa	ın)		
V (3) + <b>Metho</b> ster, in	R (1) <b>d of assessment</b> (type, scope, la formation on whether module c	anguage — if other th an be chosen to earr	an German, examina	nn) Ition offered — if not every seme-		
V (3) + Method ster, in a) writt b) oral c) oral d) proje e) pres lf a writt stead t of asse nation	R (1) d of assessment (type, scope, la formation on whether module of examination of one candidate of examination of one candidate of examination in groups (groups ect report (approx. 8 to 10 page entation/talk (approx. 30 minut tten examination was chosen as take the form of an oral examina- essment is changed, the lecture date at the latest.	anguage — if other th an be chosen to earr 120 minutes) or each (approx. 30 minu of 2, approx. 30 minu s) or tes) s method of assessm ation of one candidat r must inform studen	an German, examina a bonus) utes) or utes per candidate) o ent, this may be cha e each or an oral exa	ition offered — if not every seme-		
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V (3) + Methor ster, in a) writt b) oral c) oral d) proje e) pres If a writt stead t of asse nation Langua Allocat  Worklo	R (1) d of assessment (type, scope, la formation on whether module of examination of one candidate of examination of one candidate of examination in groups (groups ect report (approx. 8 to 10 page eentation/talk (approx. 30 minut tten examination was chosen as the form of an oral examinate essment is changed, the lecture date at the latest. age of assessment: German and tion of places	anguage — if other th an be chosen to earr 120 minutes) or each (approx. 30 minu of 2, approx. 30 minu s) or tes) s method of assessm ation of one candidat r must inform studen	an German, examina a bonus) utes) or utes per candidate) o ent, this may be cha e each or an oral exa	ition offered — if not every seme- r nged and assessment may in- mination in groups. If the method		
V (3) + Method ster, in a) writt b) oral c) oral d) proje e) pres If a writt stead t of asse nation Langua Allocat  Worklo 180 h	R (1) d of assessment (type, scope, la formation on whether module of examination of one candidate of examination of one candidate of examination in groups (groups ect report (approx. 8 to 10 page eentation/talk (approx. 30 minut tten examination was chosen as take the form of an oral examinate essment is changed, the lecture date at the latest. age of assessment: German and tion of places	anguage — if other th an be chosen to earr 120 minutes) or each (approx. 30 minu of 2, approx. 30 minu s) or tes) s method of assessm ation of one candidat r must inform studen	an German, examina a bonus) utes) or utes per candidate) o ent, this may be cha e each or an oral exa	ition offered — if not every seme- r nged and assessment may in- mination in groups. If the method		
V (3) + Method ster, in a) writt b) oral c) oral d) proje e) pres If a writt stead t of asse nation Langua Allocat  Worklo 180 h	R (1) d of assessment (type, scope, la formation on whether module of examination of one candidate of examination of one candidate of examination in groups (groups ect report (approx. 8 to 10 page eentation/talk (approx. 30 minut tten examination was chosen as the form of an oral examinate essment is changed, the lecture date at the latest. age of assessment: German and tion of places	anguage — if other th an be chosen to earr 120 minutes) or each (approx. 30 minu of 2, approx. 30 minu s) or tes) s method of assessm ation of one candidat r must inform studen	an German, examina a bonus) utes) or utes per candidate) o ent, this may be cha e each or an oral exa	ition offered — if not every seme- r nged and assessment may in- mination in groups. If the method		
V (3) + Method ster, in a) writt b) oral c) oral d) proju e) pres If a writt stead t of asse nation Langua Allocat  Worklo 180 h Teachin 	R (1) d of assessment (type, scope, la formation on whether module of examination of one candidate of examination of one candidate of examination in groups (groups ect report (approx. 8 to 10 page eentation/talk (approx. 30 minut tten examination was chosen as take the form of an oral examinate essment is changed, the lecture date at the latest. age of assessment: German and tion of places onal information	anguage — if other th an be chosen to earr 120 minutes) or each (approx. 30 minu of 2, approx. 30 minu s) or tes) s method of assessm ation of one candidat r must inform studen I/or English	an German, examina a bonus) utes) or ites per candidate) o ent, this may be cha e each or an oral exa ts about this by four	ition offered — if not every seme- r nged and assessment may in- mination in groups. If the method weeks prior to the original exami		
V (3) + Method ster, in a) writt b) oral c) oral d) proju e) pres If a writt stead t of asse nation Langua Allocat  Worklo 180 h Teachin 	R (1) d of assessment (type, scope, la formation on whether module of examination of one candidate of examination of one candidate of examination in groups (groups ect report (approx. 8 to 10 page eentation/talk (approx. 30 minut tten examination was chosen as take the form of an oral examinate essment is changed, the lecture date at the latest. age of assessment: German and tion of places	anguage — if other th an be chosen to earr 120 minutes) or each (approx. 30 minu of 2, approx. 30 minu s) or tes) s method of assessm ation of one candidat r must inform studen I/or English	an German, examina a bonus) utes) or ites per candidate) o ent, this may be cha e each or an oral exa ts about this by four	ition offered — if not every seme- r nged and assessment may in- mination in groups. If the method weeks prior to the original exami		
V (3) + Method ster, in a) writt b) oral c) oral d) proju e) pres If a writt stead t of asse nation Langua Allocat  Worklo 180 h Teachin 	R (1) d of assessment (type, scope, la formation on whether module of examination of one candidate of examination of one candidate of examination in groups (groups ect report (approx. 8 to 10 page eentation/talk (approx. 30 minut tten examination was chosen as take the form of an oral examinate essment is changed, the lecture date at the latest. age of assessment: German and tion of places onal information	anguage — if other th an be chosen to earr 120 minutes) or each (approx. 30 minu of 2, approx. 30 minu s) or tes) s method of assessm ation of one candidat r must inform studen I/or English	an German, examina a bonus) utes) or ites per candidate) o ent, this may be cha e each or an oral exa ts about this by four	ition offered — if not every seme- r nged and assessment may in- mination in groups. If the method weeks prior to the original exami		

# Module appears in

Master's degree (1 major) Physics (2016)

Master's degree (1 major) Nanostructure Technology (2016)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Module titl	e	Abbreviation						
Nano-Optic	:5			11-NOP-161-m01				
Module coordinator			Module offered by	red by				
Managing Director of the Institute of Ap		pplied Physics	Faculty of Physics a	nd Astronomy				
ECTS Me	thod of grading	Only after succ. compl. of module(s)						
6 nur	merical grade							
Duration	Module level	Other prerequisites	prerequisites					
1 semester graduate								
Contents								
The lecture conveys theoretical fundamentals, experimental techniques, and applications of nano-optics starting from the discussion of the focusing of light. Based on this, the fundamentals of modern far-field optical micros-copy are discussed. In the following, the near-field optical microscopy is introduced and discussed. As a further basis, quantum emitters are introduced and their light emission in nano-environments is derived. Plasmons in 2D, 1D and o dimensions are introduced and discussed in detail. This finally leads to the concept of optical antennas.								
Intended le	earning outcomes							
	The students have specific and advanced knowledge in the field of nano-optics. They are familiar with the theo- retical principles and application areas of nano-optics and with current developments in this field.							
Courses (ty	pe, number of weekly conta	act hours, language –	- if other than Germa	n)				
V (3) + R (1) Module tau	ight in: German or English							
			an German, evamina	tion offered — if not	avani sama.			
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)								
<ul> <li>a) written examination (approx. 90 to 120 minutes) or</li> <li>b) oral examination of one candidate each (approx. 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or</li> <li>d) project report (approx. 8 to 10 pages) or</li> <li>e) presentation/talk (approx. 30 minutes)</li> <li>If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.</li> <li>Language of assessment: German and/or English</li> <li>Assessment offered: In the semester in which the course is offered and in the subsequent semester</li> </ul>								
Allocation of places								
Additional	information							
Workload								
180 h								
Teaching cy	ycle							
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)								
 Module appears in								
Master's degree (1 major) Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)								
Master's with 1 m (2016)	najor Nanostructure Technology		e generated 19-Apr-2025 • exa r (120 ECTS) Nanostrukturtec		page 71 / 101			

aster's with 1 major Nanostructure Technology	JMU Würzburg • generated 19-Apr-2025 • exam. reg. da-	page 71
016)	ta record Master (120 ECTS) Nanostrukturtechnik - 2016	

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Quantum Technology (2021)

exchange program Physics (2023)

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

Module title					Abbreviation	
Organic Semiconductors					11-OHL-161-m01	
		• •				
	e coord			Module offered by		
		ector of the Institute of	<u> </u>	Faculty of Physics a	ind Astronomy	
ECTS		od of grading	Only after succ. cor	npl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites	;		
1 seme	1 semester graduate					
Conter	Contents					
Fundar	nentals	of organic semicondu	ctors, molecular and p	olymer electronics ar	nd sensor technology	y, applicati-
ons.						
Intend	ed learr	ning outcomes				
The stu	idents l	nave advanced knowle	dge of organic semicor	nductors.		
Course	<b>s</b> (type	, number of weekly cor	itact hours, language –	- if other than Germa	ın)	
V (3) +	R (1)				•	
		t in: German or English				
Metho	d of ass	essment (type, scope,	language — if other th	an German, examina	tion offered — if not	every seme-
ster, in	formati	on on whether module	can be chosen to earn	a bonus)		
		mination (approx. 90 to				
			e each (approx. 30 mini	-		
			s of 2, approx. 30 minu	ites per candidate) o	r	
		ort (approx. 8 to 10 pag				
		n/talk (approx. 30 min	as method of assessm	ant this may be sha	ngod and accoccmor	at may in
			nation of one candidate			
			er must inform studen			
		the latest.				iginat onann
Langua	age of a	ssessment: German ar	nd/or English			
Assess	ment o	ffered: In the semester	in which the course is	offered and in the su	ubsequent semester	
Allocat	ion of p	olaces				
Additio	onal info	ormation				
Worklo	ad					
180 h						
	ng cycl	2				
	ing cycl	5				
Referre	ad to in	<b>IPOI</b> (examination re	gulations for teaching-	degree programmes)		
Kelent						
Modul	 Module appears in					
		ee (1 major) Physics (20	216)			
			ture Technology (2016)			
	-	ee (1 major) Functional				
	-	-	n MINT Teacher Educat	ion PLUS Flite Netwo	ork Bayaria (FNB) (20	016)
			Education PLUS, Elite			510)
		•	ture Technology (2020)			
	-	-		1		
	-	ee (1 major) Physics (20	n MINT Teacher Educat	ion DILIS Elito Notur	ork Bayaria (END) (a.	020)
		Nanostructure Technology		generated 19-Apr-2025 • exa		D20) page 73 / 101
(2016)				er (120 ECTS) Nanostrukturtec		,



Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Functional Materials (2022) exchange program Physics (2023) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Master's degree (1 major) Functional Materials (2025)

Module title Abbreviation					Abbreviation
Advanc	ed Sen	ninar Nanostructure Tech	nology A		11-OSN-A-161-m01
Module	e coord	inator		Module offered by	
		ector of the Institute of Ap	onlied Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. con	· · ·	
5		rical grade		1	
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
Semina	ar on cu	Irrent issues in Theoretic	al or Experimental Ph	ysics.	
Intende	ed lear	ning outcomes		·	
are abl	e to ext				ental or Theoretical Physics. They this knowledge and present it to
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)
S (2) Module	e taugh	t in: German or English			
		sessment (type, scope, la on on whether module ca			ation offered — if not every seme-
		ussion (30 to 45 minutes) ssessment: German and,			
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
			U		
Module	e appea	urs in			
		ee (1 major) Nanostructui	re Technology (2016)		
		ee (1 major) Nanostructui			

Module	Module title Abbreviation					
Advand	ced Ser	ninar Nanostructure Tech	inology B		11-OSN-B-161-m01	
Module	e coord	inator		Module offered by	<u> </u>	
Manag	ing Dire	ector of the Institute of Ap	plied Physics	Faculty of Physics a	and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	Its					
Semina	ar on cu	irrent issues in Theoretica	al or Experimental Ph	ysics.		
Intend	ed lear	ning outcomes				
are abl	e to ext				ntal or Theoretical Physics. They this knowledge and present it to	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)	
S (2) Module	e taugh	t in: German or English				
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-	
		ussion (30 to 45 minutes) ssessment: German and,				
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module	e appea	ars in				
Master	's degr	ee (1 major) Nanostructur	re Technology (2016)			
Master	Master's degree (1 major) Nanostructure Technology (2020)					

Module	e title				Abbreviation
Advanced Laboratory Course Master Part 1			art 1		11-P-FM1-161-m01
Module	e coord	inator		Module offered by	<u> </u>
		ector of the Institute of A	onlied Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. con		
3	-	successfully completed			
Duratio		Module level	Other prerequisites		
1 seme		graduate	Preparation and saf		
Conten		0			
stems, tic reso	proper nance	ties of solids, surfaces a	nd interfaces. Experin ect - optical pumping	nents on the followi	temperatures and correlated sy- ng topics: X-rays - nuclear magne n the field of optics - Hall effect -
		ning outcomes			
suing s experin experin	cientifi nental nent ar	c publications, applicati	on of modern evaluat o work on a task on t s their results in a sci	ion systems. The stu he basis of publicati entific publication.	al results, basic knowledge of is- udents are familiar with modern ions, to conduct and evaluate an
P (3)		, number of weekly conte		n other than oenne	xii)
ster, in practica Studen fic pub succes regulat	formati al exan ts mus licatior sfully c ions ar	ion on whether module c nination t successfully prepare, p i) an experiment to be co	an be chosen to earn erform, document (la nsidered to have suc s to be considered to ctive module descript	a bonus) b notebook) and eva cessfully completed have successfully c	ation offered — if not every seme- aluate (in the form of a scienti- this experiment. Students must ompleted this module. Detailed
Allocat					
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cvcl	e			
	<u> </u>				
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes	
Module	e appea	ars in			
Master Master Master Master Master	's degr 's degr 's degr 's degr 's degr	ee (1 major) Physics (201 ee (1 major) Nanostructu ee (1 major) Nanostructu ee (1 major) Physics (202 ee (1 major) Quantum Teo gram Physics (2023)	re Technology (2016) re Technology (2020) .0)		

Module	e title				Abbreviation	
Advanc	ed Lab	oratory Course Master P	art 2		11-P-FM2-161-m01	
Module	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of A	oplied Physics	Faculty of Physics a	and Astronomy	
ECTS		od of grading	Only after succ. con			
3	-	successfully completed				
Duratio		Module level	Other prerequisites			
1 semester graduate Preparation and safety briefing.						
Conten	ts		, ·	· -		
stems, tic reso	proper nance	ties of solids, surfaces a	nd interfaces. Experir ect - optical pumping	nents on the following	temperatures and correlated sy- ng topics: X-rays - nuclear magne n the field of optics - Hall effect -	
		ning outcomes				
suing s experin experin	cientifi nental nent ar	c publications, application	on of modern evaluat o work on a task on t s their results in a sci	ion systems. The stu he basis of publicati entific publication.	al results, basic knowledge of is- udents are familiar with modern ons, to conduct and evaluate an	
	<b>J</b> (type					
P (3)				<u> </u>		
		on on whether module c			tion offered — if not every seme-	
fic pub succes regulat	licatior sfully c ions ar	i) an experiment to be co	nsidered to have suc s to be considered to tive module descript	cessfully completed have successfully c	aluate (in the form of a scienti- this experiment. Students must ompleted this module. Detailed	
Allocat						
Additio	nal inf	ormation				
Worklo	ad					
90 h						
Teachi	ng cycl	e				
	<u> </u>	-				
Referre	d to in	LPOI (examination regu	lations for teaching.	degree programmes)		
Module	e appea	urs in				
Master Master Master Master	's degr 's degr 's degr 's degr	ee (1 major) Physics (201 ee (1 major) Nanostructu ee (1 major) Nanostructu ee (1 major) Physics (202 ee (1 major) Quantum Tee	re Technology (2016) re Technology (2020) 0)			
	-	gram Physics (2023)	2021)			
	5					

Module					Abbreviation	
Advanced Laboratory Course Master Part 3			art 3		11-P-FM3-161-m01	
Module	e coord	inator		Module offered by		
		ector of the Institute of A	onlied Physics	Faculty of Physics a	and Astronomy	
ECTS		od of grading	Only after succ. con	· · · ·		
3		successfully completed				
Duratio		Module level	Other prerequisites			
1 seme		graduate	Preparation and saf			
Conten		3.44440		ety 211011131		
stems, tic reso	proper nance	ties of solids, surfaces a	nd interfaces. Experir Fect - optical pumping	nents on the followi	temperatures and correlated sy- ng topics: X-rays - nuclear magne n the field of optics - Hall effect -	
		ning outcomes	- <b>-</b>			
suing s experin experin	cientifi nental nent ar	c publications, applicati	on of modern evaluat o work on a task on t s their results in a sci	ion systems. The stu he basis of publicati entific publication.	al results, basic knowledge of is- udents are familiar with modern ions, to conduct and evaluate an	
P (3)	<b>J</b> (type				, , , , , , , , , , , , , , , , , , ,	
ster, in practica Studen fic pub succes regulat	formati al exan ts mus licatior sfully c ions ar	ion on whether module c nination t successfully prepare, p n) an experiment to be co	an be chosen to earn erform, document (la nsidered to have suc s to be considered to ctive module descript	a bonus) b notebook) and eva cessfully completed have successfully c	ation offered — if not every seme aluate (in the form of a scienti- this experiment. Students must ompleted this module. Detailed	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
90 h						
Teachi	ng cycl	e				
	- /					
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Module	e appea	ars in				
Master Master Master Master Master	's degro 's degro 's degro 's degro	ee (1 major) Physics (201 ee (1 major) Nanostructu ee (1 major) Nanostructu ee (1 major) Physics (202 ee (1 major) Quantum Te	re Technology (2016) re Technology (2020) :0)			
exchan	ge prog	gram Physics (2023)				

Module					Abbreviation	
Advanced Laboratory Course Master Part 4			art 4		11-P-FM4-161-m01	
Module	e coord	inator		Module offered by		
		ector of the Institute of A	onlied Physics	Faculty of Physics a	and Astronomy	
ECTS		od of grading	Only after succ. con	· · · ·		
3		successfully completed				
Duratio	<u> </u>	Module level	Other prerequisites			
1 seme		graduate	Preparation and saf			
Conten		3.44440		ety 20000		
stems, tic reso	proper mance	ties of solids, surfaces a	nd interfaces. Experir Fect - optical pumping	ments on the followi	temperatures and correlated sy- ng topics: X-rays - nuclear magne n the field of optics - Hall effect -	
Intende	ed lear	ning outcomes	-			
suing s experin experin	cientifi nental nent ar	c publications, applicati	on of modern evaluat o work on a task on t s their results in a sci	ion systems. The stu he basis of publicati entific publication.	al results, basic knowledge of is- udents are familiar with modern ons, to conduct and evaluate an	
P (3)						
ster, ini practica Studen fic publ success regulat	formati al exan Its mus licatior sfully c ions ar	ion on whether module c nination t successfully prepare, p n) an experiment to be co	an be chosen to earn erform, document (la nsidered to have suc s to be considered to ctive module descript	a bonus) b notebook) and eva cessfully completed have successfully c	ation offered — if not every seme aluate (in the form of a scienti- this experiment. Students must ompleted this module. Detailed	
Allocat	ion of p	olaces				
	_					
Additio	onal inf	ormation				
Worklo	ad					
90 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
		<u> </u>				
Module	e appea	ars in				
Master Master Master Master	's degr 's degr 's degr 's degr	ee (1 major) Physics (201 ee (1 major) Nanostructu ee (1 major) Nanostructu ee (1 major) Physics (202 ee (1 major) Quantum Ter	re Technology (2016) re Technology (2020) :0)			
exchan	ige prog	gram Physics (2023)				

Module title					Abbreviation		
Physic	s of Adv	vanced Materials			11-PMM-161-m01		
Module	e coord	inator		Module offered by			
Manag	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics a	nd Astronomy		
ECTS	Metho	od of grading	Only after succ. con		·		
6 numerical grade							
Duratio	on	Module level	Other prerequisites				
1 semester graduate							
Conten	ts						
and su	General properties of various material groups such as liquids, liquid crystals and polymers; magnetic materials and superconductors; thin films, heterostructures and superlattices. Methods of characterising these material groups; two-dimensional layer materials.						
Intende	ed learı	ning outcomes					
The stu	dents l	know the properties and	characterization met	hods of some moder	n materials.		
		, number of weekly cont					
V (3) +	R (1)	t in: German or English					
		e <b>ssment</b> (type, scope, l on on whether module			tion offered — if not	every seme-	
c) oral d) proje e) pres lf a writ stead t of asse nation Langua Assess	<ul> <li>a) written examination (approx. 90 to 120 minutes) or</li> <li>b) oral examination of one candidate each (approx. 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or</li> <li>d) project report (approx. 8 to 10 pages) or</li> <li>e) presentation/talk (approx. 30 minutes).</li> <li>If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.</li> <li>Language of assessment: German and/or English</li> <li>Assessment offered: In the semester in which the course is offered and in the subsequent semester</li> </ul>						
Allocat	ion of p	olaces					
			_				
Additio	nal inf	ormation					
Worklo	ad						
180 h							
Teachi	ng cycl	e					
Referre	d to in	LPOI (examination reg	ulations for teaching-	degree programmes)			
Module	e appea	rs in					
Master	's degr	ee (1 major) Mathematic	:s (2016)				
Master	's degr	ee (1 major) Physics (20	16)				
Master	's degr	ee (1 major) Nanostructi	ure Technology (2016)				
Master	's degr	ee (1 major) Computatio	nal Mathematics (201	6)			
Master	's degr	ee (1 major) Functional I	Materials (2016)				
Master	's teacł	ning degree Gymnasium	MINT Teacher Educat	ion PLUS, Elite Netwo	ork Bavaria (ENB) (20	o16)	
Supple	mentar	y course MINT Teacher I	Education PLUS, Elite	Network Bavaria (EN	B) (2016)		
Master's w (2016)	ith 1 majoi	Nanostructure Technology		generated 19-Apr-2025 • exa r (120 ECTS) Nanostrukturtec	-	page 81 / 101	

## UNIVERSITÄT WÜRZBURG

Julius-Maxi

Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019) Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Functional Materials (2022) Master's degree (1 major) Mathematics (2022) exchange program Physics (2023) Master's degree (1 major) Computational Mathematics (2024) Master's degree (1 major) Mathematics (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Master's degree (1 major) Functional Materials (2025)

Master's with 1 major Nanostructure Technology

(2016)

Module title			Abbreviation		
Quantum Information and Quantum Computing					11-QIC-161-m01
Module	coord	inator		Module offered by	
Managi and Ast		ector of the Institute of Th sics	eoretical Physics	Faculty of Physics a	nd Astronomy
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
6	nume	rical grade	11-QM2 or 11-TFK		
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
2. Quar 3. Com 4. Entai 5. Quar 6. Quar	ntum th posite ngleme ntum op ntum ga	ary of classical information leory seen from the persp systems and the Schmidt ent measures perations, POVMs, and the ates and quantum compu- the theory of decoheren	ective of information decomposition e theorems of Kraus iters		
		ning outcomes			
The stu textboo main to	dents a k inter pics of	acquire a comprehensive pretation. The learn how	to safely handle tens mathematical conce	or products and mul	ensity matrices beyond the usual ltipartite quantum systems. The ormation theory and the limits of
Courses	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)
V (3) + I Module		t in: German or English			
		e <b>ssment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
b) oral e c) oral e d) proje e) prese If a writ stead ta of asse nation e	<ul> <li>a) written examination (approx. 90 to 120 minutes) or</li> <li>b) oral examination of one candidate each (approx. 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or</li> <li>d) project report (approx. 8 to 10 pages) or</li> <li>e) presentation/talk (approx. 30 minutes).</li> <li>If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.</li> <li>Language of assessment: German and/or English</li> </ul>				
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
180 h	~-				
Teachir	ng cvcl	6			
	<u> </u>				
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)	
		5			
L					

JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record Master (120 ECTS) Nanostrukturtechnik - 2016

page 83 / 101

# Module appears in

Master's degree (1 major) Mathematics (2016) Master's degree (1 major) Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Mathematical Physics (2016) Master's degree (1 major) Computational Mathematics (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019)

Master's degree (1 major) Mathematics (2019)

Module	title				Abbreviation
Quantum Mechanics II					11-QM2-161-m01
Module	coordi	inator		Module offered by	
Managi and Ast		ector of the Institute of Th ics	eoretical Physics	Faculty of Physics a	nd Astronomy
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
8	numer	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
course for QM: 1. Histo 2. Singl 3. Princ 4. Spin 5. Appro 6. Appro 7. Seco 8. Poter 9. Gene 10. Can 11. Char 12. Qua 13. Qua Intende	The contents of this lecture build upon and will be chosen in accordance with the topics of the Bachelor's degree course "Quantum Mechanics I". Topics might include:				
The con	npletio	n of this course is highly	recommended.	·	s and Condensed Matter Physics.
		number of weekly conta	ct nours, tanguage –	- II other than Germa	1)
V (4) + F Module		t in: German or English			
		<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
<ul> <li>a) written examination (approx. 90 to 120 minutes) or</li> <li>b) oral examination of one candidate each (approx. 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or</li> <li>d) project report (approx. 8 to 10 pages) or</li> <li>e) presentation/talk (approx. 30 minutes).</li> <li>If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.</li> <li>Language of assessment: German and/or English</li> <li>Assessment offered: In the semester in which the course is offered and in the subsequent semester</li> </ul>					
Allocati	ion of p	olaces			
Additio	nal info	ormation			

## Workload

240 h

**Teaching cycle** 

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

# Module appears in

Master's degree (1 major) Mathematics (2016)

Master's degree (1 major) Physics (2016)

Master's degree (1 major) Nanostructure Technology (2016)

Master's degree (1 major) Mathematical Physics (2016)

Master's degree (1 major) Computational Mathematics (2016)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Master's degree (1 major) Computational Mathematics (2019)

Master's degree (1 major) Mathematics (2019)

Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Mathematical Physics (2020)

Master's degree (1 major) Quantum Technology (2021)

Master's degree (1 major) Computational Mathematics (2022)

Master's degree (1 major) Mathematics (2022)

Master's degree (1 major) Mathematical Physics (2022)

exchange program Physics (2023)

Master's degree (1 major) Computational Mathematics (2024)

Master's degree (1 major) Mathematics (2024)

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

Module title				Abbreviation				
Quantu	m Tran	sport			11-QTH-161-m01			
Module	e coord	inator		Module offered by				
Managi	ng Dire	ctor of the Institute of	Applied Physics	Faculty of Physics a	nd Astronomy			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)				
6	nume	rical grade						
Duratio	n	Module level	Other prerequisites	i i i i i i i i i i i i i i i i i i i				
1 seme	ster	graduate						
Conten	Contents							
			tal transport phenome					
			ort, electron interferen					
			omb blockade, thermo sulators, solid-state qu		lescription of spin-de	ependent		
				antum computers.				
		ning outcomes			: <del></del>			
		tave mastered the bas cations of respective co	ics of electronics of nation of the second s	nostructures in theor	y and practice. They	know functi-		
Course	<b>s</b> (type,	number of weekly con	tact hours, language –	- if other than Germa	n)			
V (3) + I Module		t in: German or English						
Method	l of ass	essment (type, scope,	language — if other th	an German, examina	tion offered — if not	every seme-		
ster, in	formati	on on whether module	can be chosen to earn	a bonus)				
b) oral c c) oral c d) proje e) prese If a writ stead ta of asse nation Langua	examin examin ect repo entatio ten exa ake the ssment date at ge of a	ation in groups (group) ort (approx. 8 to 10 pag n/talk (approx. 30 min mination was chosen form of an oral examin is changed, the lectur the latest. ssessment: German ar	e each (approx. 30 minu s of 2, approx. 30 minu es) or utes). as method of assessm nation of one candidate er must inform student	tes per candidate) of ent, this may be char e each or an oral exact s about this by four y	nged and assessmer mination in groups. I weeks prior to the or	If the method riginal exami-		
Allocat				oncrea and in the se	ibsequent semester			
Allocat								
Additio	nal inf	ormation						
Worklo	ad							
180 h								
Teachir	ng cycl	2						
Referre	d to in	LPOI (examination re	gulations for teaching-	degree programmes)				
Module								
	-	ee (1 major) Mathemati						
	-	ee (1 major) Physics (20						
	-		ure Technology (2016) onal Mathematics (201	6)				
	-	ee (1 major) Computati		0)				
		Nanostructure Technology		generated 19-Apr-2025 • exa	ım. reg. da-	page 87 / 101		
(2016)			-	r (120 ECTS) Nanostrukturtec	-			

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019) Master's degree (1 major) Functional Materials (2022) Master's degree (1 major) Functional Materials (2025)

Module title					Abbreviation	
Quantu	ım Info	rmation Technology			11-QUI-161-m01	
Module	e coord	inator		Module offered by		
Managi	ing Dire	ector of the Institute of A	Applied Physics	Faculty of Physics and Astronomy		
ECTS	· · · · · · · · · · · · · · · · · · ·	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duratio		Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
proach	es towa	s of quantum mechanic ards quantum computir noise, quantum informa	g (on the basis of pho	tons, ions and nucle		
Intende	ed learr	ning outcomes				
	xperim	are familiar with the bas ental approaches for th	•	•		
Course	<b>s</b> (type,	, number of weekly con	act hours, language –	- if other than Germa	n)	
V (3) + Module	• •	t in: German or English				
		essment (type, scope, on on whether module			tion offered — if not	every seme-
e) press If a writ stead ta of asse nation Langua Assess	entatio ten exa ake the ssmen date at ge of a ment o	ort (approx. 8 to 10 page n/talk (approx. 30 minu amination was chosen a form of an oral examin t is changed, the lecture the latest. ssessment: German an ffered: In the semester	ates). Is method of assessm ation of one candidate er must inform student d/or English	e each or an oral exa ts about this by four	mination in groups. I weeks prior to the or	If the method iginal exami-
Allocat		naces				
Additio	nal info	ormation				
Worklo	ad					
180 h						
Teachiı	ng cycl	9				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	appea	in in				
Master Master Master	Master's degree (1 major) Mathematics (2016) Master's degree (1 major) Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Computational Mathematics (2016)					
	-	ning degree Gymnasium			ork Bavaria (ENB) (20	016)
Master's wi (2016)	ith 1 major	Nanostructure Technology	-	generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 89 / 101



Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019)

					Abbreviation		
Spintronics 11-SPI-161-mo1							
Module coordinator				Module offered by			
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	nd Astronomy		
ECTS	<u> </u>	od of grading	Only after succ. compl. of module(s)				
6	nume	rical grade					
Duratio		Module level	Other prerequisites	<b>i</b>			
1 seme	l	graduate					
This lea magne	<b>Contents</b> This lecture covers the basic principles of spin transport, with a particular emphasis on the phenomena of giant magnetoresistance and tunnel magnetoresistance. As a last point, we discuss new phenomena from the field of spin dynamics and current-induced spin phenomena.						
Intende	ed learr	ning outcomes					
mation	techno	know the basic principl blogy. They have gained esistance).					
Course	<b>s</b> (type	, number of weekly con	tact hours, language –	– if other than Germa	n)		
V (3) + Module		t in: German or English					
		e <b>ssment</b> (type, scope, on on whether module			tion offered — if not	every seme-	
e) pres If a writ stead t of asse nation Langua Assess	<ul> <li>c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or</li> <li>d) project report (approx. 8 to 10 pages) or</li> <li>e) presentation/talk (approx. 30 minutes).</li> <li>If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.</li> <li>Language of assessment: German and/or English</li> <li>Assessment offered: In the semester in which the course is offered and in the subsequent semester</li> </ul>						
Allocat	ion of p	Diaces					
 Additio	onal info	ormation					
Worklo	ad						
180 h							
Teachi	ng cycl	9					
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Master's degree (1 major) Mathematics (2016) Master's degree (1 major) Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Master's degree (1 major) Computational Mathematics (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's with 1 major Nanostructure Technology Master's with 1 major Nanostructure Technology							
(2016)				er (120 ECTS) Nanostrukturtec	-	F-35 91, 101	

# UNIVERSITÄT WÜRZBURG

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Master's degree (1 major) Computational Mathematics (2019)

Master's degree (1 major) Mathematics (2019)

Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Quantum Technology (2021)

Master's degree (1 major) Computational Mathematics (2022)

Master's degree (1 major) Mathematics (2022)

exchange program Physics (2023)

Master's degree (1 major) Computational Mathematics (2024)

Master's degree (1 major) Mathematics (2024)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

					Abbreviation	
Surface Science 11-SSC-172-m01						
Module coordinator			Module offered by	<u> </u>		
Managing Director of the Institute of Applied Physics		Applied Physics	Faculty of Physics a	nd Astronomy		
ECTS	Metho	od of grading	Only after succ. cor			
6	nume	rical grade				
Durati	on	Module level	Other prerequisites	<b>j</b>		
1 seme	ester	graduate				
Conte	nts					
Relevance of surfaces and interfaces, distinction between bulk phases, classical description, continuum models. Atomic structure: Reconstructions and adsorbates, surface orientation and symmetries. Microscopic processes involving surfaces. Thermodynamics of surfaces, adsorption and desorption, equilibria, thermodynamic phases, experimental characterisation. Electronic structure of surfaces, chemical bonding, surface conditions, spin-orbit coupling: Rashba effect and topological insulators. Magnetism on surfaces.						
Intend	ed learr	ning outcomes				
and co	ontexts o	nave gained an overvie of physical peculiarities chniques and their spec	of surfaces and interf	aces. Additionally, th	ney know the most in	
Course	<b>es</b> (type,	, number of weekly con	tact hours, language –	– if other than Germa	n)	
V (3) +		tin. Englich				
		t in: English	if other th	an Carmon, avamina	tion offered if not	
		essment (type, scope, on on whether module			tion onered — If not	every seme-
		nination (approx. 90 to ation of one candidate		utes) or		
		ation in groups (groups		ites per candidate) o	r	
	•	ort (approx. 8 to 10 pag n/talk (approx. 30 mini				
e) presentation/talk (approx. 30 minutes) If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami- nation date at the latest. Language of assessment: German and/or English						
		ffered: In the semester	in which the course is	offered and in the su	ubsequent semester	
Alloca	tion of p	olaces				
Additi	onal info	ormation				
Workl	oad					
180 h						
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
 Module appears in						
Master's degree (1 major) Physics (2016)						
	-	ee (1 major) Nanostruct				
	-	ning degree Gymnasiun			ork Bavaria (ENB) (20	016)
Master's v (2016)	vith 1 major	Nanostructure Technology		• generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec		page 93 / 101

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Quantum Technology (2021)

exchange program Physics (2023)

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

Module title				Abbreviation		
Superconductivity 11-SUP-161-m01				11-SUP-161-m01		
Module coordinator				Module offered by		
Managi	ing Dire	ector of the Institute of Ap	, ,	Faculty of Physics a	nd Astronomy	
ECTS	î	od of grading	Only after succ. con	pl. of module(s)		
6	L	rical grade				
Duratio		Module level	Other prerequisites			
1 seme		graduate				
Conten	ts					
		iples of superconductors ds of material sciences fo			velopment of technological plat- erconductors)	
Intende	ed learı	ning outcomes				
		have a basic understandi aluate the contributions c			: quantum phenomenon. They of superconductivity.	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)	
V (3) + Module		t in: German or English				
		<b>sessment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-	
b) oral e c) oral e d) proje e) prese lf a writ stead ta of asse nation Langua Assess	a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes) If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami- nation date at the latest. Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester <b>Allocation of places</b>					
Additio	nal inf	ormation				
Worklo	ad					
180 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master' Master'	Master's degree (1 major) Physics (2016) Master's degree (1 major) Nanostructure Technology (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)					

Module title				Abbreviation			
Thermodynamics and Economics					11-TDO-161-m01		
Module coordinator				Module offered by			
Managing Director of the Institute of Theoretical and Astrophysics			Theoretical Physics	Faculty of Physics and Astronomy			
ECTS	Methe	od of grading	Only after succ. con	npl. of module(s)			
6	(not) s	successfully completed	l				
Duratio	on	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	ts						
Part I d folding cance c on, ent econon Part 2 a econon ve labo and cos cial ten Part 3 ii use, an <b>Intende</b> The stu in the v connec mies. T	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. The density of entropy production of non-equilibrium thermodynamics shows the significance 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). <b>Intended learning outcomes</b> 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 economics. They are able to apply the acquired knowledge to particular problems.						
			t to be decided whethe itact hours, language –				
V (3) +		, number of weekly cor		in other than defina			
Module	e taugh	t in: German or English					
			language — if other the can be chosen to earn		ition offered — if not	every seme-	
a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes) If a written examination was chosen as method of assessment, this may be changed and assessment may in- stead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original exami- nation date at the latest. Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester							
Allocation of places							
Additio	onal inf	ormation					
Master's wi (2016)	ith 1 majo	r Nanostructure Technology	-	generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 96 / 101	

## Workload

180 h

Teaching cycle

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

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## Module appears in

Master's degree (1 major) Physics (2016)

Master's degree (1 major) Nanostructure Technology (2016)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

				Abbreviation			
Theoretical Solid State Physics     11-TFK-161-m01					11-TFK-161-m01		
Module coordinator				Module offered by			
Managi and Ast		ctor of the Institute of Th ics	eoretical Physics	Faculty of Physics a	nd Astronomy		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
8	numer	ical grade					
Duratio		Module level	Other prerequisites				
1 semes	ster	graduate					
Conten	s						
bus whi A possi 1 Band pologic 2 Electr ry, rand 3 Applic	The contents of this two-term course will depend on the choice of the lecturer, and may include parts of the sylla- bus which could alternatively be offered as "Quantum Many Body Physics" (11-QVTP). A possible syllabus may be: 1 Band structure (Sommerfeld theory of metals, Bloch theorem, k.p approach and effective Hamiltonians for to- pological insulators (TIs), bulk-surface correspondence, general properties of TIs) 2 Electron-electron interactions in solids (path integral method for weakly interacting fermions, mean field theo- ry, random phase approximation (RPA), density functional theory) 3 Application of mean field theory and the RPA to magnetism 4 BCS theory of superconductivity						
Intende	d learn	ning outcomes					
During the two-semester lecture, the students acquire a basic understanding of many topics of Solid-State Phy- sics, which are addressed in classical textbooks, and thereby advance their knowledge of the underlying con- cepts and the methods of description. The course builds upon the courses "Experimental Condensed Matter Phy- sics" and "Quantum Mechanics".							
Courses	<b>s</b> (type,	number of weekly conta	ct hours, language –	- if other than Germa	n)		
V (4) + F Module		t in: German or English					
		<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-		
<ul> <li>a) written examination (approx. 90 to 120 minutes) or</li> <li>b) oral examination of one candidate each (approx. 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or</li> <li>d) project report (approx. 8 to 10 pages) or</li> <li>e) presentation/talk (approx. 30 minutes).</li> <li>If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.</li> <li>Language of assessment: German and/or English</li> </ul>							
Assessment offered: In the semester in which the course is offered and in the subsequent semester Allocation of places							
Additio	Additional information						
240 h							
Teachin	g cycle	2					
···	3 . y . l						

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

### Module appears in

module appears in
Master's degree (1 major) Mathematics (2016)
Master's degree (1 major) Physics (2016)
Master's degree (1 major) Nanostructure Technology (2016)
Master's degree (1 major) Mathematical Physics (2016)
Master's degree (1 major) Computational Mathematics (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (2019)
Master's degree (1 major) Nanostructure Technology (2020)
Master's degree (1 major) Physics (2020)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Mathematical Physics (2020)
Master's degree (1 major) Quantum Technology (2021)
Master's degree (1 major) Computational Mathematics (2022)
Master's degree (1 major) Mathematics (2022)
Master's degree (1 major) Mathematical Physics (2022)
exchange program Physics (2023)
Master's degree (1 major) Computational Mathematics (2024)
Master's degree (1 major) Mathematics (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title				Abbreviation		
Topological Quantum Physics     11-TQP-161-m01						
Module coordinator			Module offered by			
Managing Director of the Institute of Theoretical Physics and Astrophysics			Faculty of Physics a	Ind Astronomy		
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)			
6 nume	rical grade					
Duration	Module level	Other prerequisites	;			
1 semester	graduate					
Contents						
ding on the le tors assuming	aimed at Masters stude cturers emphasis, it is n g only "Quantum mecha n to superconductivity (i	neant to provide an in nics II" (11-QM2) as a p	troduction to topolog	gical superconductor		
2. Majorana f	ermions and topological l superconductors in two	superconductors in 1		ge states and non-Ab	oelian stati-	
<ul><li>4. Integer qua</li><li>5. Berry's pha</li><li>6. Time revers</li></ul>	ntum Hall effect and Ch se and Chern invariants sal symmetry and topolo l insulators in 3D		ne model, Jackiw-Reb	bi solitons and edge	e states)	
	ning outcomes					
In-depth und	erstanding of the topological atter Physics at the Univ		ntum Physics relevar	it to current research	n projects of	
Courses (type	, number of weekly cont	act hours, language –	- if other than Germa	ın)		
V (3) + R (1)	it in: German or English					
Method of as	sessment (type, scope, ion on whether module			tion offered — if not	every seme-	
<ul> <li>a) written examination (approx. 90 to 120 minutes) or</li> <li>b) oral examination of one candidate each (approx. 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or</li> <li>d) project report (approx. 8 to 10 pages) or</li> <li>e) presentation/talk (approx. 30 minutes).</li> <li>If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.</li> <li>Language of assessment: German and/or English</li> <li>Assessment offered: In the semester in which the course is offered and in the subsequent semester</li> </ul>						
Allocation of places						
Additional information						
Workload						
180 h						
Teaching cycle						
Master's with 1 majo (2016)	r Nanostructure Technology	-	• generated 19-Apr-2025 • exa er (120 ECTS) Nanostrukturtec	-	page 100 / 101	

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

### Module appears in

Master's degree (1 major) Mathematics (2016)

Master's degree (1 major) Physics (2016)

Master's degree (1 major) Nanostructure Technology (2016)

Master's degree (1 major) Mathematical Physics (2016)

Master's degree (1 major) Computational Mathematics (2016)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Master's degree (1 major) Computational Mathematics (2019)

Master's degree (1 major) Mathematics (2019)