

**Ausgabe Nr. 09/2022
vom 20. Dezember 2022**

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Studiengangsspezifische Prüfungsordnung für den Masterstudiengang „Nanoscience – Materials, Molecules and Cells“ <i>(Präsidiumsbeschluss in der 365. Sitzung am 17.11.2022)</i>	1885
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Fachspezifischer Teil SACHUNTERRICHT der studiengangsspezifischen Prüfungsordnung für den Bachelorstudiengang „Bildung, Erziehung und Unterricht“ <i>(Präsidiumsbeschluss in der 365. Sitzung am 17.11.2022)</i>	1968
Modulbeschreibungen für das Schwerpunktbezugsfach „Biologie“ für den fachspezifischen Teil Sachunterricht der studiengangsspezifischen Prüfungsordnung für den Bachelorstudiengang „Bildung, Erziehung und Unterricht“ <i>(Präsidiumsbeschluss in der 365. Sitzung am 17.11.2022)</i>	1972
Promotionsordnung des Fachbereichs Sprach- und Literaturwissenschaft für die Verleihung des Grades Doktorin oder Doktor der Philosophie (Dr. phil.) <i>(Präsidiumsbeschluss in der 366. Sitzung am 01.12.2022)</i>	1975
Agreement of Cooperation and Exchange between the Osnabrück University, Institute of Art/Art Education (Germany) and the University of West Bohemia, Pilsen (Czech Republic)	1996
Agreement of Cooperation and Exchange between the Osnabrück University, Law Department / FB 10 (Germany) and the National University “Odesa Law Academy” (Ukraine)	2000
Letter of Renewal between National Cheng Kung University, College of Social Sciences (Taiwan) and Osnabrück University, Department of Law (Germany)	2004
Renewal of inter-institutional Agreement of Cooperation by and between Bryn Athyn College of the New Church, Philadelphia (USA) and Osnabrück University, Division of Language and Literature / FB 7 (Germany)	2005

Impressum

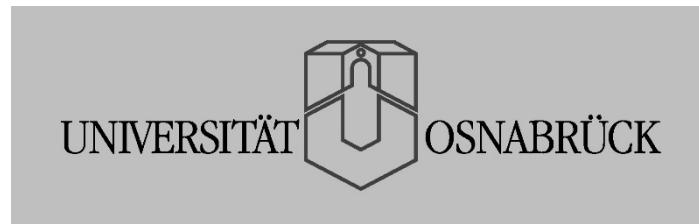
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Redaktion:

Dezernat 4 • Tel. (0541) 969-6039

Neuer Graben / Schloss • 49074 Osnabrück



FACHBEREICH PHYSIK UND
FACHBEREICH BIOLOGIE/CHEMIE

STUDIENGANGSPEZIFISCHE
PRÜFUNGSORDNUNG
FÜR DEN MASTERSTUDIENGANG
„NANOSCIENCES –
MATERIALS, MOLECULES AND CELLS“

beschlossen in der
291. Sitzung des Fachbereichsrats Physik am 17.05.2017
und in der 123. Sitzung des Fachbereichsrats Biologie/Chemie am 05.07.2017
befürwortet in der 139. Sitzung der Ständigen zentralen Kommission für Studium und Lehre
und Studienqualitätskommission (ZSK) am 25.10.2017
genehmigt in der 269. Sitzung des Präsidiums am 22.03.2018
AMBl. der Universität Osnabrück Nr. 03/2018 vom 24.05.2018, S. 292

Änderungen
beschlossen in der
301. Sitzung des Fachbereichsrats Physik am 08.05.2019
und in der 133. Sitzung des Fachbereichsrats Biologie/Chemie am 27.02.2019 sowie in der 137. Sitzung des
Fachbereichsrats Biologie/Chemie am 09.09.2019
befürwortet in der 150. und 152. Sitzung der Ständigen zentralen Kommission für Studium und Lehre
und Studienqualitätskommission (ZSK) am 29.05.2019 sowie am 16.10.2019
genehmigt in der 296. Sitzung des Präsidiums am 14.11.2019
AMBl. der Universität Osnabrück Nr. 01/2020 vom 10.03.2020, S. 26

Änderungen
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316. Sitzung des Fachbereichsrats Physik am 20.04.2022 und per Beschluss des Dekanats des Fachbereichs Physik
am 26.09.2022

und per Umlaufverfahren des Fachbereichsrats Biologie/Chemie am 09.05.2022 sowie am 24.10.2022
befürwortet in der 170. Sitzung der Ständigen zentralen Kommission für Studium und Lehre

und Studienqualitätskommission (ZSK) am 26.10.2022

genehmigt in der 365. Sitzung des Präsidiums am 17.11.2022

AMBl. der Universität Osnabrück Nr. 09/2022 vom 20.12.2022, S. 1885

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§ 1 Geltungsbereich

¹Für den Masterstudiengang „Nanosciences – Materials, Molecules and Cells“ der Universität Osnabrück gelten die Bestimmungen der Allgemeinen Prüfungsordnung für Bachelor- und Masterstudiengänge der Universität Osnabrück in der jeweils geltenden Fassung. ²Diese Ordnung regelt die weiteren Bestimmungen für den Abschluss des Masterstudiengangs „Nanosciences – Materials, Molecules and Cells“.

§ 2 Zweck der Prüfung

¹Der Studiengang bietet nach vier Fachsemestern mit der ihn abschließenden Masterprüfung einen zweiten berufsqualifizierenden Abschluss, der gleichzeitig zur Promotion befähigt. ²Im Rahmen des Masterstudiums sollen die Studierenden vertiefte und/oder erweiterte Kenntnisse, Fähigkeiten und Methoden im Bereich Nanosciences – Materials, Molecules and Cells erwerben. ³Die Master-Absolventin bzw. der Master-Absolvent soll fachliche Zusammenhänge überblicken und in der Lage sein, selbständig wissenschaftlich zu arbeiten und wissenschaftliche Erkenntnisse anzuwenden bzw. mit neuen Ansätzen zu erweitern sowie deren Bedeutung für die Gesellschaft und die berufliche Praxis zu erkennen. ⁴Durch die Masterprüfung wird festgestellt, ob der Prüfling die dafür notwendigen Kompetenzen erworben hat.

§ 3 Hochschulgrad

Aufgrund der bestandenen Masterprüfung wird der Hochschulgrad „Master of Science“ (M. Sc.) im Studiengang „Nanosciences – Materials, Molecules and Cells“ durch den Fachbereich verliehen, in dem die Masterarbeit angefertigt wurde.

§ 4 Zuständigkeit

- (1) Zuständig für die Durchführung und Organisation von Prüfungen gem. § 45 Absatz 3 Satz 1 NHG sind die Studiendekaninnen oder die Studiendekane Biologie-Chemie und Physik, die Aufgaben können von diesen einem Prüfungsausschuss übertragen werden.
- (2) ¹Dem Prüfungsausschuss gehören 5 Mitglieder an, und zwar
 - a) drei Mitglieder der Hochschullehrergruppe, von denen je ein Mitglied der Lehrinheit Physik, (Fachbereich Physik), der Lehrinheit Biologie - Chemie (Fachbereich Biologie/Chemie) angehören muss,
 - b) ein Mitglied der Mitarbeitergruppe, das in der Lehre tätig ist
sowie
 - c) ein Mitglied der Studierendengruppe.

²Die Mitglieder des Prüfungsausschusses sowie deren Vertretungen werden durch die jeweiligen Gruppenvertreter im jeweiligen Fachbereichsrat gewählt. Die Mitglieder zu Absatz 2 Nummer b) und c) im Fachbereich Physik und Biologie/Chemie gewählt, unter Berücksichtigung einer abwechselnden 2:2:1 Verteilung zwischen den beteiligten Lehrheiten.
- (3) Der Prüfungsausschuss wählt aus der Mitte seiner Mitglieder eine Vorsitzende oder einen Vorsitzenden und deren oder dessen Stellvertretung. In der Regel sollen sich die an diesem Studiengang beteiligten Fachbereiche Vorsitz und Stellvertretung teilen.
- (4) Die Studiendekanin bzw. der Studiendekan der Biologie-Chemie und der Physik sowie die Mitglieder der Prüfungsausschüsse haben das Recht, an der Abnahme der Fachprüfungen als Beobachterinnen oder Beobachter teilzunehmen.

§ 5 Aufbau und Gliederung des Studiums

¹Der Masterstudiengang „Nanosciences – Materials, Molecules and Cells“ kann interdisziplinär in einer der folgenden Major/Minor-Kombinationen studiert werden:

- A Major in Biologie, Minor in Chemie
- B Major in Biologie, Minor in Physik
- C Major in Chemie, Minor in Biologie
- D Major in Chemie, Minor in Physik
- E Major in Physik, Minor in Biologie
- F Major in Physik, Minor in Chemie

²Innerhalb jeder Studienvariante nach Satz 1 müssen bis zum Ende des zweiten Semesters Studienleistungen im Umfang von 36-48 LP aus dem entsprechenden Wahlpflichtbereich des gewählten Major und 12-24 LP aus dem entsprechenden Wahlpflichtbereich des gewählten Minor erbracht werden. ³Darüber hinaus sind im Pflichtbereich Fachliche Spezialisierung des Major Studienleistungen im Umfang von insgesamt 30 LP zu erbringen. ⁴Die Auswahl ist in Absprache mit dem Prüfungsausschuss so zu gestalten, dass sie eine sinnvolle Ergänzung des Bachelorstudiums darstellt und gleichzeitig gezielt auf die Masterarbeit hinführt. ⁵Die Masterarbeit kann nur im gewählten Major angefertigt werden.

Variante A: Major in Biologie, Minor in Chemie

Identifier	Modultitel	SWS	LP	Dauer
	Wahlpflichtbereich Major Biologie (36-48 LP)			
BIO-NMM	Master Module (general description)	8	12	1 Sem.
BIO-NMM-BC1_v1	Master Module Biochemistry: Structural and Pathobiochemistry	8	12	1 Sem
BIO-NMM-BC2_v1	Master Module Biochemistry: Molecular Cell Biochemistry: Intracellular Protein Sorting and Function	8	12	1 Sem.
BIO-NMM-BO	Master Module Botany: Molecular Plant Developmental Genetics	8	12	1 Sem
BIO-NMM-BP1	Master Module Biophysics: Biological Spectroscopy and Microscopy	8	12	1 Sem.
BIO-NMM-BP2	Master Module Biophysics: Fundamentals of Bioimaging and Data Processing	8	12	1 Sem.
BIO-NMM-BP3	Master Module Biophysics: Signalling in Cell Death and Immunity	8	12	1 Sem.
BIO-NMM-NBP	Master Module Biophysics: NanoBioPhysics	8	12	1 Sem
BIO-NMM-MB1	Master Module Microbiology: Microbial Pathomechanisms	8	12	1 Sem
BIO-NMM-MZB	Master Module Molecular Cell Biology: Cell Membranes: From Evolutionary Origins to Deciphering the Lipid Code	8	12	1 Sem
BIO-NMM-NB	Master Module Neurobiology: Neurobiology	8	12	1 Sem
BIO-NMM-ÖK1	Master Module Ecology: Experimental Ecology and Evolution	8	12	1 Sem.
BIO-NMM-ÖK2	Master Module Ecology: Theoretical Ecology and Evolution	8	12	1 Sem
BIO-NMM-PP	Master Module Plant Physiology	8	12	1 Sem
BIO-NMM-SB	Master Module Structural Biology	8	12	1 Sem.
BIO-NMM-ZO1	Master Module Zoology: Molecular Developmental Biology	8	12	1 Sem
BIO-NMM-ZO2	Master Module Zoology: Developmental Biology and Molecular Genetics of Marine Organisms, at the "Biologische Anstalt Helgoland"	8	12	1 Sem
BIO-SPV	In-Depth Lecture	2	4	1 Sem.
	Wahlpflichtbereich Minor Chemie (12 -24 LP)			
CHE-Supra	Supramolecular Chemistry	5	6	1 Sem.
CHE-FunP	Functional Polymers	10	12	2 Sem.
CHE-Nano	Nanomaterials	10	12	2 Sem.
CHE-Self	Self-Organizing Systems	5	6	1 Sem.
CHE-Porous	Porous Materials	5	6	1 Sem.
CHE-Biocon	Bioconjugates	2	2	1 Sem.
	Pflichtbereich Fachliche Spezialisierung Major Biologie (30 LP)			
BIO-FS1	Professional Specialization 1 (Methods and Project Course 1)	4	6	1 Sem.
BIO-FS2	Professional Specialization 2 (Methods and Project Course 2)	4	6	1 Sem.
BIO-FB	Research Course (Practical or Theoretical Thesis Preparation)	7-9	18	1 Sem.
	Masterarbeit		30	

Variante B: Major in Biologie, Minor Physik

Identifier	Modultitel	SWS	LP	Dauer
	Wahlpflichtbereich Major Biologie (36-48 LP)			
BIO-NMM	Master Module (general description)	8	12	1 Sem.
BIO-NMM-BC1_v1	Master Module Biochemistry: Structural and Pathobiochemistry	8	12	1 Sem
BIO-NMM-BC2_v1	Master Module Biochemistry: Molecular Cell Biochemistry: Intracellular Protein Sorting and Function	8	12	1 Sem.
BIO-NMM-BO	Master Module Botany: Molecular Plant Developmental Genetics	8	12	1 Sem
BIO-NMM-BP1	Master Module Biophysics: Biological Spectroscopy and Microscopy	8	12	1 Sem.
BIO-NMM-BP2	Master Module Biophysics: Fundamentals of Bioimaging and Data Processing	8	12	1 Sem.
BIO-NMM-BP3	Master Module Biophysics: Signalling in Cell Death and Immunity	8	12	1 Sem.
BIO-NMM-NBP	Master Module Biophysics: NanoBioPhysics	8	12	1 Sem
BIO-NMM-MB1	Master Module Microbiology: Microbial Pathomechanisms	8	12	1 Sem
BIO-NMM-MZB	Master Module Molecular Cell Biology: Cell Membranes: from Evolutionary Origins to Deciphering the Lipid Code	8	12	1 Sem.
BIO-NMM-NB	Master Module Neurobiology: Neurobiology	8	12	1 Sem
BIO-NMM-ÖK1	Master Module Ecology: Experimental Ecology and Evolution	8	12	1 Sem.
BIO-NMM-ÖK2	Master Module Ecology: Theoretical Ecology and Evolution	8	12	1 Sem.
BIO-NMM-PP	Master Module Plant Physiology	8	12	1 Sem
BIO-NMM-SB	Master Module Structural Biology	8	12	1 Sem.
BIO-NMM-ZO1	Master Module Zoology: Molecular Developmental Biology	8	12	1 Sem
BIO-NMM-ZO2	Master Module Zoology: Developmental Biology and Molecular Genetics of Marine Organisms, at the "Biologische Anstalt Helgoland"	8	12	1 Sem
BIO-SPV	In-Depth Lecture	2	4	1 Sem.
	Wahlpflichtbereich Minor Physik (12 -24 LP)			
PHY-AFP-15	Applied Solid State Physics	4	6	1 Sem.
PHY-BMMP-15	Biomacromolecular Physics	4	6	1 Sem.
PHY-OFP-15	Surface Science	4	6	1 Sem.
PHY-TKM-15	Theory of Condensed Matter	4	6	1 Sem.
PHY-UKP-15	Ultrafast Physics	4	6	1 Sem.
PHY-ACM	Advanced Computer Simulations and Modelling	4	6	1 Sem.
PHY-BPHBI-15	Biophysical and Applied Bioinformatics	4	6	1 Sem.
PHY-BPHBI-M-15	Methods of Applied Bioinformatics	2	3	1 Sem.
PHY-BPHBI-P-15	Practical Course in Applied Bioinformatics and Evolutionary Biophysics	2	3	1 Sem.
PHY-BPHBI-S-15	Seminar in Applied Bioinformatics and Evolutionary Biophysics	2	3	1 Sem.
PHY-BMMP-M-15	Techniques of Biomacromolecular Physics	2	3	1 Sem.
PHY-BMMP-P-15	Practical Course: Biomacromolecular Physics	2	3	1 Sem.
PHY-BMMP-S-15	Seminar: Biomacromolecular Physics	2	3	1 Sem.

Identifier	Modultitel	SWS	LP	Dauer
PHY-NQP-15	Computational Quantum Physics	2	3	1 Sem.
PHY-OFP-P-15	Laboratory Course: Surface Science	2	3	1 Sem.
PHY-OFP-S-15	Seminar: Surface Science	2	3	1 Sem.
PHY-PCMS-15	Practicum Computational Materials Science	2	3	1 Sem.
PHY-PCN-15	Physics of Carbon Nanostructures	2	3	1 Sem.
PHY-PCN-P-15	Physics of Carbon Nanostructures (lab course)	2	3	1 Sem.
PHY-PCN-S-15	Physics of Carbon Nanostructures (seminar)	2	3	1 Sem.
PHY-PFM-15	Physics of Functional Materials	2	3	1 Sem.
PHY-PSY-15	Physics with Synchrotron Radiation	2	3	1 Sem.
PHY-PUDS-15	Physics of Ultrathin Films	2	3	1 Sem.
PHY-SDS-15	Stochastical Dynamical Systems	2	3	1 Sem.
PHY-TRQ-15	Transport and Relaxation Dynamics in Quantum Systems	2	3	1 Sem.
PHY-UKP-E-15	Introduction: Ultrafast Physics	2	3	1 Sem.
PHY-UKP-F	Advanced Ultrafast Physics	2	3	1 Sem.
PHY-UKP-P-15	Laboratory Course: Ultrafast Physics	2	3	1 Sem.
PHY-UKP-S-15	Seminar: Ultrafast Physics	2	3	1 Sem.
PHY-EV-V-y	Complement and Deepen the Knowledge of Physics: y (*)	2	3	1 Sem.
PHY-EV-S-y	Complement and Deepen the Knowledge of Physics: y (*)	2	3	1 Sem.
	Pflichtbereich Fachliche Spezialisierung Major Biologie (30 LP)			
BIO-FS1	Professional Specialization 1 (Methods and Project Course 1)	4	6	1 Sem.
BIO-FS2	Professional Specialization 2 (Methods and Project Course 2)	4	6	1 Sem.
BIO-FB	Research Course (Practical or Theoretical Thesis Preparation)	7-9	18	1 Sem.
	Masterarbeit		30	

Variante C: Major in Chemie, Minor in Biologie

Identifier	Modultitel	SWS	LP	Dauer
	Wahlpflichtbereich Major Chemie (36-48 LP)			
CHE-Supra	Supramolecular Chemistry	5	6	1 Sem.
CHE-FunP	Functional Polymers	10	12	2 Sem.
CHE-Nano	Nanomaterials	10	12	2 Sem.
CHE-Self	Self-Organizing Systems	5	6	1 Sem.
CHE-Porous	Porous Materials	5	6	1 Sem.
CHE-Biocon	Bioconjugates	2	2	1 Sem.
	Wahlpflichtbereich Minor Biologie (12 -24 LP)			
BIO-NMM	Master Module (general description)	8	12	1 Sem.
BIO-NMM-BC1_v1	Master Module Biochemistry: Structural and Pathobiochemistry	8	12	1 Sem.
BIO-NMM-BC2_v1	Master Module Biochemistry: Molecular Cell Biochemistry: Intracellular Protein Sorting and Function	8	12	1 Sem.
BIO-NMM-BO	Master Module Botany: Molecular Plant Developmental Genetics	8	12	1 Sem.
BIO-NMM-BP1	Master Module Biophysics: Biological Spectroscopy and Microscopy	8	12	1 Sem.

Identifizier	Modultitel	SWS	LP	Dauer
BIO-NMM-BP2	Master Module Biophysics: Fundamentals of Bioimaging and Data Processing	8	12	1 Sem.
BIO-NMM-BP3	Master Module Biophysics: Signalling in Cell Death and Immunity	8	12	1 Sem.
BIO-NMM-NBP	Master Module Biophysics: NanoBioPhysics	8	12	1 Sem.
BIO-NMM-MB1	Master Module Microbiology: Microbial Pathomechanisms	8	12	1 Sem.
BIO-NMM-MZB	Master Module Molecular Cell Biology: Cell Membranes: from Evolutionary Origins to Deciphering the Lipid Code	8	12	1 Sem.
BIO-NMM-NB	Master Module Neurobiology: Neurobiology	8	12	1 Sem.
BIO-NMM-ÖK1	Master Module Ecology: Experimental Ecology and Evolution	8	12	1 Sem.
BIO-NMM-ÖK2	Master Module Ecology: Theoretical Ecology and Evolution	8	12	1 Sem.
BIO-NMM-PP	Master Module Plant Physiology	8	12	1 Sem.
BIO-NMM-SB	Master Module Structural Biology	8	12	1 Sem.
BIO-NMM-ZO1	Master Module Zoology: Molecular Developmental Biology	8	12	1 Sem.
BIO-NMM-ZO2	Master Module Zoology: Developmental Biology and Molecular Genetics of Marine Organisms, at the "Biologische Anstalt Helgoland"	8	12	1 Sem.
	Pflichtbereich Fachliche Spezialisierung Major Chemie (30 LP)			
CHE-FS1	Professional Specialization 1	5	6	1 Sem.
CHE-FS2	Professional Specialization 2	5	6	1 Sem.
CHE-FB	Research Course	7-9	18	1 Sem.
	Masterarbeit		30	

Variante D: Major in Chemie, Minor in Physik

Identifizier	Modultitel	SWS	LP	Dauer
	Wahlpflichtbereich Major Chemie (36-48 LP)			
CHE-Supra	Supramolecular Chemistry	5	6	1 Sem.
CHE-FunP	Functional Polymers	10	12	2 Sem.
CHE-Nano	Nanomaterials	10	12	2 Sem.
CHE-Self	Self-Organizing Systems	5	6	1 Sem.
CHE-Porous	Porous Materials	5	6	1 Sem.
CHE-Biocon	Bioconjugates	2	2	1 Sem.
	Wahlpflichtbereich Minor Physik (12 -24 LP)			
PHY-AFP-15	Applied Solid State Physics	4	6	1 Sem.
PHY-BMMP-15	Biomacromolecular Physics	4	6	1 Sem.
PHY-OFP-15	Surface Science	4	6	1 Sem.
PHY-TKM-15	Theory of Condensed Matter	4	6	1 Sem.
PHY-UKP-15	Ultrafast Physics	4	6	1 Sem.
PHY-ACM	Advanced Computer Simulations and Modelling	4	6	1 Sem.
PHY-BPHBI-15	Biophysical and Applied Bioinformatics	2	3	1 Sem.
PHY-BPHBI-M-15	Methods of applied Bioinformatics	2	3	1 Sem.
PHY-BPHBI-P-15	Practical Course in Applied Bioinformatics and Evolutionary Biophysics	2	3	1 Sem.
PHY-BPHBI-S-15	Seminar in Applied Bioinformatics and Evolutionary Biophysics	2	3	1 Sem.

Identifier	Modultitel	SWS	LP	Dauer
PHY-BMMP-M-15	Techniques of Biomacromolecular Physics	2	3	1 Sem.
PHY-BMMP-P-15	Practical Course: Biomacromolecular Physics	2	3	1 Sem.
PHY-BMMP-S-15	Seminar: Biomacromolecular Physics	2	3	1 Sem.
PHY-NQP-15	Computational Quantum Physics	2	3	1 Sem.
PHY-OFP-P-15	Laboratory Course: Surface Science	2	3	1 Sem.
PHY-OFP-S-15	Seminar: Surface Science	2	3	1 Sem.
PHY-PCMS-15	Practicum Computational Materials Science	2	3	1 Sem.
PHY-PCN-15	Physics of Carbon Nanostructures	2	3	1 Sem.
PHY-PCN-P-15	Physics of Carbon Nanostructures (lab course)	2	3	1 Sem.
PHY-PCN-S-15	Physics of Carbon Nanostructures (seminar)	2	3	1 Sem.
PHY-PFM-15	Physics of Functional Materials	2	3	1 Sem.
PHY-PSY-15	Physics with Synchrotron Radiation	2	3	1 Sem.
PHY-PUDS-15	Physics of Ultrathin Films	2	3	1 Sem.
PHY-SDS-15	Stochastical Dynamical Systems	2	3	1 Sem.
PHY-TRQ-15	Transport and Relaxation Dynamics in Quantum Systems	2	3	1 Sem.
PHY-UKP-E-15	Introduction: Ultrafast Physics	2	3	1 Sem.
PHY-UKP-F	Advanced Ultrafast Physics	2	3	1 Sem.
PHY-UKP-P-15	Laboratory Course: Ultrafast Physics	2	3	1 Sem.
PHY-UKP-S-15	Seminar: Ultrafast Physics	2	3	1 Sem.
PHY-EV-V-y	Complement and Deepen the Knowledge of Physics: y (*)	2	3	1 Sem.
PHY-EV-S-y	Complement and Deepen the Knowledge of Physics: y (*)	2	3	1 Sem.
	Pflichtbereich Fachliche Spezialisierung Major Chemie (30 LP)			
CHE-FS1	Professional Specialization 1	5	6	1 Sem.
CHE-FS2	Professional Specialization 2	5	6	1 Sem.
CHE-FB	Research Course	7-9	18	1 Sem.
	Masterarbeit		30	

Variante E: Major in Physik, Minor in Biologie

Identifier	Modultitel	SWS	LP	Dauer
	Wahlpflichtbereich Major Physik (36-48 LP)			
PHY-AFP-15	Applied Solid State Physics	4	6	1 Sem.
PHY-BMMP-15	Biomacromolecular Physics	4	6	1 Sem.
PHY-OFP-15	Surface Science	4	6	1 Sem.
PHY-TKM-15	Theory of Condensed Matter	4	6	1 Sem.
PHY-UKP-15	Ultrafast Physics	4	6	1 Sem.
PHY-ACM	Advanced Computer Simulations and Modelling	4	6	1 Sem.
PHY-BPHBI-15	Biophysical and Applied Bioinformatics	4	6	1 Sem.
PHY-BPHBI-M-15	Methods of Applied Bioinformatics	2	3	1 Sem.
PHY-BPHBI-P-15	Practical Course in Applied Bioinformatics and Evolutionary Biophysics	2	3	1 Sem.
PHY-BPHBI-S-15	Seminar in Applied Bioinformatics and Evolutionary Biophysics	2	3	1 Sem.
PHY-BMMP-M-15	Techniques of Biomacromolecular Physics	2	3	1 Sem.
PHY-BMMP-P-15	Practical Course: Biomacromolecular Physics	2	3	1 Sem.
PHY-BMMP-S-15	Seminar: Biomacromolecular Physics	2	3	1 Sem.

Identifier	Modultitel	SWS	LP	Dauer
PHY-MPP	Many Particle Physics	2	2	1 Sem.
PHY-NQP-15	Computational Quantum Physics	2	3	1 Sem.
PHY-OFP-P-15	Laboratory Course: Surface Science	2	3	1 Sem.
PHY-OFP-S-15	Seminar: Surface Science	2	3	1 Sem.
PHY-PCMS-15	Practicum Computational Materials Science	2	3	1 Sem.
PHY-PCN-15	Physics of Carbon Nanostructures	2	3	1 Sem.
PHY-PCN-P-15	Physics of Carbon Nanostructures (lab course)	2	3	1 Sem.
PHY-PCN-S-15	Physics of Carbon Nanostructures (seminar)	2	3	1 Sem.
PHY-PFM-15	Physics of Functional Materials	2	3	1 Sem.
PHY-PSY-15	Physics with Synchrotron Radiation	2	3	1 Sem.
PHY-PUDS-15	Physics of Ultrathin Films	2	3	1 Sem.
PHY-SDS-15	Stochastical Dynamical Systems	2	3	1 Sem.
PHY-TRQ-15	Transport and Relaxation Dynamics in Quantum Systems	2	3	1 Sem.
PHY-UKP-E-15	Introduction: Ultrafast Physics	2	3	1 Sem.
PHY-UKP-F	Advanced Ultrafast Physics	2	3	1 Sem.
PHY-UKP-P-15	Laboratory Course: Ultrafast Physics	2	3	1 Sem.
PHY-UKP-S-15	Seminar: Ultrafast Physics	2	3	1 Sem.
PHY-EV-V-y	Complement and Deepen the Knowledge of Physics: y (*)	2	3	1 Sem.
PHY-EV-S-y	Complement and Deepen the Knowledge of Physics: y (*)	2	3	1 Sem.
	Wahlpflichtbereich Minor Biologie (18 -32 LP)			
BIO-NMM	Master Module (general description)	8	12	1 Sem.
BIO-NMM-BC1_v1	Master Module Biochemistry: Structural and Pathobiochemistry	8	12	1 Sem
BIO-NMM-BC2_v1	Master Module Biochemistry: Molecular Cell Biochemistry: Intracellular Protein Sorting and Function	8	12	1 Sem.
BIO-NMM-BO	Master Module Botany: Molecular Plant Developmental Genetics	8	12	1 Sem
BIO-NMM-BP1	Master Module Biophysics: Biological Spectroscopy and Microscopy	8	12	1 Sem.
BIO-NMM-BP2	Master Module Biophysics: Fundamentals of Bioimaging and Data Processing	8	12	1 Sem.
BIO-NMM-BP3	Master Module Biophysics: Signalling in Cell Death and Immunity	8	12	1 Sem.
BIO-NMM-NBP	Master Module Biophysics: NanoBioPhysics	8	12	1 Sem
BIO-NMM-MB1	Master Module Microbiology: Microbial Pathomechanisms	8	12	1 Sem
BIO-NMM-MZB	Master Module Molecular Cell Biology: Cell Membranes: from Evolutionary Origins to Deciphering the Lipid Code	8	12	1 Sem.
BIO-NMM-NB	Master Module Neurobiology: Neurobiology	8	12	1 Sem
BIO-NMM-ÖK1	Master Module Ecology: Experimental Ecology and Evolution	8	12	1 Sem.
BIO-NMM-ÖK2	Master Module Ecology: Theoretical Ecology and Evolution	8	12	1 Sem.
BIO-NMM-PP	Master Module Plant Physiology	8	12	1 Sem
BIO-NMM-SB	Master Module Structural Biology	8	12	1 Sem.
BIO-NMM-ZO1	Master Module Zoology: Molecular Developmental Biology	8	12	1 Sem
BIO-NMM-ZO2	Master Module Zoology: Developmental Biology and Molecular Genetics of Marine Organisms, at the "Biologische Anstalt Helgoland"	8	12	1 Sem

Identifier	Modultitel	SWS	LP	Dauer
	Pflichtbereich Fachliche Spezialisierung Major Physik (30 LP)			
PHY-FS_v1	Professional Specialisation	8	12	1 Sem.
PHY-FB	Research Course	12	18	1 Sem.
	Masterarbeit		30	

Variante F: Major in Physik, Minor in Chemie

Identifier	Modultitel	SWS	LP	Dauer
	Wahlpflichtbereich Major Physik (36-48 LP)			
PHY-AFP-15	Applied Solid State Physics	4	6	1 Sem.
PHY-BMMP-15	Biomacromolecular Physics	4	6	1 Sem.
PHY-OFP-15	Surface Science	4	6	1 Sem.
PHY-TKM-15	Theory of Condensed Matter	4	6	1 Sem.
PHY-UKP-15	Ultrafast Physics	4	6	1 Sem.
PHY-ACM	Advanced Computer Simulations and Modelling	4	6	1 Sem.
PHY-BPHBI-15	Biophysical and Applied Bioinformatics	4	6	1 Sem.
PHY-BPHBI-M-15	Methods of Applied Bioinformatics	2	3	1 Sem.
PHY-BPHBI-P-15	Practical Course in Applied Bioinformatics and Evolutionary Biophysics	2	3	1 Sem.
PHY-BPHBI-S-15	Seminar in Applied Bioinformatics and Evolutionary Biophysics	2	3	1 Sem.
PHY-BMMP-M-15	Techniques of Biomacromolecular Physics	2	3	1 Sem.
PHY-BMMP-P-15	Practical Course: Biomacromolecular Physics	2	3	1 Sem.
PHY-BMMP-S-15	Seminar: Biomacromolecular Physics	2	3	1 Sem.
PHY-MPP	Many Particle Physics	2	2	1 Sem.
PHY-NQP-15	Computational Quantum Physics	2	3	1 Sem.
PHY-OFP-P-15	Laboratory Course: Surface Science	2	3	1 Sem.
PHY-OFP-S-15	Seminar: Surface Science	2	3	1 Sem.
PHY-PCMS-15	Practicum Computational Materials Science	2	3	1 Sem.
PHY-PCN-15	Physics of Carbon Nanostructures	2	3	1 Sem.
PHY-PCN-P-15	Physics of Carbon Nanostructures (lab course)	2	3	1 Sem.
PHY-PCN-S-15	Physics of Carbon Nanostructures (seminar)	2	3	1 Sem.
PHY-PFM-15	Physics of Functional Materials	2	3	1 Sem.
PHY-PSY-15	Physics with Synchrotron Radiation	2	3	1 Sem.
PHY-PUDS-15	Physics of Ultrathin Films	2	3	1 Sem.
PHY-SDS-15	Stochastical Dynamical Systems	2	3	1 Sem.
PHY-TRQ-15	Transport and Relaxation Dynamics in Quantum Systems	2	3	1 Sem.
PHY-UKP-E-15	Introduction: Ultrafast Physics	2	3	1 Sem.
PHY-UKP-F	Advanced Ultrafast Physics	2	3	1 Sem.
PHY-UKP-P-15	Laboratory Course: Ultrafast Physics	2	3	1 Sem.
PHY-UKP-S-15	Seminar: Ultrafast Physics	2	3	1 Sem.
PHY-EV-V-y	Complement and Deepen the Knowledge of Physics: y ^(*)	2	3	1 Sem.
PHY-EV-S-y	Complement and Deepen the Knowledge of Physics: y ^(*)	2	3	1 Sem.

Identifizier	Modultitel	SWS	LP	Dauer
	Wahlpflichtbereich Minor Chemie (12 -24 LP)			
CHE-Supra	Supramolecular Chemistry	5	6	1 Sem.
CHE-FunP	Functional Polymers	10	12	2 Sem.
CHE-Nano	Nanomaterials	10	12	2 Sem.
CHE-Self	Self-Organizing Systems	5	6	1 Sem.
CHE-Porous	Porous Materials	5	6	1 Sem.
CHE-Biocon	Bioconjugates	2	2	1 Sem.
	Pflichtbereich Fachliche Spezialisierung Major Physik (30 LP)			
PHY-FS_v1	Professional Specialisation	8	12	1 Sem.
PHY-FB	Research Course	12	18	1 Sem.
	Masterarbeit		30	

(*) Das Schema bezeichnet unterschiedliche Module mit inhaltspezifischen Untertiteln. $y \in \{A, B, C, \dots, Z\}$ ist dabei ein Subidentifikator, um verschiedene Modulinhalt zu unterscheiden.

§ 6 Auslandssemester

Studienleistungen in einem fachlich geeigneten Studiengang an einer ausländischen oder deutschen Hochschule können mit bis zu 30 LP anerkannt werden, sofern dies vorher mit dem Prüfungsausschuss abgestimmt wurde.

§ 7 Zulassung zur Masterarbeit

- (1) ¹Der Antrag auf Zulassung (Meldung) zur Masterarbeit ist schriftlich beim Prüfungsausschuss innerhalb des vom Prüfungsausschuss festzusetzenden Zeitraums zu stellen. ²Meldefristen, die vom Prüfungsausschuss gesetzt sind, können bei Vorliegen triftiger Gründe verlängert oder rückwirkend verlängert werden, insbesondere, wenn es unbillig wäre, die durch den Fristablauf eingetretenen Rechtsfolgen bestehen zu lassen.
- (2) Zur Masterarbeit wird zugelassen, wer
 - mit Modulen verbundene Studien begleitende Prüfungen gemäß § 5 im Umfang von wenigstens 72 Leistungspunkten erfolgreich absolviert hat und
 - mindestens ein Semester vor dem Antrag auf Zulassung zur der Masterarbeit an der Universität Osnabrück für das Masterprogramm „Nanosciences – Materials, Molecules and Cells“ eingeschrieben ist.
- (3) ¹Der Meldung zur Masterarbeit sind beizufügen
 - die Nachweise der Studien begleitenden Prüfungen gemäß § 5,
 - der Vorschlag eines Themas (in Absprache mit dem Betreuer),
 - Vorschläge für Prüfende.

²Ist es nicht möglich, eine nach Satz 1 erforderliche Unterlage in der vorgeschriebenen Weise beizufügen, kann der Prüfungsausschuss gestatten, den Nachweis auf andere Art zu führen.
- (4) ¹Über die Zulassung entscheidet der Prüfungsausschuss. ²Die Zulassung wird versagt, wenn
 - die Zulassungsvoraussetzungen nicht erfüllt sind oder
 - die Unterlagen unvollständig sind.
- (5) ¹Die Bekanntgabe der Zulassung einschließlich der Prüfungstermine und der Versagung der Zulassung erfolgt nach § 41 des Verwaltungsverfahrensgesetzes (VwVfG). ²Die Versagung der Zulassung erfolgt schriftlich.
- (6) Der Zulassungsantrag kann bis zur Ausgabe des Themas der Masterarbeit zurückgezogen werden.

§ 8 Masterarbeit

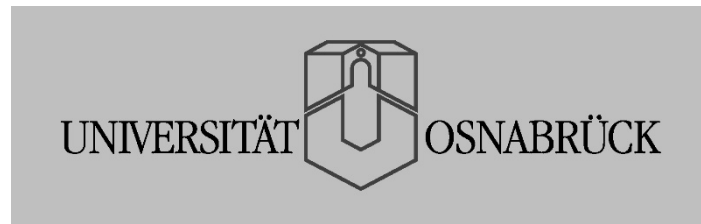
- (1) ¹Die Masterarbeit soll zeigen, dass der Prüfling in der Lage ist, innerhalb einer vorgegebenen Frist ein definiertes Problem aus dem Gebiet der Nanosciences – Materials, Molecules and Cells selbständig nach wissenschaftlichen Methoden zu bearbeiten und darzustellen. ²Thema und Aufgabenstellung der Masterarbeit müssen dem Prüfungszweck (§ 2) und der Bearbeitungszeit nach Absatz 3 entsprechen. ³Die Art der Aufgabe und die Aufgabenstellung müssen mit der Ausgabe des Themas festliegen. ⁴Die Arbeit wird in englischer Sprache verfasst. ⁵Auf Antrag kann der Prüfungsausschuss eine andere Sprache genehmigen.
- (2) ¹Die Masterarbeit kann in Form einer Gruppenarbeit angefertigt werden. ²Der als individuelle Prüfungsleistung zu bewertende Beitrag des einzelnen Prüflings muss auf Grund der Angabe von Abschnitten, Seitenzahlen oder anderen objektiven Kriterien deutlich abgrenzbar und für sich bewertbar sein sowie den Anforderungen nach Absatz 1 entsprechen.
- (3) ¹Die Zeit von der Ausgabe des Themas bis zur Ablieferung der Masterarbeit beträgt 6 Monate. ²Das Thema kann nur einmal und nur innerhalb des ersten Drittels der Bearbeitungszeit nach Satz 1 zurückgegeben werden. ³Die Bearbeitungszeit kann auf begründeten Antrag des Prüflings vom Prüfungsausschuss um in der Regel maximal drei Monate verlängert werden.
- (4) Bei der Abgabe der Masterarbeit hat der Prüfling schriftlich zu versichern, dass er die Arbeit - bei einer Gruppenarbeit den entsprechend gekennzeichneten Anteil der Arbeit - selbstständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt hat.
- (5) Die Masterarbeit ist fristgemäß im zuständigen Prüfungsamt abzuliefern sowie digital bereitzustellen; der Abgabezeitpunkt ist aktenkundig zu machen.

§ 9 Gesamtergebnis der Masterprüfung

- (1) Die Masterprüfung ist bestanden, wenn die vorgeschriebenen Studien begleitenden Prüfungen gemäß § 5 im Umfang von 90 Leistungspunkten bestanden sind und die Masterarbeit mit 4,0 oder besser bewertet worden ist.
- (2) Die Gesamtnote für die erbrachten Studien begleitenden Prüfungsleistungen errechnet sich aus dem Durchschnitt der jeweils ungerundeten Noten dieser Leistungen.
- (3) Die Gesamtnote der Masterprüfung errechnet sich im Verhältnis 1:1 aus der ungerundeten Gesamtnote für die erbrachten Studien begleitenden Prüfungsleistungen nach Absatz 2 und dem ungerundeten Durchschnitt der beiden Bewertungen der Masterarbeit.

§ 10 In-Kraft-Treten und Übergangsregelungen

- (1) Diese Prüfungsordnung tritt nach der Veröffentlichung in einem amtlichen Mitteilungsorgan der Universität Osnabrück rückwirkend zum 1. Oktober 2022 in Kraft.
- (2) Für Studierende, die bereits im Sommersemester 2022 im Masterstudiengang „Nanosciences Materials, Molecules and Cells“ eingeschrieben waren, gilt weiterhin die studiengangspezifische Prüfungsordnung für den Masterstudiengang „Nanosciences Materials, Molecules and Cells“ in der Fassung vom 10.03.2020 (AMBl. der Universität Osnabrück Nr. 01/2020, S. 26).
- (3) ¹Die bisherige studiengangspezifische Prüfungsordnung für den Masterstudiengang „Nanosciences Materials, Molecules and Cells“ in der Fassung vom 10.03.2020 (AMBl. der Universität Osnabrück Nr. 01/2020, S. 26) tritt zum 30.09.2024 endgültig außer Kraft. ²Studierende, die nach Absatz 2 in dieser Prüfungsordnung studieren, unterfallen ab dem 01.10.2024 automatisch der zum Zeitpunkt des außer Kraft Tretens gültigen studiengangspezifischen Prüfungsordnung für den Masterstudiengang „Nanosciences Materials, Molecules and Cells“.



FACHBEREICH PHYSIK UND
FACHBEREICH BIOLOGIE/CHEMIE

MODULBESCHREIBUNGEN
FÜR DEN MASTERSTUDIENGANG
„NANOSCIENCES –
MATERIALS, MOLECULES AND CELLS“

beschlossen in der
291. Sitzung des Fachbereichsrats Physik am 17.05.2017
und in der 123. Sitzung des Fachbereichsrats Biologie/Chemie am 05.07.2017
befürwortet in der 139. Sitzung der Ständigen zentralen Kommission für Studium und Lehre
und Studienqualitätskommission (ZSK) am 25.10.2017
genehmigt in der 269. Sitzung des Präsidiums am 22.03.2018
AMBl. der Universität Osnabrück Nr. 03/2018 vom 24.05.2018, S. 292

Änderungen
beschlossen in der
301. Sitzung des Fachbereichsrats Physik am 08.05.2019
und in der 133. Sitzung des Fachbereichsrats Biologie/Chemie am 27.02.2019 sowie in der 137. Sitzung des
Fachbereichsrats Biologie/Chemie am 09.09.2019
befürwortet in der 150. und 152. Sitzung der Ständigen zentralen Kommission für Studium und Lehre
und Studienqualitätskommission (ZSK) am 29.05.2019 sowie am 16.10.2019
genehmigt in der 296. Sitzung des Präsidiums am 14.11.2019
AMBl. der Universität Osnabrück Nr. 01/2020 vom 10.03.2020, S. 41

Änderungen
beschlossen in der
316. Sitzung des Fachbereichsrats Physik am 20.04.2022 und per Beschluss des Dekanats des Fachbereichs Physik
am 26.09.2022
und per Umlaufverfahren des Fachbereichsrats Biologie/Chemie am 09.05.2022 sowie am 24.10.2022
befürwortet in der 170. Sitzung der Ständigen zentralen Kommission für Studium und Lehre und
Studienqualitätskommission (ZSK) am 26.10.2022
genehmigt in der 365. Sitzung des Präsidiums am 17.11.2022
AMBl. der Universität Osnabrück Nr. 09/2022 vom 20.12.2022, S. 1899

Biologie

Identifier BIO-NMM-BC1_v1	Module title Master Module Biochemistry: Structural and Pathobiochemistry <i>German module title</i> <i>Mastermodul Biochemie: Strukturelle und Pathobiochemie</i>			Courses language English	
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester		Authorized module representative Lecturers in Biochemistry		
Credit Points 12 CP	Module frequency Each winter term		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives The students will acquire advanced scientific competences. They acquire in-depth knowledge of selected structural biological, biochemical and cell biological processes (see "contents") and develop an understanding of the processes and interrelationships involved. They will be able to transfer this knowledge to new situations and derive conclusions. They apply more demanding laboratory biochemical, biophysical, molecular biological and cell biological methods. Data collected experimentally using these methods will be carefully analysed, evaluated using standard statistical procedures, presented graphically, and critically discussed. The students acquire technical and methodological content from English-language review and technical articles, research the literature important for the respective technical environment, prepare a presentation for this, and master the common rules of presenting scientific data. They reflect and discuss the technical and methodological aspects of the respective topic and assess the quality of their own presentation as well as that of their fellow students. In doing so, they apply the usual feedback rules.					
Content LECTURE: Structural and cell biological methodology and analytics, protein biogenesis, signal transduction, lysosomal signalling, autophagy, membrane contacts and lipid transport, lipid droplets, biosynthesis and biogenesis of cholesterol, phospholipids and sphingolipids, rare diseases... SEMINAR: Presentation and discussion of cell biology-biochemistry publications, presentations and discussions in English. EXERCISES: techniques of molecular cell biology, cell transformation, subcellular fractionation & biochemical characterizations, in vitro analysis of protein complexes, protein purification, protein and organelle dynamics, microscopic cell examination.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		basic knowledge in biochemistry and cell biology (Bachelor class level)	Written examination or MC exam on the contents of the module (usually 90 min.) or protocol or seminar presentation or oral examination as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2		Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.	

3 rd Component:			
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.
Examination requirements: Specialized scientific competencies on the sub-aspects of biochemistry and molecular cell biology as described under "contents" are tested.			
Calculation of module grade, where applicable: Grade of examination			
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.			
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14			
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.			
Prerequisites for Participation in this Module: Basic module in Biochemistry or Cell Biology at the bachelor level.			

Identifier BIO-NMM- BC2_v1	Module title Master Module Biochemistry: Molecular Cell Biochemistry: Intracellular Protein Sorting and Function <i>German module title</i> <i>Mastermodul Biochemie: Molekulare Zellbiologie/Biochemie: intrazelluläre Proteinsortierung und -funktion</i>		Courses language English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in Biochemistry	
Credit Points 12 CP	Module frequency Each summer term	Committee responsible for the module Fachbereichsrat Biologie/Chemie	
Learning objectives The students will acquire advanced scientific competences. They acquire in-depth knowledge of selected structural biological, biochemical and cell biological processes (see "contents") and develop an understanding of the processes and interrelationships involved. They will be able to transfer this knowledge to new situations and derive conclusions. They will apply more demanding laboratory biochemical, biophysical, molecular biological and cell biological methods. Data collected experimentally using these methods will be carefully analysed, evaluated using standard statistical procedures, presented graphically, and critically discussed. The students acquire technical and methodological content from English-language review and technical articles, research the literature important for the respective technical environment, prepare a presentation for this, and master the common rules of presenting scientific data. They reflect and discuss the technical and methodological aspects of the respective topic and assess the quality of their own presentation as well as that of their fellow students. In doing so, they apply the usual feedback rules.			
Content LECTURE: Molecular and cell biological methodology and analytics, protein folding, protein sorting, exocytosis, endocytosis, vesicle traffic, protein complexes involved, cytoskeleton, signal transduction, cell-cell communication. SEMINAR: Presentation and discussion of cell biology-biochemistry publications, presentations and discussions in English. EXERCISES: Techniques of molecular cell biology, cell transformation, subcellular fractionation & biochemical characterizations, in vitro analysis of protein complexes, protein purification, protein and organelle dynamics, microscopic cell examination.			

Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		Basic knowledge in biochemistry and cell biology (Bachelor class level)	Written examination or MC exam on the contents of the module (usually 90 min.) or protocol or seminar presentation or oral examination as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
Examination requirements: Specialized scientific competencies on the sub-aspects of biochemistry and molecular cell biology as described under "Contents" are tested.					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.					
Prerequisites for Participation in this Module: Basic module in Biochemistry or Cell Biology at the bachelor level.					

Identifier BIO-NMM-BO	Module title Master Module Botany: Molecular Plant Developmental Genetics <i>German module title</i> <i>Mastermodul Botanik: Molekulare Entwicklungsgenetik der Pflanzen</i>	Courses language English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in Botany: S. Zachgo
Credit Points 12 CP	Module frequency Each winter term	Committee responsible for the module Fachbereichsrat Biologie/Chemie
Learning objectives Plant embryo development and organogenesis is initiated from totipotent stem cells, which are maintained by plants throughout their life cycle, representing a unique and advantageous feature of plants. Starting from stem cells, tissue differentiation and organogenesis enable, in the context of variable ecosystems, adaptations to changing environments. Students learn about key regulators and cellular as well as molecular signalling		

mechanisms leading to the formation of vegetative organs, and differently from animals, induction of the sexual reproduction after embryogenesis.

Methodologically, a comprehensive spectrum of molecular plant genetics and cell biology methods is taught. Students learn to evaluate which techniques are best suited to address different research questions. Genome editing techniques to generate transgenic plants and their impact on modifying gene functions to improve crop production are presented.

Novel plant model organisms from mosses and ferns are introduced to demonstrate how advanced plant molecular methods enable to investigate the evolution of molecular mechanisms that govern land plant adaptations to an ever-changing environment.

Content

LECTURE: A comprehensive Antirrhinum and Arabidopsis flower mutant collection is analysed to gain insight into key floral homeotic gene functions by analyses of loss-of function, gain-of-function and knock-down mutants and their impact for plant genetic studies and breeding applications.

SEMINAR: Regulatory control mechanisms exerted at the transcriptional level (e.g. cis/trans-regulatory changes, miRNA) and posttranslational modifications (e.g. redox-regulation, proteasome degradation, non-cell autonomy) affecting transcription factor activities together with hormone signalling pathways are presented. Students acquire an overview of different RNA-expression and protein interaction techniques, with the goal to discern their strengths and limitations.

EXERCISES: In the practical course, students work on their own, state-of-the art research project and gain insight into bioinformatics data analyses. They will expand their knowledge on how to design and conduct experiments as well as present, interpret and discuss their data in final presentations.

Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		Basic genetic and botany knowledge	Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Oral presentation of a scientific research paper and stimulation of an interactive discussion	Basic genetic and botany knowledge	
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
Examination requirements: Participation in lectures					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.					
Prerequisites for Participation in this Module: Students require a basic knowledge in genetics and botany (bachelor level).					

Identifier BIO-NMM-NBP	Module title Master Module Biophysics: NanoBioPhysics <i>German module title</i> <i>Mastermodul Biophysik: NanoBioPhysik</i>			Courses language English	
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester		Authorized module representative Lecturers in Biophysics		
Credit Points 12 CP	Module frequency Each summer term		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives LECTURE: The students obtain an interdisciplinary perspective of molecular cell biology covering biological, physical and chemical principles. They get a comprehensive, practice-oriented introduction into state-of-the-art techniques to clarify and manipulate molecular cell biology at the nanoscale using advanced, surface- and nanomaterial-based spectroscopic and microscopic techniques. EXERCISES: Students gain insights into interdisciplinary research and development in the field of Nanobiotechnology and deepen their methodological competence in the field of Nanobiophysics. SEMINAR: Convincing presentation of scientific data as well as critical perception is trained by a concluding meeting-like block seminar.					
Content LECTURE: "NanoBioPhysics: Interrogating and manipulating structure and function of biomolecules in cells": Physical and biological chemistry of the cell; fundamental spectroscopy, surface-sensitive and enhanced spectroscopic techniques; surface chemistry and micro-/Nano patterning techniques; colloidal nanoparticles; electron and fluorescence microscopy techniques; optical manipulation techniques; scanning probe microscopy and force spectroscopy. SEMINAR: Critical discussion of research results in the field of molecular and cellular biophysics. EXERCISES: Methods of molecular and cellular biophysics; advanced spectroscopic and microscopic techniques; Surface and nanoparticle (bio) functionalization and functional characterization.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		none	Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
Examination requirements: Special scientific and methodological competences are tested for the partial aspects of biophysics as described under "contents".					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					

Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.
Prerequisites for Participation in this Module: Basic training in molecular cell biology and spectroscopy, good background in organic, inorganic and physical chemistry

Identifier BIO-NMM-BP1	Module title Master Module Biophysics: Biological Spectroscopy and Microscopy <i>German module title</i> <i>Mastermodul Biophysik: Biologische Spektroskopie und Mikroskopie</i>			Courses language English	
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester		Authorized module representative Lecturers in Biophysics		
Credit Points 12 CP	Module frequency Each winter term		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives LECTURE: Students acquire comprehensive methodological competences in the application of advanced fluorescence imaging techniques for life science research. They widen and deepen their knowledge in the field of molecular spectroscopy and optical microscopy with a focus on fluorescence techniques. They acquire an overview of advanced and super resolution imaging techniques and their capabilities and limitation with respect to tackling questions in molecular cell biology. They obtain fundamental insights into methods of image analysis and quantitative data evaluation. EXERCISES: Within small projects, students learn to tackle unsolved questions in molecular cell biology research by applying spectroscopic and microscopic methods as well as quantitative data evaluation including statistical analysis. SEMINAR: Convincing presentation of scientific data as well as critical perception is trained by a concluding meeting-like block seminar					
Content LECTURE: "Biological Spectroscopy & Microscopy: from fundamental concepts to the application of advanced techniques": Fundamental quantum mechanics of molecular vibronic and electronic states; Fundamental properties of electronic transitions; Fluorescence spectroscopy techniques; Single molecule fluorescence; Fundamental fluorescence microscopy; Advanced and super resolution fluorescence imaging techniques. SEMINAR: Critical discussion of research results in the field of molecular and cellular biophysics. EXERCISES: Application of advanced spectroscopy and microscopy in molecular and cellular biology as well as image analysis and quantitative data evaluation including statistical analyses.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		none	Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		

3 rd Component:			
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.
Examination requirements: Special scientific and methodological competences are tested for the partial aspects of biophysics as described under "contents".			
Calculation of module grade, where applicable: Grade of examination			
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0			
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14			
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.			
Prerequisites for Participation in this Module: Basic training in molecular cell biology and light microscopy			

Identifier	Module title	Courses language
BIO-NMM-BP2	Master Module Biophysics: Fundamentals of Bioimaging and Data Processing <i>German module title</i> <i>Mastermodul Biophysik: Grundlagen der biologischen Bildgebung und Datenbearbeitung</i>	English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in CellNanOs: R. Kurre, K. Psathaki, S. Kunis
Credit Points 12 CP	Module frequency Each summer term	Committee responsible for the module Fachbereichsrat Biologie/Chemie
Learning objectives		
LECTURE: Students are going to broaden and develop a deeper theoretical and experimental knowledge of light and electron microscopy as well as computer-based image and data processing. Focus of this module is the application of advanced imaging and analysis methods in the field of biological research. Students will gain profound expertise in assessing pros and cons of different methods.		
SEMINAR: Students have to present and discuss state-of-the-art methods and/or their applications in biological research in the form of a scientific talk.		
EXERCISES: Students are going to learn fundamentals of sample preparation, image/data acquisition and post processing on the basis of typical bioimaging projects.		
Content		
LECTURE: Light and fluorescence microscopy (Epi, cLSM, TIRFM, light-sheet, etc.), electron microscopy ((cryo) sample preparation, (3D) TEM, volume EM, CLEM, etc.), data management, optimization and processing (deconvolution, denoising, visualization, correlation techniques, etc.).		
SEMINAR: Critical assessment of methods and research results in the field of bioimaging.		
EXERCISES: Selection of advanced small projects of light and electron microscopy (LM/EM) with full workflows starting from sample preparation to data/image acquisition and final post processing. Exercises will be conducted in one single block (two weeks) by small groups. (LM & EM each one week)		

Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		none	Written examination on the contents of the module (usually 90 min.) or oral examination (usually 60 min.) as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
Examination requirements: Specific methodological competences based on module content will be assessed.					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.					
Prerequisites for Participation in this Module: Basic knowledge of microscopy					

Identifier BIO-NMM-BP3	Module title Master Module Biophysics: Signalling in Immunity and Cell Death <i>German module title</i> <i>Mastermodul Biophysik: Signalwege von Immunität und Zelltod</i>	Courses language English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in Biophysics
Credit Points 12 CP	Module frequency Each summer term	Committee responsible for the module Fachbereichsrat Biologie/Chemie

Learning objectives					
LECTURE: The students obtain a comprehensive introduction of molecular cell biology covering intra- and inter-cellular signalling relevant to cell death, inflammation and immunity. They get a detailed insight of the molecular mechanisms involved in the regulation of innate immunity as well as of cell death in response to physiological and infectious challenges, and a perspective of the consequent inflammatory and immune reactions as well as of their implications in chronic inflammatory diseases and cancer.					
SEMINAR: Students learn the critical discussion and evaluation of research results.					
EXERCISES: Students gain insights into the molecular determinants involved in cell death and intercellular-immunity signalling and develop competence in the monitoring and modulation of these processes at the molecular level.					
Content					
LECTURE: " Signalling in immunity and cell death: mechanisms of inter- and intracellular communication": Innate and adaptive immunity; immune cells/haematopoiesis; immune cell communication; evolutionary origins of regulated cell death; cell death signalling and homeostasis; apoptosis and regulated necrosis; autophagy; cell death and metabolism; lipids in immunity and cell-death signal transduction; infection and inflammatory mechanisms; dysregulation and related oncogenic and inflammatory diseases; medical Implications.					
SEMINAR: Critical discussion of research results in the field of molecular and cellular biology.					
EXERCISES: Methods of molecular and cellular biology; molecular analysis of protein ligands and receptors; cell death induction and monitoring by biochemical, spectroscopic and microscopic techniques; infection assays and cell death/inflammatory read-out.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		Basic knowledge in cell biology and the immune system of vertebrates (Bachelor level)	Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
Examination requirements: Specialized scientific competencies on the sub-aspects of biochemistry and molecular cell biology as described under "contents" are tested.					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.					
Prerequisites for Participation in this Module: Basic module in cell biology at the bachelor level.					

Identifier BIO-NMM-MB1	Module title Master Module Microbiology: Microbial Pathomechanisms <i>German module title</i> <i>Mastermodul Mikrobiologie: Mikrobielle Pathomechanismen</i>		Courses language English		
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester		Authorized module representative Lecturers in Microbiology		
Credit Points 12 CP	Module frequency Each summer term		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives The students expand and deepen their subject-specific scientific and methodological competences within the framework of a project work. Students are able to plan extensive series of laboratory experiments on a selected special topic area of microbiology and infection biology, carry out the experiments independently, evaluate the results and present them in writing. In doing so, they learn to take into account the relevant literature of the respective subject area. They train to understand and give presentations in English and they train to reflect critically on original scientific literature in English. They learn to summarise and present the results of their own project in the form of an English-language presentation.					
Content LECTURE: Microbial pathomechanisms and infection biology: infectious diseases (caused by viruses, bacteria, fungi, and parasites), pathogen-host interactions, virulence factors (toxins, adhesins, etc.), methods and model systems for infectious diseases research, cell invasion and intracellular lifestyle, immune evasion, evolution of virulence factors. SEMINAR: Fundamentals of immunology and defence against infectious agents. Using selected chapters from the Janeway textbook 'Immunology', the structure and function of cells of the innate and adaptive immune system are discussed, the control of recognition 'self and foreign' and the regulation of immune responses. Basic methods of immunology are covered. Applications of -Omics approaches for study host-pathogen interactions are trained. EXERCISES: Methods of molecular microbiology and infection biology: molecular and cell biological techniques, control mechanisms by bacterial effector proteins, invasion mechanisms, intracellular lifestyle, advanced bacterial genetics, light and electron microscopy in microbiology, single cell analyses, proteomics analyses.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4			Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
Examination requirements: Competence in microbiology acquired in the different parts of the module will be examined. This includes judgement of the quality of the oral presentation and participation in the seminars.					
Calculation of module grade, where applicable: Grade of examination					

Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.
Prerequisites for Participation in this Module:

Identifier BIO-NMM-MZB	Module title Master Module Molecular Cell Biology: Cell Membranes: From Evolutionary Origins to Deciphering the Lipid Code <i>German module title</i> <i>Mastermodul Molekulare Zellbiologie: Zellmembranen: Vom evolutionären Ursprung zur Entschlüsselung des Lipid-Codes</i>	Courses language English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorised module representative Lecturers in Molecular Cell Biology
Credit Points 12 CP	Module frequency Each summer term	Committee responsible for the module Fachbereichsrat Biologie/Chemie

Learning objectives

The students acquire in-depth knowledge of molecular processes that take place on and in cell membranes, as well as how these processes help to shape cell architecture and function. They also learn how these processes can be observed and analysed at the molecular level (see "contents"). They can transfer this knowledge to new circumstances and derive conclusions. They apply sophisticated chemical-biological and molecular-cell-biological working methods in the laboratory. The data collected experimentally with these methods are carefully analysed, evaluated with common statistical procedures, graphically presented and critically discussed. Additionally, the students acquire subject-specific and methodological contents from English-language review and specialist articles, research the literature important for the respective subject-specific environment, prepare a presentation for it and master the common rules of presenting scientific data. They reflect on and discuss the subject-related and methodological aspects of the respective topic and assess the quality of their own presentation as well as that of their fellow students. In doing so they apply the usual feedback rules.

Content

LECTURE: Key functions of cell membranes, historical perspectives of membrane organisation, evolutionary origin and biogenesis of cell membranes, co-evolution of lipids and proteins, the lipid code, lipid polymorphism, control of membrane stability and fluidity by cells, lipid landscapes and organelle identity, lipid transport and homeostasis, Golgi as lipid filter, lipid flippases, sensors and transfer proteins, how defects in lipid homeostasis lead to disease, experimental approaches to deciphering the lipid code.

SEMINAR: Presentation and discussion of milestone publications in molecular membrane biology.

EXERCISES: Techniques of molecular cell biology, cell culture, live-cell imaging, subcellular fractionation & immunoblotting, cell-free translation of membrane proteins in liposomes and their subsequent analysis, determination of protein-lipid interactions in living cells and in proteoliposomes with photo-activatable lipids, dissection of lipid signalling pathways in living cells with photo-caged and/or photo-switchable lipid analogues.

Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		Successful participation in the thematically corresponding in-depth lecture or participation in the corresponding basic module "Molecular Cell Biology".	Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.

2 nd Component:				
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.	
3 rd Component:				
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.	
Examination requirements: Special scientific competences are tested in the areas described under "contents of Molecular Membrane Biology".				
Calculation of module grade, where applicable: Grade of examination				
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0				
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14				
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.				
Prerequisites for Participation in this Module: General requirements are regulated by the respective valid examination regulations.				

Identifier	Module title	Courses language
BIO-NMM-NB	Master Module Neurobiology: Neurobiology <i>German module title Mastermodul Neurobiologie: Neurobiologie</i>	English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in Neurobiology
Credit Points 12 CP	Module frequency Each summer term	Committee responsible for the module Fachbereichsrat Biologie/Chemie
Learning objectives The students should acquire advanced scientific competences. They acquire in-depth knowledge of selected neurobiological topics (see "contents") and develop an understanding of neurobiological processes and connections. They can transfer this knowledge to new circumstances and deduce consequences. They apply more sophisticated laboratory, biochemical, molecular biological, cell biological and electrophysiological working methods. The data experimentally collected with these methods are carefully analysed, evaluated with the usual statistical methods, graphically presented and critically discussed. The students develop professional and methodological content from English-language articles, research literature relevant to the respective professional environment, prepare a presentation and master the common rules for presenting scientific data. They reflect and discuss the technical and methodological aspects of the respective topic and assess the quality of their own presentation and that of their fellow students. They use the usual feedback rules.		

Content					
LECTURE: Systemic Neurobiology (Development and Anatomical Organization, Autonomic Nervous System, Sensory Perception, Motor Systems, Neuronal Foundations of Cognitive Performance, Awareness, Sleep and Systemic Diseases of the Nervous System).					
SEMINAR: With the help of primary literature in-depth technical and methodological theoretical knowledge in the field of systemic neurobiology will be developed.					
EXERCISES: Methods of molecular and systemic neurobiology: Gene transfer and life cell imaging of neural cells, identification and analysis of transgenic mice, electrophysiological recordings of brain slices.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		none	Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
Examination requirements: Special scientific competencies for the sub-aspects of neurobiology as described under "content" are examined.					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.					
Prerequisites for Participation in this Module:					

Identifier BIO-NMM-ÖK1	Module title Master Module Ecology: Experimental Ecology and Evolution <i>German module title</i> Mastermodul Ökologie: Experimentelle Ökologie und Evolution	Courses language English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in Ecology
Credit Points 12 CP	Module frequency Each winter term	Committee responsible for the module Fachbereichsrat Biologie/Chemie

Learning objectives
 This module focusses on two main aspects. First, it will highlight the experimental power of using laboratory-based model systems to address fundamental questions in ecology and evolution. Second, it will introduce participants to the scientific process. In particular, populations and communities of unicellular organisms are employed to experimentally answer certain scientific questions. For this, the lecture series will provide the relevant background information. In the seminar, participants will select their own topic in the field of experimental ecology and evolution and present a talk to the whole group. Afterwards, both the scientific content as well as the style of the presentation itself is discussed. In this way, course participants will improve their skills to present complex scientific matters and to provide constructive feedback. In the practical course, participants will form small groups, read the relevant literature and - based on this - develop their own research hypothesis. The resulting hypothesis will then be tested in dedicated experiments, which have been designed and planned by the different groups. Afterwards, the collected data will be statistically analysed and graphically displayed. In this way, course participants will gain hands-on experience with the scientific process from developing a hypothesis to presenting the final result. During this course, students will not only extend their theoretical knowledge and acquire new methodological skills, but also learn how to summarize and communicate scientific results in an effective manner. Finally, course participants will improve their skills to discuss the work of others in a critical and constructive manner.

Content
 LECTURE: Four main topics will be covered:
 (1) How do organisms adapt to their environment?
 (2) Which selection pressures result from interactions with other organisms?
 (3) How do I statistically analyse scientific data?
 (4) How does science work?
 SEMINAR: The seminar will extend and deepen the aspects treated in the lecture. Course participants will select their own topic of interest, search for and read the relevant literature, and present the topic as a talk. Subsequently, both the content of the talk and the style of presentation will be discussed.
 EXERCISES: A scientific project will be developed and performed to verify a previously-defined hypothesis. Projects will use microbial model systems to address fundamental questions in ecology and evolution.

Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
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1st Component:

Lecture	2	4		none	Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.
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2nd Component:

Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
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3rd Component:

Exercises	5	6	Approved extended protocol or poster presentation. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
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Examination requirements: Knowledge on selected topics acquired during the lecture

Calculation of module grade, where applicable: Grade of examination

Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.

Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.
Prerequisites for Participation in this Module:

Identifier BIO-NMM-ÖK2	Module title Master Module Ecology: Theoretical Ecology and Evolution <i>German module title</i> <i>Mastermodul Ökologie: Theoretische Ökologie und Evolution</i>		Courses language English		
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester		Authorized module representative Lecturers in Ecology		
Credit Points 12 CP	Module frequency Each summer term		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives Scientific competencies: In this course, students learn conceptual and technical methods that are applied in evolutionary theory and theoretical ecology. With the help of mathematical models and computer simulations, the students expand their knowledge to analyse and evaluate scientific hypotheses. Both techniques allow them to generate null models, expectations, and precise scientific predictions. Some of the most fundamental biological questions, such as B. the evolution of cooperation, the origin of life, and the evolution of multicellular organisms, are researched with the help of mathematical models. Many complex processes in the areas mentioned above can be explained with the help of mathematical models. For this reason, creative thinking and problem-oriented solution strategies will be necessary in this course in order to understand fundamental issues in biology. Methodical skills: The conceptual approaches of the theory of evolution (including population genetic issues and the application of game theory in questions of evolutionary biology) and theoretical ecology (including issues of population ecology, interaction, and mutualism of species, predation, competition, etc.) are examined with the help of mathematical models and computer simulations. No previous knowledge is required, neither in mathematics nor in computer programming. The necessary application methods are developed in close connection with conceptual mathematical questions.					
Content LECTURE: Deterministic and stochastic models of population growth, classical ecological models of interacting populations, models of spatial interactions, stability and biodiversity of ecological communities, evolutionary dynamics, evolutionary game theory, payoff matrix, evolutionary stable strategy (ESS), evolutionary games: Coward's Game, Prisoner's Dilemma, War of Attrition, Rock-Scissors-Paper, Signal Theory and Handicap Principle, Coevolution, Replicator Equation, Adaptive Dynamics and Evolutionary Invasion Analysis, Classical Population Genetic Models, Horizontal Transmission: application to horizontal gene transfer, Epidemiology, Evolution of Culture and the Evolution of Languages. SEMINAR: Further in-depth study of aspects of the lecture. EXERCISES: Analytical approaches and computer simulations to model ecological and evolutionary biological processes.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		none	Written examination on the contents of the module (usually 90 min.) or oral examination as specified by the lecturer at the beginning of the course.

2 nd Component:			
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.
3 rd Component:			
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.
Examination requirements: Knowledge on selected topics acquired during the lecture			
Calculation of module grade, where applicable: Grade of examination			
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.			
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14			
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.			
Prerequisites for Participation in this Module:			

Identifier	Module title		Courses language
BIO-NMM-PP	Master Module Plant Physiology <i>German module title</i> <i>Mastermodul Pflanzenphysiologie</i>		English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in Plant Physiology	
Credit Points 12 CP	Module frequency Each winter term	Committee responsible for the module Fachbereichsrat Biologie/Chemie	
Learning objectives The students expand and deepen their scientific and methodical competences. They can plan experimental series for selected subject areas, carry out the experiments independently, evaluate the results and present them in a written report. They learn about the relevant and current literature of the topic. They train understanding and delivering presentations in English as well as the critical reflection of original scientific literature. They will learn to summarise and present the results of their own projects in English presentations.			
Content LECTURE: Selected chapters from various areas. SEMINAR: With the help of review articles and primary literature, in-depth technical and methodological-theoretical knowledge from different sub-areas will be acquired. EXERCISES: Selected experiments from different areas.			

Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		none	Written or MC examination on the contents of the module (usually 90 min.), oral examination, lab reports or presentation as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, uninterrupted and active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, uninterrupted and active participation in the exercises is required.		
Examination requirements: Knowledge on selected topics acquired during the lecture					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.					
Prerequisites for Participation in this Module:					

Identifier BIO-NMM-SB	Module title Master Module Structural Biology <i>German module title</i> <i>Mastermodul Strukturbiologie</i>	Courses language English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in Structural Biology
Credit Points 12 CP	Module frequency Each summer term	Committee responsible for the module Fachbereichsrat Biologie/Chemie
Learning objectives The students expand their scientific and methodological competences in the field of structural biology. They receive an in-depth overview of the methods widely used in structural biology and their areas of application based on examples. They learn the theoretical background of the respective methodology and thus acquire in-depth knowledge of structural biology. The students implement what they have learned in a series of experiments and learn to carry out the evaluation independently, as well as to present the results in writing. They train to understand and give presentations in English and critically reflect on original scientific literature. They		

consider and discuss technical and methodological aspects of structural biology and assess the quality of their presentation as well as that of their fellow students.

Content

LECTURE: Methods of structural biology, design and function of the transmission electron microscope, sequence and steps of single particle analysis and tomography. Protein folding motifs, protein interaction and complex formation, conformations and dynamics. Macromolecules in a cellular context.

SEMINAR: Presentation and discussion of relevant literature in English.

EXERCISES: Techniques of structural biology. Sample preparation and data acquisition of samples relevant to structural biology. Analysis and processing of collected data, as well as their analysis and presentation.

Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4		none	Written examination or MC on the contents of the module (usually 90 min.) or oral examination or protocol or presentation as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.		
Examination requirements: Knowledge on selected topics acquired during the lecture					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.					
Prerequisites for Participation in this Module:					

Identifier BIO-NMM-ZO1	Module title Master Module Zoology: Molecular Developmental Biology <i>German module title</i> <i>Mastermodul Zoologie: Entwicklungsgenetik</i>			Courses language English	
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester		Authorized module representative Lecturers in Zoology		
Credit Points 12 CP	Module frequency Each winter term		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives The students will acquire advanced scientific competences, and an in-depth knowledge of selected topics in molecular developmental biology. During the practical course, they will be trained in sophisticated laboratory techniques, including biochemistry, molecular biology, cell biology, advanced microscopy and developmental biology. The students will be trained in reading English-language literature, to obtain technical and methodological knowledge from primary literature. They will be researching additional literature, and prepare a journal club presentation to master the basic rules of presenting scientific data. They will reflect and discuss the technical and methodological aspects of the aspects of the respective topic.					
Content LECTURE: The lecture will discuss the molecular and cellular mechanisms of <i>Drosophila melanogaster</i> development. Topics include: morphogen gradients, molecular mechanisms of axis formation, segmentation, organ formation, RNA-interference, CRISPR, fluorescent life cell markers (e.g. GFP), transgenic <i>Drosophila</i> . SEMINAR: We will read, revise and discuss recent research papers. Presentation skills, preparing a keynote seminar, in-depth technical and methodological knowledge in the field of developmental biology will be developed with the help of current literature. EXERCISES: Methods of molecular and cellular developmental biology: biochemical, molecular, cell biological and microscopic techniques, including fluorescence microscopy. Examples for experiments: Expression of various proteins in insect cells and further analysis by Western blot, analysis of fluorescent subcellular markers from <i>Drosophila</i> transgenic lines by microscopy and Western blot, localization of transposon insertions in the genome of <i>Drosophila</i> transgenic lines by PCR and other molecular biology methods, Hybridization techniques - in situ hybridization to detect gene-specific mRNAs in tissues and embryos, ectopic expression of subcellular markers with Gal4 driver lines, immunohistochemically detection of reporter gene expression, introduction to fluorescence microscopy and photo documentation.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4			Written examination or MC exam on the contents of the module (usually 90 min.) or oral examination or protocol or presentation as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.	Erweiterungsmodul Genetik I or equivalent courses in genetics, cell biology or biochemistry Please consult us if you are unsure whether you meet the requirements.	

Examination requirements: Developmental biology topics as described under "contents" will be tested.
Calculation of module grade, where applicable: Grade of examination
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.
Prerequisites for Participation in this Module: If you have a good background in genetics, but have not taken our undergraduate module Genetics I, please prepare for the present module, using a series of OpenCast lectures (provided by us) to catch up on the basics in Drosophila biology. The lectures are part of our Bachelor module (Erweiterungsmodul) Genetics I, which is currently jointly organized by the Departments of Genetics and Zoology. The topics, covered in these lectures, constitute a mandatory prerequisite to qualify for our Master module. If you have no or little training in genetics and/or basic Drosophila (developmental) biology, it is essential that you catch up on these topics before the start of the master course. Participation to the course will only be granted after passing a mandatory entry test. The test will be graded, and you can use the result to improve the overall grade for the module. This module is designed as an "Advanced Course" and cannot be taken by biology novices under any circumstances.

Identifier BIO-NMM-ZO2	Module title Master Module Zoology: Developmental Biology and Molecular Genetics of Marine Organisms, at the "Biologische Anstalt Helgoland" <i>German module title</i> <i>Mastermodul Zoologie: Entwicklungsbiologie und Molekulargenetik mariner Organismen, an der "Biologischen Anstalt Helgoland"</i>	Courses language English
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester	Authorized module representative Lecturers in Zoology
Credit Points 12 CP	Module frequency Lecture each winter term, seminar and exercises each summer term	Committee responsible for the module Fachbereichsrat Biologie/Chemie
Learning objectives The students will acquire knowledge on selected developmental biological processes of marine organisms. Thereby will be trained in and apply more demanding laboratory biochemical, molecular biological, cell biological and microscopic techniques, and learn how to obtain and revise technical and methodological contents from articles in English and prepare the contents of the articles in a journal club presentation.		

Content					
LECTURE: Students have two options: Option 1: Attendance on the Marine Biology lecture (Meeresbiologie) read in the winter term (written exam). Option 2: Attendance on another lecture on basic genetics or cell biology (basically anything from the MSc Cell and Molecular Biology program) (written exam). Please make sure to check with us if the chosen lecture is creditable for our course.					
SEMINAR: Presentation of a scientific publication of developmental biology of marine organisms in a journal club presentation.					
EXERCISES: The practical course will take place at the "AWI Biologische Anstalt Helgoland". We will preferentially work with sea urchins and sea squirts. Students will be trained in, and perform, various techniques in the field of developmental biology. These include for example: (i) Fertilization of sea urchin and sea squirt eggs, detection of cortical granules, effects of ECM proteases on development, (ii) tissue differentiation (enzyme histochemistry, antibody staining, SDS gel electrophoresis, immuno-blot, skeletal differentiation), fluorescence microscopy, video microscopy, and (iii) Comparative gene expression (PCR analysis of taxonomically selected organisms, RT-PCR for gene expression analysis, in situ hybridization). In addition, students will learn about non-university research institutes. In addition to laboratory work, zoological field trips will be carried out.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4			Written examination or MC exam on the contents of the module (usually 90 min.) or oral examination or protocol or presentation as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.	Takes place on Helgoland.	
3rd Component:					
Exercises	5	6	Approved extended protocols. Since content and skills relevant to the study and profession must be acquired and practiced, regular active participation in the exercises is required.	Takes place on Helgoland and only master's students majoring in cell and molecular biology are eligible to participate. Students of other majors may participate only after personal approval by the module supervisor.	
Examination requirements: Written exam on the topic of the selected lecture					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.					
Prerequisites for Participation in this Module: Only master's students majoring in cell and molecular biology are eligible to participate. Students of other majors may participate only after personal approval by the module supervisor.					

Identifier BIO-NMM	Module title Master module (general description) <i>German module title</i> <i>Mastermodul (allgemeine Beschreibung)</i>			Courses language English	
Module SWS (contact hours per week during semester) 8 SWS	Module duration 1 semester		Authorized module representative Lecturers in Biology		
Credit Points 12 CP	Module frequency Winter or summer term		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives The students expand and deepen their subject-specific and methodological competences. They can plan more extensive series of experiments on selected, special topics; carry out the experiments independently; evaluate the results and present them in writing. In doing so, they learn to consider the relevant and current literature of the respective subject area. They train to understand and give presentations in English and critically reflect on original scientific literature in English. You will learn to summarise and present the results of your own projects in the form of English-language presentations. The literature work associated with the exercises in the style of a short scientific publication requires independent research as well as a targeted examination of the respective subject-related content and thus leads towards the later final thesis.					
Content LECTURE: Selected chapters from different sub-areas. SEMINAR: With the help of reviewing articles and primary literature, in-depth technical and methodological-theoretical knowledge from different sub-areas is acquired. EXERCISES: Selected experiments from different sub-areas.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Lecture	2	4			Written examination or MC exam on the contents of the module (usually 90 min.) or oral examination or protocol or presentation as specified by the lecturer at the beginning of the course.
2nd Component:					
Seminar	1	2	Approved presentation. Since exercise-relevant content will be presented and discussed, regular active participation in the seminar is required.		
3rd Component:					
Exercises	5	6	Approved protocols and an additional literature paper of about 8-10 pages (approx. 1,200 characters per page). Since study and professionally relevant contents and skills must be acquired and practised, regular participation in the exercises is required.		
Examination requirements: Written exam on the topic of the selected lecture					
Calculation of module grade, where applicable: Grade of examination					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					

Module Applicability: MSc "Nanosciences" in the major or minor subject Biology. For students of other study programmes or students who have changed their place of study and are new in Osnabrück, only after personal consultation with the person responsible for the module. Admission/participation is then only possible after consultation with the lecturer and proof of the required prior knowledge. All students need a basic knowledge of the respective subject at Bachelor level.

Prerequisites for Participation in this Module:

Identifier BIO-FS1/BIO-FS2	Module title Professional Specialization 1 / Professional Specialization 2 <i>German module title</i> <i>Fachliche Spezialisierung 1/ Fachliche Spezialisierung 2</i>			Courses language English	
Module SWS (contact hours per week during semester) 4 SWS	Module duration At least 5 weeks each		Authorized module representative Lecturers in Biology		
Credit Points 6 CP each	Module frequency By individual arrangement		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives Acquisition of an in-depth subject and methodological competence in a selected special field of biology through practical studies under supervision.					
Content Practical, mostly experimental work on a bioscientific problem from the current research areas of the biology working groups.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
In each case, full-day laboratory work totalling at least 5 weeks or comparable field work.	4 each	6 each	Project report	none	
2nd Component:					
3rd Component:					
Examination requirements: none					
Calculation of module grade, where applicable: none					
Guidelines for passing the module, where applicable: All course certificates must have been obtained.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" for the Major or Minor in Biology					
Prerequisites for Participation in this Module:					

Identifier BIO-FB	Module title Research Course <i>German module title</i> <i>Forschungsarbeit</i>			Courses language English
Module SWS (contact hours per week during semester) 7-9 SWS	Module duration 1 semester		Authorized module representative Lecturers in Biology	
Credit Points 18 CP	Module frequency Each academic year by individual arrangement		Committee responsible for the module Fachbereichsrat Biologie/Chemie	

Learning objectives					
Within the framework of the research paper, students should demonstrate that they are able to work on a defined biological problem, from the development of the research question to data evaluation and discussion, in a scientifically and methodologically correct and independent manner within a specified period of time. This is particularly professionally qualifying.					
Content					
Independent practical, mostly experimental work on a bioscientific problem from the current research areas of one of the biology working groups. The research work prepares the practical part of the Master's thesis.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1st Component:					
Laboratory and/or field work and self-study	7-9	18		none	The research paper is assessed together with the Master's thesis by two surveyors.
2nd Component:					
3rd Component:					
Examination requirements: none					
Calculation of module grade, where applicable: Grade of the Master's Thesis					
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.					
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14					
Module Applicability: MSc "Nanosciences" for the Major or Minor in Biology					
Prerequisites for Participation in this Module: none					

Identifier BIO-SPV		Module title In-Depth Lecture <i>German module title</i> <i>Spezialvorlesungsmodul</i>			Courses language German or English	
Module SWS (contact hours per week during semester) 2 SWS		Module duration 1 semester		Authorized module representative Lecturers in Biology		
Credit Points 4 CP		Module frequency Each academic year		Committee responsible for the module Fachbereichsrat Biologie/Chemie		
Learning objectives						
Acquisition of specialised scientific competences. Acquisition of specialised knowledge of selected biological processes; development of an understanding of biological processes and interrelationships. Recognising biological principles and transferring them to new situations.						
Content						
Selected current topics from different biological subfields						
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method	
1st Component:						
Special non-modular lectures from the extended range of biology or a lecture decoupled from a Master's module.	2	4	none	none	Written examination or MC exam on the contents of the module (usually 90 min.) or oral examination or protocol or presentation as specified by the lecturer at the beginning of the course.	
2nd Component:						

3rd Component:				
Examination requirements: Specialised scientific competences on selected current topics in biology are examined.				
Calculation of module grade, where applicable: Grade of examination				
Guidelines for passing the module, where applicable: All course certificates must have been obtained; the course-related examination must have been passed with a grade of at least 4.0.				
Retaking examinations to improve grades, where applicable: According to the general rules of examination (allgemeine Prüfungsordnung) gem. § 14				
Module Applicability: MSc "Nanosciences" for the Major or Minor in Biology, MSc Biology				
Prerequisites for Participation in this Module: none				

Chemistry

Preface

The present module descriptions of Chemistry are based on the specifications of the General Examination Regulations for Bachelor's and Master's Programs (APO) of the University of Osnabrück.

In the module descriptions, the following abbreviations are used for the forms of course-related examinations mentioned in § 10 APO:

a) Term paper	HA	
b) Oral examination	mP	(time in minutes)
c) Presentation	Ref	(time in minutes)
d) Oral presentation	RefmA	(time in minutes)
e) Written exam	K	(time in minutes)
f) Multiple-choice exam	MCK	(time in minutes)
g) Study project	SP	

The following further forms of study-accompanying examinations are intended:

h) Seminar presentation	SV	(time in minutes)
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In a seminar presentation, the candidate should demonstrate that he/she is familiar with the scientific basics, the state-of-the-art in science as well as the scientific contexts of the examination area. As well as, that he/she is able to present and discuss these orally in a suitable manner in front of a specialist scientific audience. The seminar lecture can take place in public at the university according to the examiner's decision. The form and duration of the seminar presentation will be in accordance with the requirements of the module description.

i) Poster presentation	PP	(time in minutes)
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In a poster presentation, the candidate should demonstrate that he/she is familiar with the scientific principles, and the scientific contexts of the examination field and that he/she is able to present and discuss them orally in a suitable manner with the aid of the poster in front of a specialist scientific audience. The poster presentation can take place in public at the university according to the examiner's decision. The form and duration of the poster presentation will depend on the specifications of the module description.

A slash ("/") between two or more course-related forms of examination means that they are available for selection. The lecturer(s) will announce at the beginning of the module/component which form of examination will be used in the current case.

The topics indicated in the module descriptions under "Contents" are to be regarded as guidance for the lecturers and students and are based on a course period of 15 weeks. Deviations in the scope of the learning content taught will inevitably result from the varying length of the course period in a semester and from the varying location of holidays in a semester. In addition, the selection, methodological design and depth of detail of the topics listed under content are subject to Art. 5 Para. 3 Sentence 1 GG (freedom of science, research and teaching).

Compulsory attendance

For reasons of health and safety, attendance is compulsory at the seminars on the practical courses in chemistry. Participation in the practical course without attending the seminar is not possible. Furthermore, it goes without saying that practical experience and knowledge can only be acquired through active participation in the practical course, which is why compulsory attendance is also a prerequisite for passing the practical course.

Identifier CHE-Supra		Module title Supramolecular Chemistry			
		German module title <i>Supramolekulare Chemie</i>			
Module SWS (contact hours per week during semester) 5 SWS	Module duration 1 semester			Authorised module representative Lecturers of Organic Chemistry	
Credit Points 6 CP	Module frequency Each academic year			Committee responsible for the module Faculty council of Biology/Chemistry	
Learning objectives Students will obtain structured expert knowledge on intermolecular interactions based on advanced theories of weak and non-covalent bonds. This includes knowledge of important supramolecular compound classes and structures. The goal is to enable students to understand nanomolecular, functional, and switchable systems, e.g. molecular machines, rotors, shuttles, and photonic devices. By comparing natural and synthetic catalysts and membrane transporters, the students will be enabled to recognize and discuss similarities and differences of supramolecular and biomolecular systems. Within the accompanying lab course, the students will receive a hands-on training in supramolecular, optical-spectroscopic characterization methods, they will learn to make scientific hypotheses, and how to address them. The seminar of this module includes advanced topics, which are partly related to the experiments of the lab course and, in the other part, provide an insight into contemporary and seminal original research from the scientific literature.					
Content Theory of weak, non-covalent, intermolecular interactions: ion-ion, ion-dipole, dipole-dipole, induction and dispersion interactions, hydrogen bonds, the hydrophobic effect, fluorophilicity, cation- π and anion- π -interactions, aromatic electron donor-acceptor interactions, halogen bonding. Molecular recognition of host-guest complexes (crown ethers, cyclodextrins, calixarenes, cucurbiturils, and others) and methods for the determination of binding thermodynamics and kinetics (NMR, isothermal titration calorimetry, optical-spectroscopic methods). Dynamics of supramolecular systems and dynamic covalent chemistry. Supramolecular topology (catenanes, rotaxanes, and molecular knots). Selfassembly. Functional and switchable supramolecular systems and machines. Supramolecular photochemistry. Biomimetic chemistry of biomembranes and membrane transporters, and supramolecular catalysis.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1. Component: SupraV					
Lecture	2 SWS	3 CP	none	Participation in exercises, passing 50 % of the exercise tasks, presentation, report of practical course	K (120) / mP (30)
2. Component: SupraÜ					
Exercise	1 SWS	1 CP	Solving the exercises, presentation	none	included in lecture
3. Component: SupraPrac					
Practical course	2 SWS	2 CP	Written protocols; compulsory attendance	none	none
Examination requirements					
<ul style="list-style-type: none"> Content and qualification aims of the module 					

Calculation of module grade, where applicable
<ul style="list-style-type: none"> Grade of the course-related exams
Guidelines for passing the module, where applicable
<ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0.
Guidelines for retaking examinations to improve grades, where applicable
<ul style="list-style-type: none"> According to §14 APO
Module Applicability
<ul style="list-style-type: none"> MSc Nanosciences
Prerequisites for Participation in this Module
<ul style="list-style-type: none"> none

Identifier	Module title				
CHE-FunP	Functional Polymers				
	German module title <i>Funktionelle Polymere</i>				
Module SWS (contact hours per week during semester) 10 SWS	Module duration 2 semesters		Authorised module representative Lecturers of Organic Chemistry		
Credit Points 12 CP	Module frequency Each academic year		Committee responsible for the module Faculty council of Biology/Chemistry		
Learning objectives					
It is the students to recognize that functional polymers are macromolecules that exhibit special properties in addition to their function as materials. The module treats the preparation of synthetic macromolecules, and describes examples from the diverse world of functional polymers.					
Content					
Lecture, Part 1: Synthesis					
Step growth reactions (Flory-principle, linear, crosslinked step-growth, Flory - Stockmeyer), chain growth reactions: free radical polymerization, emulsion polymerization, controlled radical polymerization (nitroxide mediated, ATRP, RAFT), copolymerization (terminal model, copolymerization diagrams, sequences, Q-e-scheme), cationic polymerization, ring-opening cationic polymerization, anionic polymerization (mechanism, Poisson-distribution, effect of counter-ions and solvents, Winstein-spectrum, block copolymers), coordinative polymerization (Ziegler-Natta-, Phillips-, Metallocene-Catalysts, ROMP), rapid injection moulding, thermoplastic elastomers, rubber (entropy elasticity, vulcanization chemistry).					
Lecture, Part 2: Materials and Applications					
Type and applications of special synthetic polymers: Membranes (porous membrane preparation via track-etching, polymer stretching, TIPS, SIPS, membrane materials, separation processes: microfiltration, ultrafiltration, hyperfiltration, non-porous membranes: materials, solution-diffusion mechanism of separation, gas separations, pervaporation, membrane reactors), high temperature resistant polymers (materials, synthesis, performances), photo conducting polymers, self organization, polymeric liquid crystals (phases, materials, properties), Dendrimers and hyperbranched polymers, polyelectrolytes (materials, applications), non ionic, water soluble polymers (PEO, PVA, PVAm, NVP) glues.					
Practical course					
Participation in current research work on polymer synthesis and / or modification in the Department of Organic Materials Chemistry.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1. Component: FunP SynthesisV					
Lecture	2 SWS	3 CP	none	Participation in exercises, report of practical course	K (90)

2. Component: FunP SynthesisÜ					
Exercise	1 SWS	1 CP	Processing of exercise tasks	none	included in component 1 lecture
3. Component: FunP Materials and ApplicationsV					
Lecture	2 SWS	3 CP	none	none	K (90)
4. Component: FunP Prac					
Practical course	5 SWS	5 CP	Compulsory attendance; conducting experiments; written protocols of the experiments	none	none
Examination requirements					
<ul style="list-style-type: none"> Content and qualification aims of the module 					
Calculation of module grade, where applicable					
<ul style="list-style-type: none"> Grade of the course-related exams or average grade of all course-related exams. 					
Guidelines for passing the module, where applicable					
<ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0. 					
Guidelines for retaking examinations to improve grades, where applicable					
<ul style="list-style-type: none"> According to §14 APO 					
Module Applicability					
<ul style="list-style-type: none"> MSc Nanosciences 					
Prerequisites for Participation in this Module					
<ul style="list-style-type: none"> none 					

Identifier CHE-Nano	Module title Nanomaterials	
	German module title <i>Nanomaterialien</i>	
Module SWS (contact hours per week during semester) 10 SWS	Module duration 2 semesters	Authorised module representative Lecturers of Inorganic Chemistry
Credit Points 12 CP	Module frequency Each academic year	Committee responsible for the module Faculty council of Biology/Chemistry
Learning objectives		
Students acquire a detailed structured special knowledge regarding the synthesis methods and the particle size-dependent properties of nanocrystalline solids. Based on the model concepts on the subject, abstract thinking is promoted; in the accompanying practical course the working out and solving of scientific questions is promoted and practised.		
Content		
Lecture 1: Properties of nanocrystalline solids		
Optical and electronic characteristics of nanocrystals from semiconductors, metals, and doped isolators; magnetic properties of nanocrystals, supra paramagnetism.		
Lecture 2: Synthesis of nanocrystalline solids		
Theories on nucleation, nucleation in solution, supersaturation, growth in solution, Ostwald Ripening, „focussing“ of particle size distribution, thermodynamic and kinetic control of growth, control of crystallite shape, surface ligands, electrostatic and steric stabilization of colloids.		

Practical training: Synthesis of nanocrystalline semiconductors, metals or doped isolators in solution and application of different characterization methods, such as X-ray powder diffractometry, transmission electron microscopy, dynamic light scattering, UV-Vis-absorption spectroscopy, FTIR spectroscopy, fluorescence spectroscopy, thermogravimetry.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method)
1. Component: Nano Properties of nanocrystalline solidsV					
Lecture	2 SWS	3 CP	none	none	K (120) / 2xK (60) / MCK (90) / 2xMCK (45) / mP (60) / 2xmP (45)
2. Component: Nano Properties of nanocrystalline solidsÜ					
Exercise	1 SWS	1 CP	Processing of exercise tasks	none	included in component 1 lecture
3. Component: Nano Synthesis of nanocrystalline solidsV					
Lecture	2 SWS	3 CP	none	none	K (120) / 2xK (60) / MCK (90) / 2xMCK (45) / mP (60) / 2xmP (45)
4. Component: Nano Prac					
Practical course	5 SWS	5 CP	Compulsory attendance; conducting of the experiments; written protocols or oral presentation of the results.	none	none
Examination requirements					
<ul style="list-style-type: none"> Content and qualification aims of the module 					
Calculation of module grade, where applicable					
<ul style="list-style-type: none"> Grade of the course-related exams or average grade of all course-related exams. 					
Guidelines for passing the module, where applicable					
<ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0. 					
Guidelines for retaking examinations to improve grades, where applicable					
<ul style="list-style-type: none"> According to §14 APO 					
Module Applicability					
<ul style="list-style-type: none"> MSc Nanosciences 					
Prerequisites for Participation in this Module					
<ul style="list-style-type: none"> none 					

Identifier CHE-Self	Module title Self-Organizing Systems German module title <i>Selbstorganisierende Systeme</i>
Module SWS (contact hours per week during semester) 5 SWS	Module duration 1 semester
Credit Points 6 CP	Module frequency Each academic year
Authorised module representative Lecturers of Physical Chemistry	
Committee responsible for the module Faculty council of Biology/Chemistry	

Learning objectives					
The students acquire knowledge of structure formation processes that are coupled with self-organization. They will explore the potential of such structure formation processes for the production of functional materials. By elaborating interactive content modules related to the topic of the module, the students will train how to become acquainted with new scientific areas. They will practice literature research, scientific writing, structuring and summarizing of scientific problems as well as correct referencing.					
Content					
Nature of self-organized processes and their physical fundamentals; syntheses based on self-organization; structure formation by self-organization; characterization of self-organized structures by microscopy, scattering methods and image analysis; examples of self-organization.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1. Component: Seminar on Study project					
Seminar on Study project	3 SWS	4 CP	none	1) Elaboration of an interactive content module on a scientific problem related to the topic of the module 2) Participation in the laboratory course and written protocols of all experiments	SP / Ref (45) / RefmA (45) / mP (30) / K (60) / MCK (60)
2. Component: Laboratory course with seminar					
Seminar	2 SWS	2 CP	Compulsory attendance; processing of experiments; experimental protocols	none	none
Examination requirements					
<ul style="list-style-type: none"> Content and qualification aims of the module 					
Calculation of module grade, where applicable					
<ul style="list-style-type: none"> Grade of the course-related exams 					
Guidelines for passing the module, where applicable					
<ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0. 					
Guidelines for retaking examinations to improve grades, where applicable					
<ul style="list-style-type: none"> According to §14 APO 					
Module Applicability					
<ul style="list-style-type: none"> MSc Nanosciences 					
Prerequisites for Participation in this Module					
<ul style="list-style-type: none"> none 					

Identifier CHE-Porous		Module title Porous Materials			
		German module title <i>Poröse Materialien</i>			
Module SWS (contact hours per week during semester) 5 SWS	Module duration 1 semester			Authorised module representative Lecturers of Organic Chemistry	
Credit Points 6 CP	Module frequency Each academic year			Committee responsible for the module Faculty council of Biology/Chemistry	
Learning objectives In this lecture, microporous materials will be introduced. Microporous materials represent a versatile class of materials which includes systems with different chemical structures. Zeolites, metal organic frameworks (MOF) and porous conjugated organic polymer belong to this class of material. Their synthesis as well as applications will be discussed. The theory of porosity and the characterization using gas physisorption isotherms will be part of the lecture. Characterization methods such as (powder) X-ray diffraction ((P)XRD), energy dispersive X-ray spectroscopy (EDX) and photoelectron spectroscopy such as XPS, are valuable tools in material analysis and will be part of the lecture. In the seminar, students are given the opportunity to recapitulate their new acquired knowledge of porous polymers and characterization methods by exercises. The other part of the seminar is related to the experimental part of the module. We will discuss in detail what polymers will be synthesized and how to work with schlenk technique and autoclaves. Within the accompanying lab course, the students will synthesize ionic microporous polymers and characterize by powder x-ray diffraction (PXRD) among others.					
Content Theory of porosity; zeolites metal organic frameworks, conjugated microporous polymers; ionic microporous polymers; applications of those polymers in the field of gas storage, e.g. hydrogen storage for fuel cells or gas separation, catalysis, storage and conversion of energy, e.g. as polyelectrolyte in lithium ion batteries or as ion exchangers for water softening in detergents or in wastewater treatments, biological applications due to antibacterial activity; characterization methods such as physisorption, (powder) X-ray diffraction ((P)XRD), energy dispersive X-ray spectroscopy (EDX) and photoelectron spectroscopy such as XPS.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1. Component: PorousV					
Lecture	2 SWS	3 CP	none	none	K (60) / mP (45)
2. Component: PorousÜ					
Exercise	1 SWS	1 CP	Exercise tasks; compulsory attendance	none	included in lecture
3. Component: PorousPrac					
Practical course	2 SWS	2 CP	Written protocols; compulsory attendance	Ref (30)	none
Examination requirements <ul style="list-style-type: none"> Content and qualification aims of the module 					
Calculation of module grade, where applicable <ul style="list-style-type: none"> Grade of the course-related exams 					
Guidelines for passing the module, where applicable <ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0. 					

Guidelines for retaking examinations to improve grades, where applicable
<ul style="list-style-type: none"> According to §14 APO
Module Applicability
<ul style="list-style-type: none"> MSc Nanosciences
Prerequisites for Participation in this Module
<ul style="list-style-type: none"> none

Identifier CHE-Biocon	Module title Bioconjugates				
	German module title <i>Biokonjugate</i>				
Module SWS (contact hours per week during semester) 2 SWS	Module duration 1 semester			Authorised module representative Lecturers of Organic Chemistry	
Credit Points 2 CP	Module frequency Each academic year			Committee responsible for the module Faculty council of Biology/Chemistry	
Learning objectives					
Students will obtain in this interdisciplinary course a structured knowledge on the synthesis and application of bioconjugates. They will learn how different functional groups can be used to connect peptides, proteins, DNA, and other biomolecules with synthetic materials such as dendrimers, fluorescent dyes, or different types of nanoparticles. They will learn how functional group selectivity can be controlled by choosing appropriate reagents and reaction conditions, and how the resulting bioconjugates can be purified. In the second part, students will learn how bioconjugates are used in analytical procedures called “assays” to determine the presence of a particular analyte, a certain biological activity, or a biomolecular property. The typical scientific instrumentation and assay design principles will be covered, the influence of binding equilibria of biomolecular interactions and enzyme kinetics will be discussed, and the students will obtain skills to critically assess data quality and the reliability of mechanistic models.					
Content					
Structure of biomolecules and the reactivity of major functional groups used in bioconjugation (amines, thiols, aldehydes). Reagents and mechanisms of bioconjugate reactions. Introduction of fluorescent, radioactive, and other labels to biomolecules. Biotinylation and the strept(avidin)-biotin system. Functionalization of polymer, gold, and silica particles and the DLVO theory. Chromogenic and fluorogenic probes. Fluorescence resonance energy transfer probes. Dye-antibody and enzyme-antibody conjugates for immunoassays. Theoretical basis and instrumentation for ligand binding and enzyme assays (absorption and fluorescence spectroscopy, radioactivity, and surface plasmon resonance), potential sources of error and how to avoid them. Data evaluation and statistical analysis.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1. Component: BioconV					
Lecture	2 SWS	2 CP	none	none	K (60) / mP (30)
Examination requirements					
<ul style="list-style-type: none"> Content and qualification aims of the module 					
Calculation of module grade, where applicable					
<ul style="list-style-type: none"> Grade of the course-related exams 					
Guidelines for passing the module, where applicable					
<ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0. 					
Guidelines for retaking examinations to improve grades, where applicable					
<ul style="list-style-type: none"> According to §14 APO 					

Module Applicability <ul style="list-style-type: none"> MSc Nanosciences
Prerequisites for Participation in this Module <ul style="list-style-type: none"> none

Identifier CHE-FS1	Module title Professional Specialization 1				
	German module title <i>Fachliche Spezialisierung 1</i>				
Module SWS (contact hours per week during semester) 5 SWS	Module duration 1 semester		Authorised module representative Lecturers of Chemistry		
Credit Points 6 CP	Module frequency Each academic year		Committee responsible for the module Faculty council of Biology/Chemistry		
Learning objectives Students acquire advanced knowledge and methodological competence in a specialized research topic in chemistry by studying relevant literature. Self-competences such as time management, initiative, perseverance, tenacity, etc.					
Content The module aims to deepen the already known procedures in the treatment of original literature, starting from the search for literature, compilation of original literature, its interpretation up to its classification by bringing it together in a written report. Guided by a teacher of the special field, the students should independently deepen their knowledge in this special field. The choice of literature should be based on the master's thesis planned for the next semester in this special field, since the module serves as conceptual preparation for the master's thesis. Guidance is provided by the supervisor of the master's thesis.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1. Component: FS1 Self-study					
Self-study	4 SWS	5 CP	Consistent participation in the seminar and frequent communication with the supervisor		SV (30) / RefmA (30) / mP (30)
2. Component: FS1 Seminar					
Seminar	1 SWS	1 CP	Consistent participation in the seminar and frequent communication with the supervisor		included in 1 st Component
Examination requirements <ul style="list-style-type: none"> none 					
Calculation of module grade, where applicable <ul style="list-style-type: none"> Grade of the written report 					
Guidelines for passing the module, where applicable <ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0. 					
Guidelines for retaking examinations to improve grades, where applicable <ul style="list-style-type: none"> According to §14 APO 					

Module Applicability
<ul style="list-style-type: none"> MSc Nanosciences
Prerequisites for Participation in this Module
<ul style="list-style-type: none"> none

Identifier CHE-FS2	Module title Professional Specialization 2				
	German module title <i>Fachliche Spezialisierung 2</i>				
Module SWS (contact hours per week during semester) 5 SWS	Module duration 1 semester			Authorised module representative Lecturers of Chemistry	
Credit Points 6 CP	Module frequency Each academic year			Committee responsible for the module Faculty council of Biology/Chemistry	
Learning objectives					
Students acquire advanced knowledge and methodological competence in a specialized research topic in chemistry via the performance of established chemical experiments and characterization methods. Self-competencies such as time management, initiative, perseverance, tenacity, etc. are developed.					
Content					
The module is intended to deepen the already known procedures in handling chemicals, performing advanced experiments, and to deepen the knowledge on the preparation of spectra and other sources of information to characterize the products produced. Guided by an instructor, the students will independently learn the special experimental techniques, theoretical background, and characterization methods in this special field through independent study. The selection of experiments and characterization methods should be based on the master thesis planned for the next semester in this special field, since the module is intended to serve as experimental and theoretical preparation for the master thesis. Guidance will be provided by the supervisor of the master thesis.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1. Component: FS2 Self-study					
Self-study	4 SWS	5 CP	Consistent participation in the seminar and frequent communication with the supervisor		SV (30) / RefmA (30) / mP (30)
2. Component: FS2 Seminar					
Seminar	1 SWS	1 CP	Consistent participation in the seminar and frequent communication with the supervisor		included in 1 st Component
Examination requirements					
<ul style="list-style-type: none"> none 					
Calculation of module grade, where applicable					
<ul style="list-style-type: none"> Grade of the written report or public lecture 					
Guidelines for passing the module, where applicable					
<ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0. 					

Guidelines for retaking examinations to improve grades, where applicable
<ul style="list-style-type: none"> According to §14 APO
Module Applicability
<ul style="list-style-type: none"> MSc Nanosciences
Prerequisites for Participation in this Module
<ul style="list-style-type: none"> none

Identifier CHE-FB	Module title Research Course				
	German module title <i>Forschungsarbeit</i>				
Module SWS (contact hours per week during semester) 7-9 SWS	Module duration 1 semester		Authorised module representative Lecturers of Chemistry		
Credit Points 18 CP	Module frequency Each academic year		Committee responsible for the module Faculty council of Biology/Chemistry		
Learning objectives					
The students acquire knowledge of structure formation processes that are coupled with self-organization. They will explore the potential of such structure formation processes for the production of functional materials. By elaborating interactive content modules related to the topic of the module, the students will train how to become acquainted with new scientific areas. They will practice literature research, scientific writing, structuring and summarizing of scientific problems as well as correct referencing.					
Content					
Nature of self-organized processes and their physical fundamentals; syntheses based on self-organization; structure formation by self-organization; characterization of self-organized structures by microscopy, scattering methods and image analysis; examples of self-organization.					
Module components including CP information	SWS	CP	Course Credits	Module prerequisites	Continuous assessment examination method
1. Component: FB Seminar on the study project					
Seminar on the study project	6 – 8 SWS	17 CP	Consistent participation in the seminar and frequent communication with the supervisor		RefmA (30) / PP (30) / mP (30)
2. Component: FB Seminar					
Seminar	1 SWS	1 CP	Consistent participation in the seminar and frequent communication with the supervisor		included in 1 st component
Examination requirements					
<ul style="list-style-type: none"> Content and qualification aims of the module 					
Calculation of module grade, where applicable					
<ul style="list-style-type: none"> Average of the grades for the written report and the oral or poster presentation. 					
Guidelines for passing the module, where applicable					
<ul style="list-style-type: none"> Passing the course-related exams with a grade of at least 4.0. 					
Guidelines for retaking examinations to improve grades, where applicable					
<ul style="list-style-type: none"> According to §14 APO 					

Module Applicability

- MSc Nanosciences

Prerequisites for Participation in this Module

- none

Physics

Module PHY-FS_v1 Professional Specialization	
Identifier	PHY-FS_v1
Module title	Professional Specialization
German module title	Fachliche Spezialisierung
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Independent specialization in a specific topic of physics • Understanding of essential topics • Summarizing results by oral or written presentation • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence
Contents	<p>Guided by a lecturer, the module serves to work independently and deeply on a current research project in experimental and/or theoretical physics. Contents are fixed individually. Examples are:</p> <ul style="list-style-type: none"> • reading current literature to acquire survey knowledge • reproducing basic elements by studying literature or lab work • evaluating various arguments • writing or presenting the central aspects of the research topic
Module components including CP (LP) information	Professional Specialization (12 LP)
CP of the module	12 LP
SWS (hours per week during the semester) of the module	8 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in winter and summer term
Course credits	Oral exam (30min)
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	-
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc "Nanosciences - Materials, Molecules and Cells"

Modul PHY-FB: Research Course	
Identifier	PHY-FB
Module title	Research Course
German module title	Forschungsarbeit
Authorised module representative	Dean of Studies

Qualification objectives	<ul style="list-style-type: none"> • Learning of actual aspects in experimental and theoretical concepts of research in physics • Learning to present scientific results obtained during the course • Self-competence such as self-management, time management, creativity, own initiative, motivation, carefulness, accuracy, endurance, self-confidence, etc.
Contents	<p>The module comprises advanced concepts as well as experimental and theoretical techniques of the physics concerning current fields or research. Contents include:</p> <ul style="list-style-type: none"> • Comprehending well established results of research • Acquiring own scientific results • Presenting established and self-acquired results using written or oral presentation
Module components including CP (LP) information	Research project (18 LP)
CP of the module	18 LP
SWS (hours per week during the semester) of the module	6-8 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in either winter or summer term
Course credits	Closing table (30min)
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences – Materials, Molecules and Cells”
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-AFP-15: Applied Solid State Physics	
Identifier	PHY-AFP-15
Module title	Applied Solid State Physics
German module title	Angewandte Festkörperphysik
Authorised module representative	Dean of Studies

Qualification objectives	<ul style="list-style-type: none"> • Consolidation of knowledge in experimental solid-state physics, based on exemplary advanced current topics • Acquisition of physics knowledge in English • Exemplary application of numerical methods • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence
Contents	<p>This module introduces topics in applied solid-state physics, focussing mainly on electronic transport phenomena and their application in modern electronic devices.</p> <p>Specific contents:</p> <ul style="list-style-type: none"> • Semiconductor devices (transistors, LEDs, solar cells, microwaves) • Superconductor devices (e.g., SQUID) • Magnetism and spintronics
Module components including CP (LP) information	Lecture with exercises (6 LP)
CP of the module	6 LP
SWS (hours per week during the semester) of the module	4 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually (winter term)
Course credits	Regular attendance of exercises
Required pre-examination achievements	Successful completion of exercises
Type of examination by continuous assessment	Written (120 min) or oral (30 min)
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	Grade of final exam
Regulations on how to pass the module	Grade ≤ 4.0 ('sufficient' or better)
Retaking to improve grades	Not allowed
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-BMMP-15: Biomacromolecular Physics	
Identifier	PHY-BMMP-15
Module title	Biomacromolecular Physics
German module title	Biomakromolekülphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Introduction into theoretical and experimental fundamentals of biophysics (structure, dynamics and function of biomolecules, thermodynamics of biomolecular processes, etc.) • Acquisition of biophysical knowledge in English • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.

Contents	This module introduces the basics of biophysics. Contents include: <ul style="list-style-type: none"> • Structure and function of proteins, nucleic acids and membranes • Thermodynamics of biomolecular processes • Protein dynamics • Protein reactions
Module components including CP (LP) information	Lectures with exercises (6 LP)
CP of the module	6 LP
SWS (hours per week during the semester) of the module	4 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in winter or summer term
Course credits	
Required pre-examination achievements	Successful completion of exercise tasks
Type of examination by continuous assessment	Written exam (120 min) or oral exam (30 min)
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-OFP-15: Surface Science	
Identifier	PHY-OFP-15
Module title	Surface Science
German module title	Oberflächenphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Introduction to experimental and theoretical concepts of surface science and exemplary applications of the concepts for different materials and experimental techniques • Learning of physics in English • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	The module comprises basic concepts and experimental techniques of surface science. Contents include: <ul style="list-style-type: none"> • Basics of experimental and vacuum techniques • Geometric and electronic structure of surfaces • Structural properties and kinetics of adsorbates • Elementary processes on surfaces
Module components including CP (LP) information	Lecture with exercises (6 LP)
CP of the module	6 LP
SWS (hours per week during the semester) of the module	4 SWS
Duration of the module	One semester

Frequency with which the course is offered	Annually in either winter or summer term
Course credits	
Required pre-examination achievements	Successful working on exercises
Type of examination by continuous assessment	Written examination (120 min) or oral examination (30 min)
Examination requirements	All contents of the module
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-TKM-15: Theory of Condensed Matter	
Identifier	PHY-TKM-15
Module title	Theory of Condensed Matter
German module title	Theorie der Kondensierten Materie
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Introduction to the theoretical concepts of condensed matter physics, application to modern problems • Acquiring physics knowledge from english texts • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>The course introduces to basic concepts of condensed matter theory. Contents include:</p> <ul style="list-style-type: none"> • Basic solid state theory • Elements of theory of electronic structure and many-particle physics • Elements of soft condensed matter theory • Mean field theory
Module components including CP (LP) information	Lecture with exercise classes (6 LP)
CP of the module	6 LP
SWS (hours per week during the semester) of the module	4 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually, either summer or winter-term
Course credits	
Required pre-examination achievements	Successful participation in the exercise classes
Type of examination by continuous assessment	Written (120 min) or oral exam (30 min)
Examination requirements	Mastering of all contents of the module
Calculation of module grade	
Regulations on how to pass the module	

Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-UKP-15: Ultrafast Physics	
Identifier	PHY-UKP-15
Module title	Ultrafast Physics
German module title	Ultrakurzzeitphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Knowledge about physics of ultrashort laser pulses • Understanding of the properties of ultrashort laser pulses and their interaction with matter, applications • Application of ultrafast physics in spectroscopy with a focus on modern examples of the fields of (nano-) photonics, solid state- and bio-physics. Knowledge about industrial applications, development of ultrafast laser systems, material processing, sensors. • English language skills in the field of ultrafast physics • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>The module gives an introduction to the fundamentals of ultrafast physics. It includes:</p> <ul style="list-style-type: none"> • Physics of ultrashort laser pulses • Propagation, correlation and interaction phenomena, i.e. chirp and self-phase modulation • Optical nonlinearities: Two-Photon Absorption, nonlinear index of refraction • Frequency conversion, optical parametric processes • Ultrafast transport phenomena in (nonlinear) optical (nanoscopic) materials: excited carriers, electron-phonon-relaxation, exziton formation, lumineszenz, self-localization of carriers
Module components including CP (LP) information	Lecture with exercises (6 LP)
CP of the module	6 LP
SWS (hours per week during the semester) of the module	4 SWS
Duration of the module	One semester
Frequency with which the course is offered	Bi-annually in summer or winter term
Course credits	
Required pre-examination achievements	Successful solution of exercise
Type of examination by continuous assessment	Written examination (120 min) or oral examination (30 min)
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	
Regulations on how to pass the module	

Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-ACM: Advanced Computer Simulations and Modelling	
Identifier	PHY-ACM
Module title	Advanced Computer Simulations and Modelling
German module title	Fortgeschrittene Computersimulation und Modellierung
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Implementation of advanced computer simulations and modelling • Acquiring physics knowledge from English texts • Self-competence such as self-management, time management, creativity, proactiveness, motivation, carefulness, accurateness, endurance, self-confidence, etc.
Contents	<p>The course introduces to implementation of advanced computer simulations and modelling by means of algorithms, programming, and data analysis. Contents include:</p> <ul style="list-style-type: none"> • Calculus of condensed matter physics • Elements of programming • Quantum mechanics • Statistical physics • Practical exercises
Module components including CP (LP) information	Lecture with exercise classes (6 LP)
CP of the module	6 LP
SWS (hours per week during the semester) of the module	4 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually, either summer or winter term
Course credits	
Required pre-examination achievements	Successful participation in the exercise classes
Type of examination by continuous assessment	Written exam (120 min) or oral exam (30 min) or oral presentation (30 min)
Examination requirements	Mastering of all contents of the module
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	

Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-BPHBI-15: Biophysical and Applied Bioinformatics	
Identifier	PHY-BPHBI-15
Module title	Biophysical and Applied Bioinformatics
German module title	Biophysikalische und Angewandte Aspekte der Bioinformatik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Knowledge of biophysical properties of proteins, DNA and RNA. • Knowledge of principles and basic algorithms of Computational Biology • Knowledge of databases and servers that contain sequence and structural information together with software for their analyses. • English language skills in the field of Bioinformatics • Self-competence such as self-management, time management, creativity, own initiative, motivation, carefulness, accuracy, endurance, self-confidence, etc.
Contents	<p>This module provides an introduction to the fundamentals of Bioinformatics. It includes:</p> <ul style="list-style-type: none"> • Physical aspects of Bioinformatics • Proteins as physical systems • RNA and DNA as physical systems • Molecular dynamics simulations • Evolution, Homology, Orthology, Paralogy • Sequence analyses, Alignments (Needleman-Wunsch, BLAST, psi-BLAST), Substitution matrices • Prediction of protein and RNA structures.
Module components including CP (LP) information	Lectures with practicals (6 LP)
CP of the module	6 LP
SWS (hours per week during the semester) of the module	4 SWS
Duration of the module	One semester
Duration of the module	Annually during the winter term
Course credits	
Required pre-examination achievements	Successful participation in the practicals
Type of examination by continuous assessment	Written examination (120 min)
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	

Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-BPHBI-M-15: Methods of Applied Bioinformatics	
Identifier	PHY-BPHBI-M-15
Module title	Methods of Applied Bioinformatics
German module title	Methoden der angewandten Bioinformatik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Experimental and theoretical basics of bioinformatic methods (analysis of operons, genome analysis, functional predictions, structural analysis of substrate-binding sites) • English language skills in the field of bioinformatic methods • Self-competence such as self-management, time management, creativity, own initiative, motivation, carefulness, accuracy, endurance, self-confidence, etc.
Contents	<p>This module gives an introduction to the fundamentals of bioinformatic methods. It includes:</p> <ul style="list-style-type: none"> • Databases and servers (e.g. EBI, NCBI, DDBJ), • Multiple alignments (e.g. Clustal, T-Coffee, MUSCLE) und phylogenetic analysis • Comparison of protein folds and their classification (e.g. SCOP, CATH) • Methods of structure prediction • Methods of molecular dynamics simulations
Module components including CP (LP) information	Lectures and homework (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Duration of the module	Annually during the summer term
Course credits	
Required pre-examination achievements	Successful completion of the homework
Type of examination by continuous assessment	Written examination (120 min) and Homework
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of Module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-BPHBI-P-15: Practical Course in Applied Bioinformatics and Evolutionary Biophysics	
Identifier	PHY-BPHBI-P-15
Module title	Practical Course in Applied Bioinformatics and Evolutionary Biophysics
German module title	Praktikum zur Angewandten Bioinformatik und Evolutionären Biophysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Acquisition of in-depth knowledge and experimental skills in a specific area of computational biology or evolutionary biophysics • Self-management such as time management, creativity, own initiative, motivation, carefulness, accurateness, endurance, self-confidence, etc.
Contents	<p>Independent training in special topics of computational biology or evolutionary biophysics and practical implementation of the skills obtained in experimental work. Contents include:</p> <ul style="list-style-type: none"> • Introduction into a special topic of computational biology or evolutionary biophysics • Practical implementation of the experimental concepts • Conducting computer-based analysis in the field of computational biology or evolutionary biophysics • Writing an internship report
Module components including CP (LP) information	Practical (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Duration of the module	Annually during the summer semester
Course credits	Successful participation in the practical, evaluation and processing of special experimental problems; written internship report or oral presentation
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-BPHBI-S-15: Seminar in Applied Bioinformatics and Evolutionary Biophysics	
Identifier	PHY-BPHBI-S-15
Module title	Seminar in Applied Bioinformatics and Evolutionary Biophysics
German module title	Seminar zur Angewandten Bioinformatik und Evolutionäre Biophysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Independent preparation and delivery of talks in the fields of Bioinformatics, Computational Biology and Evolutionary Biophysics • English language skills in the field of Bioinformatic methods • Self-competencies such as self-management, time management, creativity, own initiative, motivation, carefulness, accurateness, endurance, self-confidence, etc.
Contents	<p>The course deals with selected questions of evolution of Biophysical processes. Contents include:</p> <ul style="list-style-type: none"> • Evolution of enzyme mechanisms, • Biophysics of protein evolution, • Biophysics of RNA- and DNA-evolution, • Evolution of prokaryotes • Basics of comparative genomics • Structure prediction
Module components including CP (LP) information	Seminar (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Duration of the module	Annually during the summer term
Course credits	
Required pre-examination achievements	A successful delivery of a talk and compulsory regular attendance of all seminars, participation in the discussions
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-BMMP-M-15: Techniques of Biomacromolecular Physics	
Identifier	PHY-BMMP-M-15
Module title	Techniques of Biomacromolecular Physics
German module title	Methoden der Biomakromolekülphysik
Authorised module representative	Dean of Studies

Qualification objectives	<ul style="list-style-type: none"> • Experimental and theoretical fundamentals of Biophysical methods (spectroscopy, modeling, etc.) • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>The course introduces the methods of Biophysics. Contents include:</p> <ul style="list-style-type: none"> • Spectroscopy: Mössbauer spectroscopy, X-ray spectroscopy, UV-Vis-, IR-, Raman- spectroscopy, NMR, ESR spectroscopy • Modeling, molecular dynamics simulations
Module components including CP (LP) information	Lecture with exercises (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in winter or summer term
Course credits	
Required pre-examination achievements	
Type of examination by continuous assessment	Written exam (60 min) or oral exam (20 min) and a homework
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-BMMP-P-15: Practical Course: Biomacromolecular Physics	
Identifier	PHY-BMMP-P-15
Module title	Practical Course: Biomacromolecular Physics
German module title	Praktikum zur Biomakromolekülphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Acquisition of in-depth knowledge and experimental skills in a specific area of biophysics. • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>Independent training in special topics of Biophysics and practical implementation of the skills obtained in experimental work. Contents include:</p> <ul style="list-style-type: none"> • Introduction into a special topic in Biophysics • Practical implementation of the experimental concepts • Conducting experiments in the field of Biophysics • Writing an internship report
Module components including CP (LP) information	Practical (3 LP)
CP of the module	3 LP

SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually during the winter or summer term
Course credits	Successful participation in the practical, evaluation and processing of special experimental problems; written internship report or oral presentation
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-BMMP-S-15: Seminar: Biomacromolecular Physics	
Identifier	PHY-BMMP-S-15
Module title	Seminar: Biomacromolecular Physics
German module title	Seminar zur Biomakromolekülphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Independent preparation and delivery of talks in the field of Biophysics • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>The course deals with selected questions of Biophysics. Contents include:</p> <ul style="list-style-type: none"> • Structure, dynamics and function of proteins, nucleic acids and membranes • Thermodynamics of biomolecular processes • Spectroscopy in Biophysics • Molecular dynamics simulations
Module components including CP (LP) information	Seminar (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually during the winter or summer term
Course credits	A successful delivery of a lecture and compulsory regular attendance of all seminars, participation in the discussions
Required pre-examination achievements	
Type of examination by continuous assessment	

Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-NQP-15: Computational Quantum Physics	
Identifier	PHY-NQP-15
Module title	Computational Quantum Physics
German module title	Numerische Quantenphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Deepened knowledge of quantum mechanics • Implementation of advanced numerical methods • Self-competence such as self-management, time management, creativity, proactiveness, motivation, carefulness, accurateness, endurance, self-confidence, etc.
Contents	<p>The module applies advanced numerical methods to problems in the context of quantum mechanics. Topics include:</p> <ul style="list-style-type: none"> • Quantum dynamics • Lattice models of interacting spin, fermions, and bosons • Use of Symmetries • Extension of programming skills • Application to specific problems • Writing of a scientific report
Module components including CP (LP) information	Practical (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually, either summer or winter term
Course credits	Successful participation in the practicum, written report or oral presentation
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	

Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc "Nanosciences - Materials, Molecules and Cells"
Prerequisites for participation in this module	Possible prerequisites see under respective "examination regulations"

Modul PHY-OFP-P-15: Laboratory Course: Physics of Thin Films	
Identifier	PHY-OFP-P-15
Module title	Laboratory Course: Physics of Thin Films
German module title	Praktikum zur Oberflächenphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Learning of advanced knowledge and experimental abilities of special fields of surface science • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>The student has to deepen his/her knowledge on a special subject in the field of surface science and apply this to practical exercises.</p> <p>Contents include:</p> <ul style="list-style-type: none"> • Settling into a special subject of surface science • Practical application of theoretical concepts • Final report
Module components including CP (LP) information	Laboratory course (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in either winter or summer term
Course credits	Successful participation in laboratory course, analysis of distinct experiments, written report or oral presentations
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-OFP-S-15: Seminar: Surface Science	
Identifier	PHY-OFP-S-15
Module title	Seminar: Surface Science
German module title	Seminar zur Oberflächenphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> Gathering knowledge on a special subject of surface science and presenting this to an auditorium Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>The student has to deepen his/her knowledge on a special subject in the field of surface science and to present his/her knowledge to an auditorium.</p> <p>Contents include:</p> <ul style="list-style-type: none"> Physical concept of distinct phenomena in surface science Physical concept of experimental techniques in surface science
Module components including CP (LP) information	Seminar (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in either winter or summer term
Course credits	Successful presentation of an oral presentation and regular participation at the seminar. The student has the duty to participate regularly at the seminar.
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-PCMS-15: Practicum Computational Materials Science	
Identifier	PHY-PCMS-15
Module title	Practicum Computational Materials Science
German module title	Praktikum Computersimulationen in den Materialwissenschaften
Authorised module representative	Dean of Studies

Qualification objectives	<ul style="list-style-type: none"> • Knowledge of various basic computer simulation methods, their merits and limits, and their mutual relations • Practical implementation of simulation algorithms • Competence for development of models and respective computer simulation techniques to describe structural and dynamical properties of complex materials • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	Techniques are conveyed to conduct computer simulations for exploring structural and dynamical properties of materials. Contents include: <ul style="list-style-type: none"> • Basic methods of computer simulations in condensed matter physics • Applications to structural properties of fluids, soft matter systems as well as crystalline and amorphous solids • Applications to transport and relaxation processes in soft matter systems and solids
Module components including CP (LP) information	Practical (3LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in either the summer or winter term
Course credits	Written report or oral presentation of methods and results
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-PCN-15: Physics of Carbon Nanostructures (lecture)	
Identifier	PHY-PCN-15
Module title	Physics of Carbon Nanostructures (lecture)
German module title	Physik der Kohlenstoff-Nanostrukturen
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Specific knowledge in the physics of carbon nanostructures • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.

Contents	Introduction to basic concepts and application-relevant methods in the area of 'physics of carbon nanostructures' Exemplary contents: <ul style="list-style-type: none"> • Carbon nanostructures – classification and general properties • Fullerenes: chem. modification, quantum and solar applications • Nanotubes and graphene: electronic transport and sensing • Diamond: defects, electronics, sensing and quantum application
Module components including CP (LP) information	Lecture (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually
Course credits	Regular attendance
Required pre-examination achievements	Open to regular participants
Type of examination by continuous assessment	Written (60 min) or oral (20 min)
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	Grade of final examination
Regulations on how to pass the module	Grade \leq 4.0 ('sufficient' or better)
Retaking to improve grades	Not allowed
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-PCN-P-15: Physics of Carbon Nanostructures (lab course)	
Identifier	PHY-PCN-P-15
Module title	Physics of Carbon Nanostructures (lab course)
German module title	Praktikum zur Physik der Kohlenstoff-Nanostrukturen
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Gain hands-on experience in experimental physics • Learn about good laboratory practices, hone team work skills • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	Project-based work in the physics of carbon nanostructures. Exemplary topics / areas: <ul style="list-style-type: none"> • CVD synthesis of carbon materials (nanotubes, diamond) • Physical modification by ion implantation • Chemical modification (simple one-pot reactions) • Preparative work (purification, surface treatments) • Microelectronics methods (metallisation, lithography) • Analysis and characterization (structural, optical, electronic, spin)
Module components including CP (LP) information	Lab course (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS

Duration of the module	One semester
Frequency with which the course is offered	Each semester
Course credits	Participation in lab course + treatment of specific experimental problem + written lab protocol + short oral presentation
Required pre-examination achievements	Lab protocol deemed sufficient
Type of examination by continuous assessment	Oral presentation (20 min)
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	Grade of presentation (25%) and grade of lab protocol (75%)
Regulations on how to pass the module	Grade \leq 4.0 ('sufficient' or better)
Retaking to improve grades	Not allowed
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-PCN-S-15: Physics of Carbon Nanostructures (seminar)	
Identifier	PHY-PCN-S-15
Module title	Physics of Carbon Nanostructures (seminar)
German module title	Seminar zur Physik der Kohlenstoff-Nanostrukturen
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • (Self-) Acquisition of experimental und theoretical concepts in the physics of carbon nanostructures • Develop communication and presentation skills • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>Detailed discussions of basic topics in the area of applied methods, esp. in the context of carbon nanostructure physics</p> <p>Exemplary topics:</p> <ul style="list-style-type: none"> • Electronic transport in 1D und 2D materials • Electronic bio-sensing with carbon nanotube transistors • Methods and concepts of electron spin resonance • Optical bio-sensing with nano-diamonds • Spin-based quantum sensing and quantum computing
Module components including CP (LP) information	Seminar (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually, alternating with lecture PHY-PCN-15
Course credits	Participation in seminar and own presentation
Required pre-examination achievements	Independent preparation of a technical topic
Type of examination by continuous assessment	Seminar presentation with discussion
Examination requirements	Complete contents of module and qualification objectives

Calculation of module grade	Grade of presentation
Regulations on how to pass the module	Grade \leq 4.0 ('sufficient' or better)
Retaking to improve grades	Not allowed
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc "Nanosciences - Materials, Molecules and Cells"

Modul PHY-PFM-15: Physics of Functional Materials	
Identifier	PHY-PFM-15
Module title	Physics of Functional Materials
German module title	Physik funktionaler Materialien
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Learning of experimental and theoretical concepts of the physics of functional materials • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>The module comprises basic concepts and experimental techniques of the physics of functional materials.</p> <p>Contents include:</p> <ul style="list-style-type: none"> • Modification of physical properties due to lower dimension • Impact of defects and material properties • Application in the fields of electronic and magnetic materials
Module components including CP (LP) information	Lecture with exercises (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in either winter or summer term
Course credits	
Required pre-examination achievements	
Type of examination by continuous assessment	Written examination (60 min) or oral examination (20 min)
Examination requirements	All contents of the module
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc "Nanosciences - Materials, Molecules and Cells"

Modul PHY-PSY-15: Physics with Synchrotron Radiation	
Identifier	PHY-PSY-15
Module title	Physics with Synchrotron Radiation
German module title	Physik mit Synchrotronstrahlung
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Learning of experimental and theoretical concepts of the physics using synchrotron radiation • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.
Contents	<p>The module comprises basic concepts and experimental techniques of the physics using synchrotron radiation. Contents include:</p> <ul style="list-style-type: none"> • Interaction of x-rays with matter • Sources of synchrotron radiation – generation and instruments • Techniques and applications of spectroscopy • Diffraction techniques and their application • Imaging techniques (x-ray microscopy)
Module components including CP (LP) information	Lecture with exercises (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in either winter or summer term
Course credits	
Required pre-examination achievements	Written examination (60 min) or oral examination (20 min)
Type of examination by continuous assessment	All contents of the module
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc „Nanosciences - Materials, Molecules and Cells“

Modul PHY-PUDS-15: Physics of Ultrathin Films	
Identifier	PHY-PUDS-15
Module title	Physics of Ultrathin Films
German module title	Physik Ultradünner Schichten
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Learning of experimental and theoretical concepts of the physics of thin and ultrathin films • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.

Contents	The module comprises basic concepts and applied techniques of the physics of ultrathin films. Contents include: <ul style="list-style-type: none"> • Deposition techniques • Experimental techniques to characterize ultrathin films • Morphology and defects • Elektronic, optical and magnetic properties of ultrathin films • Transport in ultrathin films
Module components including CP (LP) information	Lecture with excercises (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One emester
Frequency with which the course is offered	Annually in either winter or summer term
Course credits	
Required pre-examination achievements	Written examination (60 min) or oral examination (20 min)
Type of examination by continuous assessment	All contents of the module
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“

Modul PHY-SDS-15: Stochastical Dynamical Systems	
Identifier	PHY-SDS-15
Module title	Stochastical Dynamical Systems
German module title	Stochastische dynamische Systeme
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Consolidation of condensed matter theory • Knowledge of stochastic methods for the description and modelling of systems whose dynamics is influenced by random forces • Application of stochastic methods with focus on current research in Materials science, Biophysics and further interdisciplinary research areas (e.g., physiology, finance) • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.

Contents	<p>Concepts and methods are conveyed to describe stochastic dynamical systems, which occur in many areas of physics as well as many other scientific fields. Contents include:</p> <ul style="list-style-type: none"> • Basis principles of probability theory, central limit theorem and generalisations, extreme value statistics • Theory of stochastic processes; Markov processes; Gauß, Poisson and shot noise processes • Correlation functions, cumulants, stationary processes, spectral decomposition, Wiener-Khinchin theorem • Linear response theory and fluctuation-dissipation theorem • Langevin- and Fokker-Planck equations; master equation • Stochastic thermodynamics; detailed and integral fluctuation theorems
Module components including CP (LP) information	Lecture with exercises (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in either the summer or winter term
Course credits	
Required pre-examination achievements	
Type of examination by continuous assessment	Written exam (60 min.) or oral exam (20 min.)
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“

Modul PHY-TRQ-15: Transport and Relaxation Dynamics in Quantum Systems	
Identifier	PHY-TRQ-15
Module title	Transport and Relaxation Dynamics in Quantum Systems
German module title	Transport und Relaxationsdynamik in Quantensystemen
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Consolidation of condensed matter theory • Application of the theory to non-equilibrium processes in condensed matter systems • Profound understanding of non-equilibrium physics in quantum systems • Acquiring physics knowledge from english texts • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.

Contents	The course introduces the non-equilibrium physics of quantum systems. Contents include: <ul style="list-style-type: none"> • Mapping of quantum dynamics onto master equations • Relaxation of excited states • Introduction to transport theory • Green-Kubo-formalism • Calculating relaxation times and transport coefficients
Module components including CP (LP) information	Lecture with exercises (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually, either summer or winter term
Course credits	
Required pre-examination achievements	
Type of examination by continuous assessment	Written examination (60 min) or oral examination (20 min)
Examination requirements	All contents of the module
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc "Nanosciences - Materials, Molecules and Cells"

Modul PHY-UKP-E-15: Introduction: Ultrafast Physics	
Identifier	PHY-UKP-E-15
Module title	Introduction: Ultrafast Physics
German module title	Einführung in die Ultrakurzzeitphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Knowledge about physics and mathematical description of ultrashort laser pulses • Understanding of the properties of ultrashort laser pulses and their interaction with matter, applications • Understanding of the propagation of ultrashort laser pulses • Nonlinear optical phenomena and phase matching conditions • Ultrashort pulse laser systems • English language skills in the field of ultrafast physics • Self-competence such as self-management, time management, creativity, own initiative, motivation, carefulness, accuracy, endurance, self-confidence, etc.

Contents	The module gives an introduction to the fundamentals of ultrafast physics. It includes: <ul style="list-style-type: none"> • Physics of ultrashort laser pulses • Propagation, correlation and interaction phenomena, i.e. chirp and self-phase modulation • Optical nonlinearities: Two-Photon Absorption, nonlinear index of refraction • Frequency conversion, optical parametric processes • Laser system resonators, Kerr lens design, Pockels cells
Module components including CP (LP) information	Lecture (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Bi-annually in summer or winter term
Course credits	
Required pre-examination achievements	
Type of examination by continuous assessment	Written examination (60 min) or oral examination (20 min)
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-UKP-F: Advanced Ultrafast Physics	
Identifier	PHY-UKP-F
Module title	Advanced Ultrafast Physics
German module title	Fortgeschrittene Ultrakurzzeitphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • In-depth presentation of selected topics from ultrafast physics Self-competencies such as self and time management, personal initiative, motivation, diligence, willingness to perform, accuracy, endurance, self-confidence, etc.

Contents	The lecture provides in-depth knowledge on a topic of ultrafast physics on a high level. Typically, it involves: <ul style="list-style-type: none"> • The physical background of current research results • The discussion of research results in an interdisciplinary context or • The physical background of new fields of research.
Module components including CP (LP) information	Lecture with exercises (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Annually in summer or winter term
Course credits	
Required pre-examination achievements	Successful solution of exercise
Type of examination by continuous assessment	Written examination (60 min) or oral examination (20 min)
Examination requirements	Complete contents of module and qualification objectives
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-UKP-P-15: Laboratory Course: Ultrafast Physics	
Identifier	PHY-UKP-P-15
Module title	Laboratory Course: Ultrafast Physics
German module title	Praktikum zur Ultrakurzzeitphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Experience with experimental techniques in the laboratory for ultrafast physics and with ultrashort laser pulses • Application to modern research topics • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.

Contents	The module shows and imparts skills in the context of ultrafast physics. Contents include: <ul style="list-style-type: none"> • Generation of ultrashort laser pulses • Detection of ultrashort laser pulses via detectors and autocorrelation techniques • Temporal control of ultrashort laser pulses • Nonlinear optical fs-spectroscopy, holographic ultrafast spectroscopy, UV/VIS/MIR fs-spectroscopy • Application to modern research topics in the field of (nano-) photonics, solid state – and bio-physics.
Module components including CP (LP) information	Practical (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Bi-annually in either summer or winter term
Course credits	Successful participation, analysis and study of specific experimental questions, written report or oral presentation
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“

Modul PHY-UKP-S-15: Seminar: Ultrafast Physics	
Identifier	PHY-UKP-S-15
Module title	Seminar: Ultrafast Physics
German module title	Seminar zur Ultrakurzzeitphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Competence in techniques and giving of professional talks and presentation • Application to modern research topics in the field of ultrafast physics • Self-competencies such as self and time management, initiative, willingness to perform, motivation, diligence, accuracy, persistence, self-confidence, etc.

Contents	<p>The module introduces the techniques and the giving of talks and presentations with modern research topics in the field of ultrafast physics as an example.</p> <p>Content includes:</p> <ul style="list-style-type: none"> • Selection and finding of topics, outline and search • Time management and planning of the preparation phase • Techniques of presentation (i.e. with power point or prezi) • Creative elements of presentations, implementation of media • Speech techniques, rhetoric, voice control • Selfreflection and critical discussion with seminar participants • Detailed study of modern research topics in the field of ultrafast physics
Module components including CP (LP) information	Seminar (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	Bi-annually in either summer or winter term
Course credits	Successful presentation of a talk and regular participation at the seminar. Presence at talk and discussion
Required pre-examination achievements	
Type of examination by continuous assessment	
Examination requirements	
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“

Modul PHY-EV-V-y: Complement and Deepen the Knowledge of Physics: y	
Identifier	PHY-EV-V-y
Module title	Complement and Deepen the Knowledge of Physics: y
German module title	Ergänzung und Vertiefung zur Physik: y
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Acquisition of supplementary or in-depth knowledge of physics • Social skills such as the ability to cooperate, advisory skills as well as personal skills such as time and self-management, initiative, diligence, accuracy, perseverance, etc.
Contents	<p>Selected topics in physics</p> <p>Different module contents are distinguished by different sub-identifiers $y \in \{A, B, C, \dots, Z\}$.</p>
Module components including CP (LP) information	Lecture (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	As required in summer or winter semester
Course credits	
Required pre-examination achievements	
Type of examination by continuous assessment	Written exam (90 min) or oral exam (30 min)
Examination requirements	Mastering of all contents of the module
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-EV-S-y: Complement and Deepen the Knowledge of Physics: y	
Identifier	PHY-EV-S-y
Module title	Complement and Deepen the Knowledge of Physics: y
German module title	Ergänzung und Vertiefung zur Physik: y
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Acquisition of supplementary or in-depth knowledge of physics • Social skills such as the ability to cooperate, advisory skills as well as personal skills such as time and self-management, initiative, diligence, accuracy, perseverance, etc.
Contents	<p>Selected topics in physics</p> <p>Different module contents are distinguished by different sub-identifiers $y \in \{A, B, C, \dots, Z\}$.</p>
Module components including CP (LP) information	Seminar (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	One semester
Frequency with which the course is offered	As required in summer or winter semester
Course credits	
Required pre-examination achievements	
Type of examination by continuous assessment	Oral exam (30 min) or oral presentation and written report
Examination requirements	Mastering of all contents of the module
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Modul PHY-MPP: Many Particle Physics	
Identifier	PHY-MPP
Module title	Many Particle Physics
German module title	Vielteilchenphysik
Authorised module representative	Dean of Studies
Qualification objectives	<ul style="list-style-type: none"> • Deepened knowledge on selected topics in the context of many particle physics • Acquiring physics knowledge from English texts • Self-competence such as self-management, time management, creativity, proactiveness, motivation, carefulness, accurateness, endurance, self-confidence, etc.
Contents	The course deepens knowledge on selected topics in the context of many particle physics. Contents are oriented according to topics of theoretical condensed matter physics.
Module components including CP (LP) information	Seminar (3 LP)
CP of the module	3 LP
SWS (hours per week during the semester) of the module	2 SWS
Duration of the module	one semester
Frequency with which the course is offered	Each semester
Course credits	
Required pre-examination achievements	
Type of examination by continuous assessment	Oral exam (30 min) or oral presentation (30 min) or written report
Examination requirements	Mastering of all contents of the module
Calculation of module grade	
Regulations on how to pass the module	
Retaking to improve grades	
Decision-making body for the module	Fachbereichsrat Physik
Use of module	MSc “Nanosciences - Materials, Molecules and Cells“
Prerequisites for participation in this module	Possible prerequisites see under respective “examination regulations”

Fachspezifischer Teil

Sachunterricht

der studiengangspezifischen Prüfungsordnung für den Bachelorstudiengang

Bildung, Erziehung und Unterricht

Der Fachbereichsrat des Fachbereichs Erziehungs- und Kulturwissenschaften hat gemäß § 44 Absatz 1 NHG in der 117. Sitzung vom 14.09.2022 den folgenden fachspezifischen Teil zur studiengangspezifischen Prüfungsordnung für den Bachelorstudiengang *Bildung, Erziehung und Unterricht* vom 09.05.2019 (Amtliches Mitteilungsblatt der Universität Osnabrück Nr. 03/2016, S. 425) beschlossen, der in der 170. Sitzung der zentralen Kommission für Studium und Lehre und Studienqualitätsmittel (ZSK) am 26.10.2022 befürwortet und in der 365. Sitzung des Präsidiums am 17.11.2022 genehmigt wurde (Amtliches Mitteilungsblatt der Universität Osnabrück Nr. 09/2022, S. 1968).

§ 1 Zuständigkeit

Zuständig ist der Prüfungsausschuss des Fachs Sachunterricht.

§ 2 Studienprogramm und Studienablauf

Das Studienprogramm für das Fach Sachunterricht im Bachelorstudiengang *Bildung, Erziehung und Unterricht* gliedert sich wie folgt:

Identifizier	Pflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen/ Empfehlungen
SUNT-FD1	Fachdidaktik I „Grundfragen der Didaktik des Sachunterrichts“	4	7		1.	--
SUNT-GM1	Grundmodul I „Naturwissenschaftlich-technischer Bereich des Sachunterrichts“	4	7		2.-4.	--
SUNT-GM2	Grundmodul II „Sozial- und kulturwissenschaftlicher Bereich des Sachunterrichts“	4	7		2.-4.	--
SUNT-HM1	Hauptmodul I „Lehren und Lernen im Sachunterricht“	4	7		3.-6.	SUNT-FD1
SUNT-HM2	Hauptmodul II „Fächerübergreifende Bildungsaufgaben des Sachunterrichts“	4	7		4.-6.	SUNT-FD1
	Gesamtsumme	20	35			

Schwerpunktbezugsfach **Arbeit/Wirtschaft**

Identifizier	Pflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
SOZ-SU-EF1	Einführung in die Soziologie und die Sozialstrukturanalyse für Studierende des Fachs Sachunterricht	4	7	1-2 Sem.	1.-3.	--
SOZ-SU-EF2	Einführung in die Wirtschafts- und Organisationssoziologie für Studierende des Fachs Sachunterricht	4	8	2 Sem.	3.-6.	--
	Gesamtsumme	8	15			

Schwerpunktbezugsfach **Biologie**

Identifizier	Pflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
BIO-SU-GM	Grundmodul Biologie: Vorlesung* & Experimentelle Übungen**	9	14	2 Sem.	1./2.	Keine
BIO-KLEX_v1	Kleines Exkursionsmodul (3 Kleine Exkursionen)	1	1	1 Sem.	1.-5.	--
	Gesamtsumme	9	15			

* Die Studierenden wählen 7 Themenblöcke á 2 Wochen aus den 13 -14 angebotenen Themen. Folgende Kapitel werden empfohlen: im Wintersemester Zoologie, Genetik und Mikrobiologie; im Sommersemester: Tier- und Pflanzenphysiologie, Verhaltensbiologie, Botanik und Ökologie. Es sind jeweils die zugehörigen Klausuren mitzuschreiben. Zum Bestehen müssen mindestens 50% der erreichbaren Punkte, gemittelt über alle Klausuren beider Semester erreicht werden.

** Zu den von den Studierenden gewählten Vorlesungsthemen sind die zugehörigen semesterbegleitenden Übungen erfolgreich zu absolvieren.

Schwerpunktbezugsfach **Erdkunde**

Identifizier	Pflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
GEO-SU-12	Grundlagen in einem Teilbereich der Physischen Geographie	2	3	1 Sem.	1.-3.	--
GEO-SU-13	Grundlagen in einem Teilbereich der Humangeographie	2	3	1 Sem.	1.-3.	--
GEO-25	Regionale Geographie	2	4	1 Sem.	2.-4.	--
GEO-STM-SU3	Projektseminar Geographiedidaktik für Studierende im Sachunterricht	2	5	1 Sem.	4.-6.	GEO-SU-12 und GEO-SU-13
	Gesamtsumme	8	15			

Schwerpunktbezugsfach **Geschichte**

Identifizier	Pflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
GES-FD-GPGD_SU	Grundlagen und Problemfelder der Geschichtsdidaktik	6	8	2-3 Sem.	1.-3.	--
Identifizier	Wahlpflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
GES-EfAG	Einführungsmodul „Alte Geschichte“	5	7	Sem.	1.-6.	--
oder						
GES-EfMA	Einführungsmodul „Geschichte des Mittelalters“	5	7	Sem.	1.-6.	--
oder						

GES-EfFN	Einführungsmodul „Frühe Neuzeit“	5	7	Sem.	1.-6.	--
oder						
GES-EfNG	Einführungsmodul „Neueste Geschichte“	5	7	1 Sem.	1.-6.	--
	Gesamtsumme	11	15			

Schwerpunktbezugsfach **Physik**

Identifizier	Pflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
PHY-EFD_v1	Einführung in die Fachdidaktik	2	3	1 Sem.	1.	--
Identifizier	Wahlpflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
PHY-GPU-M-15	Grundlagen des Physikunterrichts Mechanik	5	6	1 Sem.	2. oder 3.	--
oder						
PHY-GPU-O-15	Grundlagen des Physikunterrichts Optik	5	6	1 Sem.	2. oder 3.	--
oder						
PHY-GPU-E-15	Grundlagen des Physikunterrichts Elektrizitätslehre	5	6	1 Sem.	2. oder 3.	--
oder						
PHY-GPU-T-15	Grundlagen des Physikunterrichts Thermodynamik	5	6	1 Sem.	2. oder 3.	--
Identifizier	Pflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
PHY-PSU-15	Physik im Sachunterricht	4	6	1 Sem.	ab 3.	--
	Gesamtsumme	11	15			

Schwerpunktbezugsfach **Politik**

Identifizier	Pflichtbereich	SWS	LP	Dauer	Empfohlenes Semester	Voraussetzungen
SOZ-SUNTP1	Nationale Politische Systeme	4	4	2 Sem.	1.-3.	
SOZ-SUNTP2	„Internationale Politik und Wirtschaft“	4	4	2 Sem.	2.-4.	SOZ-SUNTP1
SOZ-SUNTP3	„Vertiefungsbereich“	2	7	2 Sem.	3.-6.	SOZ-SUNTP1 und SOZ-SUNTP2
	Gesamtsumme	10	15			

§ 3 Zulassungsbedingungen zur Bachelorarbeit

- (1) Wird die Bachelorarbeit im Fach Sachunterricht geschrieben, so sind die Module SUNT-FD1, SUNT-GM1 und SUNT-GM2 vor der Anmeldung zur Bachelorarbeit erfolgreich zu absolvieren.
- (2) Die Bachelorarbeit kann nicht in einem der Schwerpunktbezugsfächer geschrieben werden.

§ 4 In-Kraft-Treten und Übergangsregelungen

- (1) ¹Dieser fachspezifische Teil der Prüfungsordnung tritt nach der Veröffentlichung in einem amtlichen Mitteilungsorgan der Universität Osnabrück rückwirkend zum 01.10.2022 für alle Studierenden im 1. Fachsemester in Kraft.
- (2) Für Studierende, die bereits im Wintersemester 2021/2022 im fachspezifischen Teil „Sachunterricht“ zur studiengangspezifischen Prüfungsordnung für den Bachelorstudiengang Bildung, Erziehung und Unterricht eingeschrieben waren, gilt weiterhin der fachspezifische Teil „Sachunterricht“ zur studiengangspezifischen Prüfungsordnung für den Bachelorstudiengang Bildung, Erziehung und Unterricht in der Fassung vom 14.07.2020 (Amtliches Mitteilungsblatt der Universität Osnabrück Nr. 05/2020, S. 515).
- (3) ¹Der bisherige fachspezifische Teil „Sachunterricht“ zur studiengangspezifischen Prüfungsordnung für den - Bachelorstudiengang Bildung, Erziehung und Unterricht in der Fassung vom 14.07.2020 (Amtliches Mitteilungsblatt der Universität Osnabrück Nr. 05/2020, S. 515) tritt zum 30.09.2025 endgültig außer Kraft. ²Studierende nach Absatz 2 unterfallen ab dem 01.10.2025 automatisch dem zum Zeitpunkt des Außerkrafttretens gültigen fachspezifischen Teil „Sachunterricht“ zur studiengangspezifischen Prüfungsordnung für den Bachelorstudiengang Bildung, Erziehung und Unterricht.



MODULBESCHREIBUNGEN
FÜR DAS SCHWERPUNKTBEZUGSFACH
„BIOLOGIE“

für den fachspezifischen **Teil Sachunterricht**
der studiengangspezifischen Prüfungsordnung für den Bachelorstudiengang
Bildung, Erziehung und Unterricht

Änderung
beschlossen

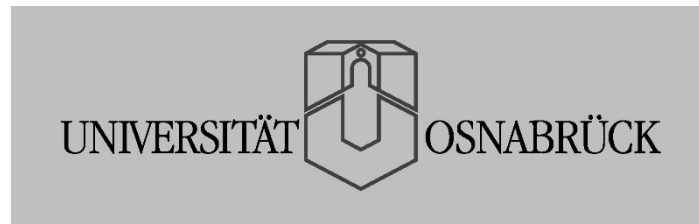
durch den Fachbereichsrats des Fachbereichs Biologie/Chemie im Umlaufverfahren am 03.06.2022
befürwortet in der 170. Sitzung der zentralen Kommission für Studium und Lehre und Studienqualitätskommission
(ZSK) am 26.40.2022

genehmigt in der 365. Sitzung des Präsidiums am 17.11.2022
AMBl. der Universität Osnabrück Nr. 09/2022 vom 20.12.2022, S. 1972

Identifizier		Grundmodul Biologie: Vorlesung + Experimentelle Übungen		Veranstaltungssprache	
BIO-SU-GM		Basic Module Biology		Deutsch	
SWS	9	Dauer des Moduls zwei Semester	Modulbeauftragte(r) Die Lehrenden der Biologie		
LP	14	Angebotsturnus Winter- und Sommersemester; Beginn im Wintersemester	Modul beschließendes Gremium Fachbereichsrat Biologie/Chemie		
<p>Qualifikationsziele Die Studierenden sollen fachwissenschaftliche Grundkompetenzen erlangen. Sie erwerben Grundkenntnisse über ausgewählte Prinzipien der Biologie und entwickeln Verständnis für biologische Abläufe und Zusammenhänge. Sie erkennen allgemeine biologische Grundprinzipien und können diese auf neue Sachverhalte übertragen.</p>					
<p>Inhalte VORLESUNG: Die Ringvorlesung Biologie orientieren sich an den Kapiteln des Lehrbuches Campbell Biologie. Für das Wintersemester werden für den Sachunterricht folgende Kapitel dringend empfohlen: Zoologie, Genetik und Mikrobiologie.</p> <ol style="list-style-type: none"> 1) Physik und Chemie des Lebens 2) Grundlagen der Biochemie 3) Grundlagen der Zellbiologie 4) Einführung in die Zoologie 5) Genetik 6) Biologie der Mikroorganismen 7) Ausgewählte Kapitel aus der Strukturbioogie <p>Für das Sommersemester werden für den Sachunterricht folgende Kapitel dringend empfohlen: Tier- und Pflanzenphysiologie, Verhaltensbiologie, Botanik und Ökologie.</p> <ol style="list-style-type: none"> 1) Einführung in die Botanik 2) Physiologie der Pflanzen 3) Tier- und Humanphysiologie 4) Grundlagen der Neurobiologie 5) Einführung in die Verhaltensbiologie 6) Einführung in die Ökologie <p>ÜBUNGEN: u.a. Blütendiversität & Blütenbestimmung, Mikroskop & Mikroskopieren, Mathematische Grundlagen, Stöchiometrie, Fehlerbetrachtung, Pipettieren, Verdünnungsreihe, Photometrie, ϵ-Bestimmung, Puffer, potentiometrische pH-Bestimmung, Proteinbestimmung, Einführung in die DNA-Analytik, Protein-Chromatographie, Sterilarbeiten, Arbeiten mit Mikroorganismen, Hypothesenbildung und Versuchsplanung, Verbindung theoretischer Modellvorhersagen mit experimentellen Daten, Datenaufnahme und Datenanalyse, einfache statistische Verfahren.</p>					
Veranstaltungsform	SWS	LP	Studiennachweis(e)	Prüfungsvorleistungen	Studienbegleitende Prüfungen
1. Komponente:					
Vorlesung	7	11	Die Studierenden wählen frei 7 Themenblöcke á 2 Wochen aus den 13 -14 angebotenen.	keine	7 Teilklausuren über die Inhalte der Vorlesung und Experimentellen Übungen (i.d.R. à 30 Min.)
2. Komponente:					
Experimentelle Übungen	2	3	Da studien- und berufsrelevante Inhalte und Fähigkeiten erworben und eingeübt werden müssen, ist die regelmäßige Teilnahme an den Übungen erforderlich.		
3. Komponente:					

Prüfungsanforderungen: Es werden fachwissenschaftliche Grundkompetenzen zu den unter Inhalte beschriebenen Teilaspekten der allgemeinen Biologie geprüft.
Berechnung der Modulnote: Nach prozentualer Bewertungsskala über die Gesamtpunktzahl
Bestehensregel für dieses Modul: 50% der Gesamtpunktzahl über alle Teilklausuren muss erreicht sein.
Wiederholbarkeit zur Notenverbesserung: Entsprechend der allgemeinen Prüfungsordnung gem. § 14
Verwendung des Moduls: BA BEU Sachunterricht
Teilnahmevoraussetzungen: Allgemeine Voraussetzungen regeln die jeweilig gültigen Prüfungsordnungen.

Identifizier		Modul Praxisorientierung: Kleine Exkursionen		Veranstaltungssprache	
BIO-KLEX_v1		Module practical orientation: Short Field Trips		Deutsch oder Englisch	
SWS	1	Dauer des Moduls 3 Kleine Exkursionen	Modulbeauftragte(r) Die Lehrenden der Biologie		
LP	1	Angebotsturnus Winter- und Sommersemester	Modul beschließendes Gremium Fachbereichsrat Biologie/Chemie		
Qualifikationsziele					
Erlangen spezieller fachwissenschaftlicher Kompetenzen oder Berufsfeld bezogener Einblicke innerhalb und außerhalb des universitären Rahmens.					
Typ A: Einüben von Arbeitstechniken zur Beobachtung, Erfassung und Bestimmung von Pflanzen, Pilzen und Tieren sowie ökologisch wichtiger Strukturen u.a. im Freiland, in Botanischen und Zoologischen Gärten und in naturkundlichen Museen/Sammlungen; überwiegend in den Bereichen Artenkenntnis, Biodiversität, Ökologie, Verhaltensbiologie und Exkursionsdidaktik.					
Typ B: Einblicke in die berufliche Praxis u.a. in biologischen Forschungseinrichtungen/-instituten, in Firmen aus den Bereichen der Biotechnologie oder deren Anwendung, in fachnahen Institutionen, bei NGOs, in Planungsbüros, Behörden und außerschulischen Bildungseinrichtungen.					
Typ C: Einblicke in aktuelle Forschungsmethoden und Großgeräte-Infrastrukturen für die biologische Forschung.					
Inhalte					
Typ A: Fauna und Flora sowie ökologisch wichtige Strukturen terrestrischer und aquatischer Lebensräume und Demonstration von Lebensräumen und -äußerungen.					
Typ B: Kennenlernen unterschiedlichster Berufs- und Tätigkeitsfelder für Biologen außerhalb der Universität.					
Typ C: Kennenlernen aktueller Methoden, u.a. der Analyse oder Auswertung und des professionellen Managements von Forschungs- und Großgeräteinfrastrukturen bzw. Gerätezentren.					
Für die jeweiligen Exkursionen können Besprechungen zur Vor- und Nachbereitung vorgesehen werden.					
Veranstaltungsform	SWS	LP	Studiennachweis(e)	Prüfungsvorleistungen	Studienbegleitende Prüfungen
1. Komponente:					
Kleine Exkursion Typ A	1	1	Genehmigte Protokolle von 2-4 Seiten oder Vorträge oder erfolgreiche Bestimmung von Arten.	keine	keine
2. Komponente:					
Kleine Exkursion Typ B	1	1	Genehmigte Protokolle von 2-4 Seiten oder Vorträge.	keine	keine
3. Komponente:					
Kleine Exkursion Typ C	1	1	Genehmigte Protokolle von 2-4 Seiten oder Vorträge.	keine	keine
Prüfungsanforderungen: Es werden fachwissenschaftliche Grundkompetenzen geprüft.					
Berechnung der Modulnote:					
Bestehensregel für dieses Modul: Anwesenheitspflicht und Erlangen aller Studiennachweise					
Wiederholbarkeit zur Notenverbesserung:					
Verwendung des Moduls:					
BA Biologie/Biology: 1-2 KIEEx Typ A & 1-2 KIEEx Typ B oder Typ C 2-F-BA, BA BEU, Sachunterricht, BA LBS: 2-3 KIEEx Typ A und maximal 1 KIEEx Typ B oder Typ C					
Teilnahmevoraussetzungen: Allgemeine Voraussetzungen regeln die jeweilig gültigen Prüfungsordnungen.					



FACHBEREICH SPRACH- UND LITERATURWISSENSCHAFT

PROMOTIONSORDNUNG FÜR DIE VERLEIHUNG DES GRADES DOKTORIN ODER DOKTOR DER PHILOSOPHIE (DR. PHIL.)

Neufassung beschlossen in der 111. und 113. Sitzung des Fachbereichsrates des Fachbereichs
Sprach- und Literaturwissenschaft am 06.01. und 28.04.2010
befürwortet in der 30. Sitzung der Kommission für Forschung und Nachwuchsförderung am 17.02.2010
genehmigt in der 141. Sitzung des Präsidiums am 24.06.2010
AMBl. der Universität Osnabrück Nr. 07/2010 vom 15.09.2010, S. 1095

Änderungen beschlossen in der 129. Sitzung des Fachbereichsrates des Fachbereichs
Sprach- und Literaturwissenschaft am 18.07.2012
befürwortet in der 37. Sitzung der Kommission für Forschung und Nachwuchsförderung am 21.11.2012
genehmigt in der 189. Sitzung des Präsidiums am 17.01.2013
AMBl. der Universität Osnabrück Nr. 03/2013 vom 06.03.2013 S. 393

Redaktionelle Änderung in § 12 Absatz 4
AMBl. der Universität Osnabrück Nr. 04/2013 vom 04.04.2013, S. 476

Änderungen beschlossen in der 167. Sitzung des Fachbereichsrates des Fachbereichs
Sprach- und Literaturwissenschaft am 19.06.2019
befürwortet in der 54. Sitzung der Kommission für Forschung und Nachwuchsförderung am 23.10.2019
genehmigt in der 296. Sitzung des Präsidiums am 14.11.2019
AMBl. der Universität Osnabrück Nr. 08/2019 vom 19.12.2019, S. 1316

Änderungen beschlossen in der 183. und 185. Sitzung des Fachbereichsrates des Fachbereichs
Sprach- und Literaturwissenschaft am 01.06. und 23.08.2022
befürwortet in der 62. Sitzung der Kommission für Forschung und Förderung des wissenschaftlichen Nachwuchses
am 26.10.2022
genehmigt in der 366. Sitzung des Präsidiums am 01.12.2022
AMBl. der Universität Osnabrück Nr. 09/2022 vom 20.12.2022, S. 1975

I N H A L T :

I. Allgemeiner Teil	1977
§ 1 Promotion	1977
§ 2 Ehrenpromotion	1977
§ 3 Promotionsleistungen	1977
§ 4 Betreuerin oder Betreuer	1977
§ 5 Promotionsausschuss	1978
§ 6 Promotionskommission	1978
II. Vorverfahren	1978
§ 7 Voraussetzungen zur Annahme als Doktorandin oder Doktorand	1978
§ 8 Annahme als Doktorandin oder Doktorand	1979
§ 9 Immatrikulation	1979
III. Hauptverfahren	1979
§ 10 Zulassung zur Promotion	1979
§ 11 Dissertation	1980
§ 12 Beurteilung der Dissertation	1980
§ 13 Mündliche Prüfung (Disputation)	1982
§ 14 Beurteilung der mündlichen Prüfung	1982
IV. Weitere Verfahrensregelungen	1983
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I. Allgemeiner Teil

§ 1 Promotion

¹Der Fachbereich Sprach- und Literaturwissenschaft der Universität Osnabrück verleiht den Grad einer Doktorin oder eines Doktors der Philosophie (Dr. phil.) in den in ihm vertretenen Fachgebieten und Fächern. ²Die Promotion dient dem Nachweis der Befähigung zu vertiefter selbstständiger wissenschaftlicher Arbeit. ³Dies geschieht durch eine wissenschaftliche Abhandlung (Dissertation) und eine mündliche Prüfung (Disputation).

§ 2 Ehrenpromotion

¹Für besondere Verdienste in einem seiner Fachgebiete kann der Fachbereich den Doktorgrad auch ehrenhalber verleihen (Dr. phil. h.c.). ²Die Entscheidung trifft der Fachbereichsrat vorbehaltlich der Stellungnahme des Senats. ³Die Entscheidung des Fachbereichsrates bedarf einer Mehrheit von drei Vierteln der abgegebenen gültigen Stimmen und der Mehrheit der Mitglieder der Professorengruppe.

§ 3 Promotionsleistungen

Als Promotionsleistungen sind

- a) eine wissenschaftliche Abhandlung (Dissertation), deren Gegenstand zu den im Fachbereich Sprach- und Literaturwissenschaft vertretenen Gebieten gehört (§ 11), sowie
- b) eine mündliche Prüfung in Form einer Disputation (§ 13)

zu erbringen.

§ 4 Betreuerin oder Betreuer

- (1) ¹Die Bewerberin oder der Bewerber wählt eine Betreuerin oder einen Betreuer, die oder der bereit ist, das Promotionsverfahren zu begleiten. ²Aufgabe der Betreuerin oder des Betreuers ist es, die Bewerberin oder den Bewerber während des gesamten Verfahrens zu beraten und darauf hinzuwirken, dass das Promotionsverfahren in angemessenem Zeitraum zum Abschluss gebracht wird.
- (2) ¹Die Betreuerin oder der Betreuer muss Professorin oder Professor, Juniorprofessorin oder Juniorprofessor, außerplanmäßige Professorin oder außerplanmäßiger Professor (§ 35a NHG), im Ruhestand befindliche Professorin oder im Ruhestand befindlicher Professor, entpflichtete Professorin oder entpflichteter Professor, Honorarprofessorin oder Honorarprofessor (§ 35 Absatz 1 NHG), oder Privatdozentin oder Privatdozent des Fachbereichs Sprach- und Literaturwissenschaft der Universität Osnabrück sein.
- (3) ¹Ein promoviertes, nicht der Hochschullehrergruppe angehörendes Mitglied des Fachbereichs kann auf Antrag als Betreuerin oder Betreuer vom Promotionsausschuss zugelassen werden, sofern dieses Mitglied durch seine Forschungsleistungen für das Fach oder Fachgebiet, aus dem die Dissertation gewählt ist, ausgewiesen ist.
- (4) ¹Wechselt eine Betreuerin oder ein Betreuer an eine andere Universität, so ist eine Co-Betreuerin oder ein Co-Betreuer gemäß Absatz 2 zu bestellen.
- (5) ¹Die Betreuerin oder der Betreuer kann das Betreuungsverhältnis lösen, wenn
 - a) sich die Doktorandin oder der Doktorand nachträglich als ungeeignet erweist, oder
 - b) Zeitpläne oder zeitliche Verabredungen mehrfach nicht eingehalten werden und ein erfolgreicher Abschluss des Promotionsverfahrens binnen angemessener Zeit nicht mehr zu erwarten ist, oder
 - c) die Vertrauensgrundlage des Betreuungsverhältnisses zerstört ist und ein Zusammenwirken nicht mehr möglich erscheint.

²Das Betreuungsverhältnis kann auch durch die Doktorandin oder den Doktoranden gelöst werden. ³Die Auflösung des Betreuungsverhältnisses ist dem Promotionsausschuss mitzuteilen.
- (6) Ein Wechsel der Betreuerin oder des Betreuers muss vom Promotionsausschuss genehmigt werden.

§ 5 Promotionsausschuss

- (1) ¹Zur Umsetzung der Promotionsordnung wird ein Promotionsausschuss gebildet. ²Der Promotionsausschuss trifft alle Entscheidungen im Zusammenhang mit dem Promotionsverfahren, soweit es nicht um die Bewertung der Promotionsleistungen geht oder die Zuständigkeit dem Promotionsausschuss ausdrücklich nicht zugewiesen ist.
- (2) ¹Dem Promotionsausschuss gehören die dem Fachbereichsrat angehörenden Mitglieder der Hochschullehrergruppe sowie die weiteren habilitierten Mitglieder des Fachbereichsrates an. ²Die Vertretung der Mitglieder des Promotionsausschusses bestimmt sich nach den Vorschriften über ihre Stellvertretung im Fachbereichsrat.
- (3) Den Vorsitz des Promotionsausschusses übernimmt die Dekanin oder der Dekan bzw. deren oder dessen Stellvertretung.
- (4) ¹Die oder der Vorsitzende bereitet die Beschlüsse des Promotionsausschusses vor und führt sie aus. ²Sie oder er berichtet dem Promotionsausschuss laufend über ihre oder seine Tätigkeit.
- (5) ¹Der Promotionsausschuss entscheidet mit Stimmenmehrheit der anwesenden Mitglieder. ²Bei Stimmengleichheit gibt die Stimme der oder des Vorsitzenden den Ausschlag.
- (6) ¹Entscheidungen des Promotionsausschusses sind der Bewerberin oder dem Bewerber schriftlich mitzuteilen. ²Ablehnende Entscheidungen sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen.

§ 6 Promotionskommission

- (1) ¹Zur Durchführung der mündlichen Prüfung wird eine Promotionskommission gebildet. ²Die Promotionskommission hat in der Regel fünf Mitglieder, die die Qualifikation gemäß § 4 Absatz 2 erfüllen. ³Die Betreuerin oder der Betreuer muss der Promotionskommission angehören. ⁴Sofern die Betreuerin oder der Betreuer nicht als Gutachterin oder Gutachter fungiert, muss mindestens eine Gutachterin oder ein Gutachter der Promotionskommission angehören. ⁵Darüber hinaus müssen mindestens drei Mitglieder der Promotionskommission Mitglieder der Hochschullehrergruppe des Fachbereichs Sprach- und Literaturwissenschaft sein. ⁶§ 4 Absatz 3 bleibt unberührt. ⁷Die Promotionskommission wählt aus ihrer Mitte eine Vorsitzende oder einen Vorsitzenden.
- (2) ¹Die Mitglieder der Promotionskommission nach Absatz 1 werden vom Promotionsausschuss bestellt. ²Die Betreuerin oder der Betreuer schlägt dem Promotionsausschuss die Gutachterinnen oder Gutachter und die Mitglieder der Promotionskommission zur Benennung vor. ³Hierbei können die Vorschläge der Doktorandin oder des Doktoranden berücksichtigt werden.
- (3) Die Zusammensetzung der Promotionskommission soll eine hinreichende fachliche Breite sichern.
- (4) ¹Für Entscheidungen der Promotionskommission gilt § 5 Absatz 5 entsprechend. ²Stimmenthaltung ist nicht zulässig.

II. Vorverfahren

§ 7 Voraussetzungen zur Annahme als Doktorandin oder Doktorand

¹Als Doktorandin oder Doktorand kann, unbeschadet der gesetzlichen Bestimmungen, angenommen werden, wer ein Studium in einem universitären Studiengang der Sprach- oder Literaturwissenschaften oder eines benachbarten Faches durch eine Prüfung (Diplom, Staatsexamen, Magister, Master oder vergleichbar) abgeschlossen hat. ²Im Zweifelsfall entscheidet der Promotionsausschuss.

§ 8 Annahme als Doktorandin oder Doktorand

- (1) Das Gesuch auf Annahme als Doktorandin oder Doktorand ist schriftlich unter Angabe des Dissertationsthemas und unter Benennung der Betreuerin oder des Betreuers an die oder den Vorsitzenden des Promotionsausschusses zu richten.
- (2) Dem Gesuch sind beizufügen:
 - a) ein in deutscher, englischer, französischer, italienischer oder spanischer Sprache abgefasster Abriss des Lebenslaufs und des Bildungsgangs,
 - b) ein Exposé über das Promotionsvorhaben in deutscher oder englischer Sprache.
Sofern die Dissertation auf eine Master-, Magister- oder Diplomarbeit oder eine gleichwertige Abschlussarbeit aufbauen soll, muss dies im Exposé nachvollziehbar kenntlich gemacht werden,
 - c) eine Erklärung über etwaige frühere Promotionsgesuche,
 - d) eine Einverständniserklärung der Betreuerin oder des Betreuers gemäß § 4,
 - e) der Nachweis über ein ordnungsgemäß abgeschlossenes Studium nach § 7,
 - f) eine Bestätigung über den Abschluss eines individuellen Entwicklungsplans zur Promotion (IEP) / Individual Development Plan (IDP) gemäß *Anlagen 1a und 1b*
- (3) ¹Werden ausländische Studienabschlüsse nachgewiesen, so prüft der Promotionsausschuss, ob diese den deutschen Abschlüssen im Sinne von § 7 gleichwertig sind. ²Dabei sind rechtsverbindliche zwischenstaatliche Abkommen, die Anerkennungsempfehlungen der Kultusministerkonferenz (Zentralstelle für ausländisches Bildungswesen) oder der Hochschulrektorenkonferenz zugrunde zu legen. ³Die Anerkennung kann von Auflagen abhängig gemacht werden.
- (4) ¹Ausländische Bewerberinnen oder Bewerber, die keinen deutschen Schul- oder Hochschulabschluss besitzen, sollen ausreichende Sprachkenntnisse in der Sprache nachweisen, in der die Dissertation verfasst werden soll. ²Der Nachweis wird geführt durch das Bestehen der folgenden Prüfungen:
 - für Deutsch durch DSH (2) oder TestDaF (4x4);
 - für Englisch durch IELTS (mit mindestens 7);
 - für Französisch durch DALF (Niveau C1);
 - für Italienisch durch PLIDA (Niveau C1) oder CELI (Niveau C1);
 - für Spanisch durch DELE (Niveau C1).³Ausnahmen können zugelassen werden.
- (5) ¹Über die Annahme als Doktorandin oder Doktorand entscheidet der Promotionsausschuss. ²Die Annahme als Doktorandin oder als Doktorand berechtigt zur Einschreibung an der Universität Osnabrück.

§ 9 Immatrikulation

Nach erfolgter Annahme sollen Doktorandinnen und Doktoranden sich unverzüglich als Promotionsstudierende einschreiben.

III. Hauptverfahren

§ 10 Zulassung zur Promotion

- (1) Das Gesuch um Zulassung zur Promotion ist schriftlich an die Vorsitzende oder den Vorsitzenden des Promotionsausschusses zu richten.

- (2) Dem Gesuch sind beizufügen:
 - a) der Nachweis der Einschreibung als Promotionsstudentin oder Promotionsstudent,
 - b) fünf Exemplare der Dissertation sowie eine entsprechende elektronische Fassung, die jeweils eine Versicherung an Eides statt über die Eigenständigkeit der erbrachten wissenschaftlichen Leistung laut *Anlage 2* enthalten sowie
 - c) eine Zusammenfassung der Dissertation in deutscher Sprache gemäß § 11 Absatz 3 Satz 3
- (3) Durch die Zulassung zur Promotion erwirbt die Doktorandin oder der Doktorand den Anspruch auf Bewertung ihrer oder seiner Dissertation und auf Durchführung des Hauptverfahrens.
- (4) Die oder der Vorsitzende des Promotionsausschusses stellt die Dissertation den nach Maßgabe des § 12 Absatz 1 bestellten Gutachterinnen oder Gutachtern zu.

§ 11 Dissertation

- (1) Die Dissertation muss einen Beitrag zum Fortschritt der Wissenschaft in den im Fachbereich Sprach- und Literaturwissenschaft vertretenen Fachgebieten und Fächern darstellen.
- (2) ¹Anstelle einer Einzelarbeit kann in Ausnahmefällen bei geeigneter Themenstellung auch eine intra- oder interdisziplinäre Gemeinschaftsarbeit vorgelegt werden. ²Diese muss den folgenden Anforderungen genügen:
 - a) ³Der theoretische und methodische Gehalt einer Gemeinschaftsarbeit sowie die tatsächlich investierte wissenschaftliche Arbeit müssen sich wesentlich von einer Einzelarbeit unterscheiden; dabei muss der Beitrag jedes Mitglieds dem wissenschaftlichen Rang einer Einzelarbeit entsprechen.
 - b) ⁴Die Doktorandinnen und Doktoranden müssen im Fall einer Gemeinschaftsarbeit die individuelle Urheberschaft für bestimmte Dimensionen des Forschungsprozesses oder für einzelne Abschnitte kenntlich machen.
- (3) ¹Die Dissertation wird in deutscher, englischer, französischer, italienischer oder spanischer Sprache abgefasst. ²Auf begründeten Antrag entscheidet der Promotionsausschuss über Ausnahmen. ³Der Dissertation ist eine Zusammenfassung in deutscher Sprache beizufügen.
- (4) ¹Die Dissertation kann auf eine Master-, Magister- oder Diplomarbeit oder eine gleichwertige Abschlussarbeit aufbauen. ²Voraussetzung dafür ist, dass die Dissertation wesentliche neue Erkenntnisse liefert.

§ 12 Beurteilung der Dissertation

- (1) ¹Der Promotionsausschuss bestellt für die Beurteilung der Dissertation mindestens zwei Gutachterinnen oder Gutachter, die die Qualifikation gemäß § 4 Absatz 2 erfüllen. ²Dabei können die Vorschläge der Doktorandin oder des Doktoranden berücksichtigt werden. ³Die Betreuerin oder der Betreuer ist in der Regel als Gutachterin oder Gutachter zu bestellen. ⁴Mindestens eine Gutachterin oder ein Gutachter muss Mitglied des Fachbereichs Sprach- und Literaturwissenschaft sein oder zum Zeitpunkt der Annahme der Doktorandin oder des Doktoranden Mitglied des Fachbereichs Sprach- und Literaturwissenschaft gewesen sein. ⁵Gutachterinnen oder Gutachter, die nicht Mitglieder oder Angehörige der Universität Osnabrück sind, haben im Promotionsverfahren die Rechte der ihr angehörenden Mitglieder.
- (2) ¹Sofern es ein besonderer thematischer Schwerpunkt der Arbeit erfordert, ist eine weitere fachlich zuständige Gutachterin oder ein weiterer fachlich zuständiger Gutachter gemäß § 4 Absatz 2 einer anderen wissenschaftlichen Hochschule oder eines Forschungsinstituts hinzuzuziehen. ²Sofern das Fachgebiet eines anderen Fachbereichs berührt wird und es zur Beurteilung der wissenschaftlichen Leistungen geboten erscheint, ist eine weitere Fachvertreterin oder ein weiterer Fachvertreter gemäß § 4 Absatz 2 als Gutachterin oder Gutachter hinzuzuziehen.
- (3) ¹Jede Gutachterin und jeder Gutachter erstattet in der Regel innerhalb von vier Monaten nach Zustellung ein schriftliches Gutachten und schlägt die Annahme oder Ablehnung der Dissertation vor. ²Über eine Fristverlängerung entscheidet die oder der Vorsitzende des Promotionsausschusses. ³Jede Gutachterin und jeder Gutachter hat den Vorschlag zur Annahme der Dissertation mit einer Einzelbewertung entsprechend den Noten

summa cum laude	ausgezeichnet	(0)
magna cum laude	sehr gut	(1)
cum laude	gut	(2)
rite	genügend	(3)

zu verbinden. ⁴Sofern eine Gutachterin oder ein Gutachter die Annahme der Dissertation ablehnt, wird die Note ungenügend (4) vergeben.

- (4) ¹Sind die Vorschläge aller Gutachterinnen oder Gutachter eingegangen, wird zur Bildung der Gesamtnote der Dissertation aus den Einzelbewertungen das arithmetische Mittel gebildet. ²Dabei ergibt ein Zahlenwert

kleiner als 0,5	die Gesamtnote	ausgezeichnet = summa cum laude
gleich oder größer als 0,5 und kleiner oder gleich 1,5	die Gesamtnote	sehr gut = magna cum laude
größer als 1,5 und kleiner oder gleich 2,5	die Gesamtnote	gut = cum laude
größer als 2,5 und kleiner oder gleich 3,5	die Gesamtnote	genügend = rite.

³Im Falle einer Gemeinschaftsarbeit erfolgen die Gutachten und die Bewertung für jeden Einzelbeitrag getrennt.

- (5) ¹Weichen die Einzelbewertungen um zwei oder mehr Notenstufen voneinander ab, bestellt der Promotionsausschuss eine weitere Gutachterin oder einen weiteren Gutachter. ²Haben alle Gutachterinnen oder Gutachter die Ablehnung der Dissertation vorgeschlagen, so ist sie durch den Promotionsausschuss sofort abzulehnen. ³Ist die Dissertation nicht von allen Gutachterinnen oder Gutachtern zur Annahme empfohlen worden, bestellt der Promotionsausschuss eine weitere Gutachterin oder einen weiteren Gutachter. ⁴Schlägt diese Gutachterin oder dieser Gutachter die Ablehnung der Dissertation vor, so ist die Dissertation durch den Promotionsausschuss abzulehnen, andernfalls wird aus allen Einzelbewertungen eine Gesamtnote nach Absatz 4 Satz 2 gebildet. ⁵Im Falle einer Teamarbeit ist für jede Doktorandin oder jeden Doktoranden ein gesondertes Gutachten zu erstellen. ⁶Dabei bilden sowohl der Einzelbeitrag als auch die Gesamtleistung die Grundlage für die Bewertung.

- (6) ¹Die Dissertation wird mit den Gutachten für die Dauer von zwei Wochen im Fachbereich zur vertraulichen Einsichtnahme ausgelegt; hiervon setzt die Vorsitzende oder der Vorsitzende des Promotionsausschusses die zur Abgabe von Stellungnahmen berechtigten Mitglieder des Fachbereiches Sprach- und Literaturwissenschaft schriftlich in Kenntnis und macht dies hochschulöffentlich bekannt. ²Alle Mitglieder und Angehörigen des Fachbereichs Sprach- und Literaturwissenschaft gemäß § 4 Absatz 2 haben das Recht, die Dissertation sowie die Gutachten einzusehen und schriftlich Stellung zu nehmen. ³Sofern durch die Dissertation das Fachgebiet eines anderen Fachbereichs berührt wird, steht das Recht zur Einsicht- und Stellungnahme auch dem entsprechenden Personenkreis dieses Fachbereichs zu. ⁴Die Stellungnahme zur Dissertation darf erst nach Auslage der Gutachten erfolgen; sie ist jedoch spätestens innerhalb von sieben Tagen nach Ende der Auslagefrist abzugeben. ⁵Die Stellungnahmen sind an die Vorsitzende oder den Vorsitzenden des Promotionsausschusses zu senden.

- (7) ¹Liegen zusätzliche Stellungnahmen im Sinne von Absatz 6 zu einzelnen oder mehreren der Gutachten vor, so gibt der Promotionsausschuss den Gutachterinnen oder Gutachtern Gelegenheit zur schriftlichen Äußerung. ²Dies schließt die Möglichkeit ein, das Gutachten einschließlich der Note zu überarbeiten. ³Der Promotionsausschuss entscheidet anschließend über eine mögliche Berücksichtigung der Stellungnahmen als zusätzliche Gutachten. ⁴Die Berücksichtigung einer Stellungnahme als Gutachten setzt voraus, dass die Stellungnahme mit einem Notenvorschlag gemäß Absatz 3 versehen ist.

- (8) Die Promotionskommission kann aufgrund des Vorschlags einer Gutachterin oder eines Gutachters oder aufgrund eines Vorschlags in einer Stellungnahme Anforderungen an die Überarbeitung der Dissertation für die zu veröffentlichende Fassung festlegen (Auflagen).

- (9) ¹Die oder der Vorsitzende des Promotionsausschusses teilt der Doktorandin oder dem Doktoranden die Annahme oder die Ablehnung der Dissertation in der Regel sechs Monate nach der Zulassung zur Promotion mit. ²Gutachten und Stellungnahmen im Sinne von § 12 Absatz 6 werden gleichzeitig übersandt. ³Falls ein zusätzliches Gutachten angefordert werden muss, kann sich dieser Zeitraum um drei Monate verlängern.

- (10) ¹Ist die Dissertation abgelehnt worden, ist das Promotionsverfahren beendet. ²Eine Ausfertigung der abgelehnten Arbeit ist mit sämtlichen Gutachten und Stellungnahmen zu den Akten zu nehmen.

§ 13 Mündliche Prüfung (Disputation)

- (1) ¹Nach der Annahme der Dissertation findet eine mündliche Prüfung in Form einer Disputation vor der Promotionskommission statt. ²In der Disputation soll die Doktorandin oder der Doktorand nachweisen, dass sie oder er in der Lage ist, ihre oder seine Forschungsergebnisse zu begründen, gegen kritische Einwände zu verteidigen sowie sich mit gegenteiligen Auffassungen wissenschaftlich fundiert auseinanderzusetzen. ³Darüber hinaus soll die Doktorandin oder der Doktorand die Fähigkeit nachweisen, die Forschungsergebnisse sowohl in das betreffende Fachgebiet als auch in das weitere wissenschaftliche Umfeld einzuordnen.
- (2) ¹Die mündliche Prüfung soll frühestens zwei Wochen und spätestens drei Monate nach der Annahme der Dissertation stattfinden, sofern nicht wichtige persönliche Gründe der Doktorandin oder des Doktoranden entgegenstehen. ²Hierüber entscheidet die oder der Vorsitzende des Promotionsausschusses.
- (3) ¹Die oder der Vorsitzende des Promotionsausschusses lädt die Doktorandin oder den Doktoranden sowie die Mitglieder der Promotionskommission zur mündlichen Prüfung und gibt den Termin hochschulöffentlich bekannt. ²Vom Zeitpunkt der Bekanntgabe des Termins der mündlichen Prüfung bis zur mündlichen Prüfung ist erneut ein Exemplar der Dissertation zur Einsicht für die promovierten Mitglieder des Fachbereiches und, sofern ein Fachgebiet eines anderen Fachbereiches berührt wird, auch für die promovierten Mitglieder jenes Fachbereiches in der Geschäftsstelle des Promotionsausschusses auszulegen.
- (4) ¹Die mündliche Prüfung ist hochschulöffentlich. ²Sie wird von der oder dem Vorsitzenden der Promotionskommission geleitet. ³Über die wesentlichen Gegenstände der mündlichen Prüfung, ihre Bewertung und über die tragenden Erwägungen der Bewertungsentscheidung ist ein Protokoll zu führen. ⁴Es ist von den Mitgliedern der Promotionskommission zu unterzeichnen.
- (5) ¹Bleibt die Doktorandin oder der Doktorand der mündlichen Prüfung unentschuldigt fern, so gilt die Promotion als insgesamt nicht bestanden. ²Bei entschuldigtem Fernbleiben wird ein neuer Termin entsprechend § 13 Absatz 2 bestimmt. ³Über die Anerkennung der Entschuldigung entscheidet der Promotionsausschuss.
- (6) Die Disputation ist als Einzelprüfung durchzuführen.
- (7) ¹Die Disputation besteht aus einem Vortrag von 20 bis 30 Minuten Dauer, der die Ziele, Methoden und Ergebnisse der Dissertation darstellt und allgemein verständlich macht. ²Hieran schließt sich unmittelbar eine Diskussion von 60 Minuten Dauer über die Ziele, Methoden und Ergebnisse der Dissertation an. ³Die Gesamtdauer der Disputation soll zwei Stunden nicht überschreiten. ⁴Die Diskussion wird durch Fragen aus dem Kreise der Promotionskommission eröffnet. ⁵Die oder der Vorsitzende hat das Recht, Fragen aus dem Kreise der Hochschulöffentlichkeit zuzulassen.
- (8) ¹In begründeten Ausnahmefällen kann die oder der Vorsitzende des Promotionsausschusses mit Einwilligung der Kandidatin oder des Kandidaten entscheiden, dass höchstens ein Mitglied der Promotionskommission, welches der oder dem Vorsitzenden des Promotionsausschusses frühzeitig angezeigt hat, dass eine Teilnahme an der Sitzung nicht möglich ist, als anwesend gilt, sofern eine Zuschaltung mit Hilfe von verfügbaren technischen Einrichtungen zur Bild- und Tonübertragung (Videokonferenz) erfolgen kann, die eine umfassende Wahrnehmung des Prüfungsgeschehens gewährleistet. ²Ein begründeter Ausnahmefall ist im Protokoll zu begründen und liegt insbesondere vor, wenn sich das Mitglied im Ausland aufhält, eine Anreise mit unverhältnismäßigen Kosten verbunden wäre oder aufgrund der Anordnung einer Behörde soziale Kontakte zu beschränken sind. ³Eine Zuschaltung der Kandidatin oder des Kandidaten sowie der Betreuerin oder des Betreuers ist nicht zulässig.

§ 14 Beurteilung der mündlichen Prüfung

- (1) Unmittelbar im Anschluss an die mündliche Prüfung entscheidet die Promotionskommission in nicht-öffentlicher Sitzung, ob und gegebenenfalls mit welchem Ergebnis die mündliche Prüfung bestanden ist.

- (2) ¹Die Promotionskommission bestimmt die Note der Disputation in der Weise, dass jedes ihrer Mitglieder eine Note gemäß § 12 Absatz 3 nennt und sodann das arithmetische Mittel gebildet wird. ²§ 12 Absatz 4 gilt entsprechend.
- (3) ¹Hat die Kandidatin oder der Kandidat die mündliche Prüfung nicht bestanden, ist ihr oder ihm die Möglichkeit zu einmaliger Wiederholung zu geben, wenn sie oder er dies innerhalb einer Woche schriftlich beantragt. ²Der Antrag ist an die Vorsitzende oder den Vorsitzenden des Promotionsausschusses zu richten. ³Die mündliche Prüfung kann frühestens nach vier Wochen und muss spätestens vor Ablauf von drei Monaten wiederholt werden.

IV. Weitere Verfahrensregelungen

§ 15 Abschluss der Promotion

- (1) Die Promotion ist abgeschlossen, wenn die Dissertation und die mündliche Prüfung nach Maßgabe von § 12 und § 14 bestanden sind.
- (2) ¹Zur Berechnung der Gesamtnote der Promotion wird das arithmetische Mittel gebildet aus
- | | | |
|--|----------------|---------------------------------|
| a) dem dreifach gewerteten arithmetischen Mittel der Einzelbewertungen der Dissertation, wobei alle Dezimalstellen außer den ersten zwei ohne Rundung gestrichen werden, und | | |
| b) dem einfach gewerteten Mittel der Einzelbewertungen der Disputation, wobei alle Dezimalstellen außer den ersten zwei ohne Rundung gestrichen werden. ² Dabei ergibt ein Zahlenwert | | |
| kleiner oder gleich 0,5 | die Gesamtnote | ausgezeichnet = summa cum laude |
| größer als 0,5
und kleiner oder gleich 1,5 | die Gesamtnote | sehr gut = magna cum laude |
| größer als 1,5
und kleiner oder gleich 2,5 | die Gesamtnote | gut = cum laude |
| größer als 2,5
und kleiner oder gleich 3,5 | die Gesamtnote | genügend = rite. |
- (3) Das Ergebnis der Bewertung der Promotionsleistungen ist der Bewerberin oder dem Bewerber unmittelbar im Anschluss an die mündliche Prüfung unter Ausschluss der Öffentlichkeit bekannt zu geben.
- (4) ¹Die Doktorandin oder der Doktorand erhält von der oder dem Promotionsausschussvorsitzenden eine vorläufige Bescheinigung über ihre oder seine Promotion mit der Gesamtnote (**Anlage 3**). ²In ihr ist klarzustellen, dass sie nicht als Promotionsurkunde gilt. ³Die Berechtigung zur Führung des Dokortitels besteht erst nach Aushändigung der Promotionsurkunde.

§ 16 Veröffentlichung der Dissertation

- (1) ¹Innerhalb von 18 Monaten nach der bestandenen mündlichen Prüfung hat die Bewerberin oder der Bewerber die Dissertation in angemessener Weise der wissenschaftlichen Öffentlichkeit durch Vervielfältigung und Verbreitung zugänglich zu machen. ²Die Publikation ist ein Bestandteil der Promotionsleistung. ³In der Publikation ist kenntlich zu machen, dass diese auf der begutachteten Dissertation des Fachbereichs Sprach- und Literaturwissenschaft der Universität Osnabrück beruht.
- (2) Die oder der Vorsitzende des Promotionsausschusses kann auf begründeten schriftlichen Antrag der Doktorandin oder des Doktoranden die Frist für die Publikation verlängern.

- (3) In angemessener Weise der wissenschaftlichen Öffentlichkeit zugänglich gemacht wird die Dissertation, wenn die Verfasserin oder der Verfasser neben dem für die Prüfungsakten des Fachbereichs erforderlichen Exemplar für die Archivierung sechs Exemplare und im Falle von Absatz 3 a) drei Exemplare, die auf alterungsbeständigem Holz- und säurefreiem Papier ausgedruckt und dauerhaft haltbar gebunden sein müssen, unentgeltlich an die Hochschulbibliothek abliefern und darüber hinaus die Verbreitung sicherstellt durch entweder
- a) den Nachweis einer Verbreitung über den Buchhandel durch einen gewerblichen Verleger mit einer Mindestauflage von 100 Exemplaren; auf der Rückseite des Titelblattes ist die Veröffentlichung als Dissertation unter Angabe des Fachbereichs Sprach- und Literaturwissenschaft der Universität Osnabrück auszuweisen, oder
 - b) den Nachweis der Veröffentlichung in einer Zeitschrift, oder
 - c) die Ablieferung einer elektronischen Version nach Maßgabe der „Verfahrensordnung der Universität Osnabrück zur elektronischen Publikation einer Dissertation“ in der jeweils geltenden Fassung, oder
 - d) die Ablieferung anderer Vervielfältigungen von mindestens 40 Exemplaren jeweils in Buch- oder Fotodruck.
- (4) Im Fall d) ist die Hochschulbibliothek verpflichtet, die überzähligen Tauschexemplare vier Jahre lang in angemessener Stückzahl aufzubewahren.
- (5) ¹Das zur Veröffentlichung vorgesehene Manuskript ist der ersten Gutachterin oder dem ersten Gutachter vor Drucklegung oder Ablieferung zur Druckgenehmigung vorzulegen. ²Mit der Druckgenehmigung bestätigt die Erstgutachterin oder der Erstgutachter, dass das zur Veröffentlichung vorgesehene Manuskript mit der zur Beurteilung eingereichten Dissertation im Wesentlichen übereinstimmt und ggf. gemachte Auflagen erfüllt sind. ³Die Doktorandin oder der Doktorand hat die unterschriebene Druckgenehmigung im Dekanat einzureichen. ⁴Ohne Vorlage der Druckgenehmigung wird die Promotion nicht vollzogen.
- (6) Wird eine Dissertation von einem gewerblichen Verleger vertrieben und wird dafür ein Druckkostenzuschuss aus öffentlichen Mitteln gewährt, sind der Hochschulbibliothek sechs Exemplare für Tauschzwecke zur Verfügung zu stellen.

§ 17 Vollzug der Promotion

- (1) ¹Nach Abschluss der Promotion gemäß § 15 Absatz 1 und Veröffentlichung der Dissertation gemäß § 16 verleiht der Fachbereich Sprach- und Literaturwissenschaft der Universität Osnabrück den Grad einer Doktorin oder eines Doktors der Philosophie (Dr. phil.). ²Die Promotion wird durch Aushändigung der Promotionsurkunde durch die Dekanin oder den Dekan des Fachbereichs Sprach- und Literaturwissenschaft oder deren oder dessen Stellvertretung vollzogen.
- (2) ¹Die Promotionsurkunde wird nach dem Muster der *Anlage 4* ausgefertigt. ²Sie datiert vom Tag der mündlichen Prüfung, wird jedoch erst nach Erfüllung der Veröffentlichungspflicht gemäß § 16 ausgehändigt. ³Auf Antrag wird die Promotionsurkunde auch in englischer Sprache nach dem Muster der *Anlage 5* ausgefertigt.

§ 18 Erfolgreicher Abschluss des Promotionsverfahrens

- (1) Das Promotionsverfahren ist erfolglos beendet, wenn entweder die Annahme der Dissertation abgelehnt wurde oder die mündliche Prüfung endgültig kein genügendes Ergebnis gehabt hat.
- (2) Die oder der Vorsitzende des Promotionsausschusses teilt der Bewerberin oder dem Bewerber das Ergebnis mit.

- (3) ¹Eine abermalige Bewerbung ist nur einmal zulässig. ²Dies gilt auch dann, wenn die erste erfolglose Bewerbung an einer anderen wissenschaftlichen Hochschule stattgefunden hat. ³Eine zurückgewiesene Dissertation darf nicht in gleicher oder unwesentlich abgeänderter Form wieder zum Zwecke der Promotion vorgelegt werden. ⁴Bei einem erneuten Gesuch auf Annahme als Doktorandin oder Doktorand ist in jedem Fall von dem früheren fehlgeschlagenen Versuch Mitteilung zu machen. ⁵Dabei sind der Zeitpunkt der ersten Bewerbung, die wissenschaftliche Hochschule und der Fachbereich (Fakultät), bei dem die Arbeit eingereicht wurde, sowie das Thema der Arbeit anzugeben.

§ 19 Zurücknahme des Promotionsgesuchs

- (1) ¹Ein Promotionsgesuch kann zurückgenommen werden, solange noch kein Gutachten über die Dissertation eingegangen ist. ²Danach ist eine Rücknahme nur aus wichtigen persönlichen Gründen, die nicht im Zusammenhang mit dem Promotionsverfahren stehen dürfen, möglich.
- (2) ¹Der Antrag auf Rücknahme des Promotionsgesuchs ist schriftlich an die Vorsitzende oder den Vorsitzenden des Promotionsausschusses zu richten. ²Eine Neueröffnung kann danach in gleicher Weise beantragt werden.

§ 20 Ungültigkeit der Promotionsleistungen

- (1) Ergibt sich vor der Aushändigung der Promotionsurkunde, dass sich die Bewerberin oder der Bewerber bei ihren oder seinen Promotionsleistungen einer Täuschung schuldig gemacht hat oder wesentliche Voraussetzungen für die Zulassung zur Promotion irrtümlicherweise als gegeben angenommen worden sind, so kann der Promotionsausschuss die Promotionsleistungen für ungültig erklären.
- (2) Vor der Beschlussfassung ist der oder dem Betroffenen Gelegenheit zur Stellungnahme zu geben.

§ 21 Entziehung des Doktorgrades

- (1) ¹Stellt sich nach Abschluss des Promotionsverfahrens heraus, dass der Doktorgrad durch Täuschung oder sonst in unrechtmäßiger Art und Weise erworben worden ist, so spricht der Fachbereich die Unwürdigkeit der oder des Promovierten zur Führung des Doktorgrades aus. ²Der akademische Titel ist zu entziehen.
- (2) ¹Die Verleihung des Doktorgrades kann außer in den Fällen des § 49 Verwaltungsverfahrensgesetz auch dann widerrufen werden, wenn die Inhaberin oder der Inhaber in schwerer Weise die mit dem Doktorgrad verliehene Würde verletzt hat, insbesondere durch eine Straftat, oder den mit dem Doktorgrad verbundenen Anspruch der Wissenschaftlichkeit missbraucht hat. ²Eine Straftat darf nur nach den Vorschriften des Bundeszentralregisters berücksichtigt werden

§ 22 Einsicht in die Promotionsakte

¹Nach Abschluss des Promotionsverfahrens wird der Bewerberin oder dem Bewerber auf Antrag Einsicht in die Promotionsakte gewährt. ²Davon unberührt bleiben §§ 29ff. Verwaltungsverfahrensgesetz.

§ 23 Widerspruch

- (1) Gegen ablehnende Entscheidungen nach dieser Promotionsordnung kann innerhalb eines Monats nach Bekanntgabe des Bescheides schriftlich Widerspruch bei der oder dem Vorsitzenden des Promotionsausschusses eingelegt werden.
- (2) ¹Über den Widerspruch entscheidet der Promotionsausschuss. ²Wird dem Widerspruch nicht abgeholfen, bescheidet die Hochschulleitung die Widerspruchsführerin oder den Widerspruchsführer.
- (3) ¹Soweit sich der Widerspruch gegen eine Entscheidung der Promotionskommission richtet, leitet die oder der Vorsitzende des Promotionsausschusses den Widerspruch der Promotionskommission zur Überprüfung zu. ²Ändert die Promotionskommission ihre Entscheidung nicht antragsgemäß, prüft der Promotionsausschuss die Entscheidung darauf, ob

1. von unrichtigen Voraussetzungen oder sachfremden Erwägungen ausgegangen,
 2. gegen allgemein anerkannte Grundsätze oder Bewertungsmaßstäbe verstoßen oder
 3. gegen Rechtsvorschriften verstoßen wurde.
- (4) ¹Soweit sich der Widerspruch gegen die Entscheidung einer Gutachterin oder eines Gutachters richtet, leitet die oder der Vorsitzende des Promotionsausschusses den Widerspruch der Gutachterin oder dem Gutachter zu. ²Im übrigen gilt Absatz 3 entsprechend.
- (5) ¹Über den Widerspruch soll innerhalb von drei Monaten abschließend entschieden werden. ²Soweit dem Widerspruch nicht abgeholfen wird, ist der Bescheid zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen.

§ 24 In-Kraft-Treten

¹Diese Ordnung tritt nach ihrer Genehmigung durch das Präsidium der Universität Osnabrück am Tage nach ihrer Veröffentlichung im Amtlichen Mitteilungsblatt der Universität Osnabrück in Kraft. ²Gleichzeitig treten die bisher geltenden Promotionsordnungen des Fachbereichs Sprach- und Literaturwissenschaft an der Universität Osnabrück in den Fassungen der Bekanntmachungen vom 04.04.2013 (AMBl. der Universität Osnabrück Nr. 04/2013, Seite 476) und 19.12.2019 (AMBl. der Universität Osnabrück Nr. 08/2019, Seite 1316) außer Kraft.

§ 25 Besondere Bestimmungen für die Promotion in gemeinsamer Betreuung mit einer ausländischen wissenschaftlichen Hochschule

- (1) ¹Promotionsverfahren können in gemeinsamer Betreuung mit einer ausländischen wissenschaftlichen Hochschule vorbereitet und durchgeführt werden, wenn
1. für die Promotion die Vorlage einer Dissertation und eine mündliche Promotionsleistung erforderlich sind,
 2. weitere Promotionsleistungen nicht zu erbringen sind und
 3. mit dem Fachbereich der ausländischen wissenschaftlichen Hochschule eine Kooperationsvereinbarung zur Durchführung eines gemeinsamen Promotionsverfahrens getroffen worden ist. ²Die Kooperationsvereinbarung muss Regelungen über Einzelheiten der gemeinsamen Betreuung, die Einschreibung der Bewerberin oder des Bewerbers an einer wissenschaftlichen Hochschule und die Registrierung des Dissertationsthemas enthalten.
- (2) ¹Für die Promotion in gemeinsamer Betreuung mit einem Fachbereich kann die Bewerberin oder der Bewerber wählen, ob sie oder er das Promotionsverfahren nach den an der Universität Osnabrück oder nach den an der ausländischen wissenschaftlichen Hochschule geltenden Vorschriften durchführen will. ²Wählt die Bewerberin oder der Bewerber das an der Universität Osnabrück angewandte Verfahren, gelten die Bestimmungen dieser Promotionsordnung, soweit im Folgenden keine besonderen Bestimmungen getroffen sind.
- (3) ¹Neben der Betreuerin oder dem Betreuer gemäß § 4 wird die Bewerberin oder der Bewerber während des Promotionsverfahrens von einer oder einem dieser oder diesem gleichgestellten Hochschullehrerin oder Hochschullehrer des Fachbereichs der ausländischen wissenschaftlichen Hochschule begleitet. ²Die Betreuerinnen oder Betreuer sind in der Vereinbarung nach Absatz 1 zu nennen. ³§ 12 Absatz 1 Satz 4 gilt entsprechend.
- (4) Mitglied der Promotionskommission muss mindestens eine weitere Hochschullehrerin oder ein weiterer Hochschullehrer des Fachbereichs der ausländischen wissenschaftlichen Hochschule sein.
- (5) ¹Die Beurteilung der Promotionsleistungen erfolgt auch nach dem für den Fachbereich der ausländischen wissenschaftlichen Hochschule geltenden Recht. ²Ob und inwieweit diese Bewertung bei der Bekanntgabe des Ergebnisses mitgeteilt und in der Promotionsurkunde ausgewiesen wird, entscheidet sich nach dem für die beteiligte ausländische wissenschaftliche Hochschule geltenden Recht.
- (7) ¹Die Promotionsurkunde wird nach dem Muster der *Anlage 6* angefertigt. ²Findet die mündliche Prüfung nicht an der Universität Osnabrück statt, muss die Promotionsurkunde unter Berücksichtigung der für die ausländische wissenschaftliche Hochschule geltenden Vorschriften den Anforderungen des § 17 Absatz 2 entsprechen.

- (8) ¹Mit dem Empfang der Promotionsurkunde erhält die Bewerberin oder der Bewerber das Recht, in der Bundesrepublik Deutschland den Doktorgrad gemäß § 1 und in dem Staat, dem die beteiligte ausländische wissenschaftliche Hochschule angehört, den entsprechenden Doktorgrad zu führen. ²Die Promotionsurkunde muss einen Zusatz enthalten, dass der verliehene ausländische Doktorgrad kein im Ausland erworbener akademischer Grad im Sinne der Nds. Verordnung über die Führung ausländischer akademischer Grade, Titel und Tätigkeitsbezeichnungen (AkGradVO) vom 24.04.2008 (Nds. GVBl. 2008, Seite 116) ist. ³§ 15 Absatz 4 findet entsprechende Anwendung.
- (9) Für die Vervielfältigung der Dissertation und die Zahl der Pflichtexemplare gilt das Recht der wissenschaftlichen Hochschule, an der die mündliche Prüfung erbracht worden ist.

Anlage 1a**Bestätigung über den Abschluss eines Individuellen
Entwicklungsplans zur Promotion (IDP)**

Die Doktorandin/ der Doktorand und die Betreuerin/
der Betreuer haben im Rahmen des geplanten
Promotionsvorhabens mit einer Dissertation zum Thema

.....
.....

(Arbeitstitel oder Arbeitsgebiet)

einen Individuellen Entwicklungsplan zur Promotion (IDP) abgeschlossen.

Der IDP beinhaltet eine Betreuungsvereinbarung und schließt darüber hinaus weitere Vereinbarungen mit Blick auf Fragen der Finanzierung der Promotionsphase, der individuellen Qualifikation, der Beteiligung in der Lehre, ggf. der beruflichen Orientierung sowie eine Verpflichtung auf die Einhaltung der Grundsätze guter wissenschaftlicher Praxis ein.

Der IDP wird zu Beginn der Promotion abgeschlossen und im Rahmen der Statusgespräche von Promovierenden und Betreuenden weiterentwickelt.

Osnabrück, den

.....
Doktorandin/Doktorand

.....
Betreuerin/ Betreuer

Anlage 1b



**Confirmation of conclusion of an
Individual Development Plan (IDP) for PhD Studies**

The PhD student and the Supervisor
..... have concluded an Individual Development Plan
(IDP) for PhD Studies within the framework of the intended doctoral research project
involving a PhD thesis on the topic

.....
.....

(Working title, Field of work)

The IDP comprises a supervision agreement and also includes additional agreements in
reference to issues such as how the PhD phase is funded, individual qualifications,
involvement in teaching and, if desired, professional orientation as well as a
commitment to comply with the principles of good scientific practice.

The IDP is concluded at the start of the PhD program and will be updated in the
framework of status talks between the PhD student and the Supervisor.

Osnabrück, dated

.....
PhD student

.....
Supervisor

Anlage 2

Versicherung an Eides statt über die Eigenständigkeit der erbrachten wissenschaftlichen Leistung¹

Ich versichere hiermit an Eides statt, dass ich die vorliegende Arbeit ohne unzulässige Hilfe Dritter und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Die aus anderen Quellen direkt oder indirekt übernommenen Daten und Konzepte sind unter Angabe der Quelle gekennzeichnet.

Weitere Personen oder Organisationen waren an der inhaltlichen materiellen Erstellung der vorliegenden Arbeit nicht beteiligt. Insbesondere habe ich hierfür nicht die entgeltliche Hilfe von Vermittlungs- bzw. Beratungsdiensten, Promotionsberaterinnen oder Promotionsberatern oder anderen Personen in Anspruch genommen.

Die Arbeit wurde bisher weder im In- noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde vorgelegt.

.....
(Ort, Datum)

.....
(Unterschrift)

1 Nach § 9 Absatz 3 Satz 3, § 7 Absatz 4 Satz 2 NHG darf die Universität von den Doktorandinnen und Doktoranden eine Versicherung an Eides statt verlangen und abnehmen, wonach die Promotionsleistung von ihnen selbständig und ohne unzulässige fremde Hilfe erbracht worden ist.

Die Abgabe einer falschen eidesstattlichen Versicherung ist strafbar. Bei vorsätzlicher, also wissentlicher, Abgabe einer falschen Erklärung droht eine Freiheitsstrafe bis zu 3 Jahren oder eine Geldstrafe. Eine fahrlässige Abgabe (obwohl hätte erkannt werden müssen, dass die Erklärung nicht den Tatsachen entspricht) kann eine Freiheitsstrafe bis zu einem Jahr oder eine Geldstrafe nach sich ziehen.

§ 156 StGB: Falsche Versicherung an Eides Statt

Wer vor einer zur Abnahme einer Versicherung an Eides Statt zuständigen Behörde eine solche Versicherung falsch abgibt oder unter Berufung auf eine solche Versicherung falsch aussagt, wird mit Freiheitsstrafe bis zu drei Jahren oder mit Geldstrafe bestraft.

§ 161 StGB: Fahrlässiger Falscheid, fahrlässige falsche Versicherung an Eides Statt:

(1) Wenn eine der in den §§ 154 bis 156 bezeichneten Handlungen aus Fahrlässigkeit begangen worden ist, so tritt Freiheitsstrafe bis zu einem Jahr oder Geldstrafe ein.

(2) Strafflosigkeit tritt ein, wenn der Täter die falsche Angabe rechtzeitig berichtigt. Die Vorschriften des § 158 Abs. 2 und 3 gelten entsprechend.

Anlage 3 (§ 15 Absatz 4)

Bescheinigung

(gilt nicht als Promotionsurkunde)

Es wird hierdurch bestätigt, dass (Frau/Herr)

- nach Vorlage (ihrer/seiner) Dissertationsschrift zum Thema: „(Thema)“ und
- nach Begutachtung durch (Name und Titel Gutachterin/Gutachter) und (Name und Titel Gutachterin/Gutachter) und
- nach der mündlichen Prüfung vom (Datum Prüfung)

folgendes Gesamtprädikat erhalten:

Prädikat:

„...“

Datum:

Siegel

Dekan

Anlage 4 (§ 17 Absatz 2)**Fachbereich Sprach- und Literaturwissenschaft**

Der Fachbereich Sprach- und Literaturwissenschaft
der Universität Osnabrück
verleiht
mit dieser Urkunde

Frau/Herrn
geboren am (Datum) in (Geburtsort)

den akademischen Grad

**Doktorin oder Doktor der Philosophie
(Dr. phil.)**

nachdem sie/er in ordnungsgemäßem
Promotionsverfahren mit der Dissertation

„Titel“

und durch eine mündliche Prüfung ihre/seine
wissenschaftliche Befähigung erwiesen hat.

Die Promotionsleistung wird wie folgt bewertet:

Dissertation

Gesamtprädikat

Datum: (Disputation)

Siegel

Dekanin/Dekan

Anlage 5 (§ 17 Absatz 2)

The School of Linguistics and Literature

The School of Linguistics and Literature
at the University of Osnabrück
represented by the Dean

Prof. Dr.

has awarded the degree of

Doctor of Philosophy (Dr. phil.)

to **Mr./Ms.**

born on in

after the successful completion of his/her dissertation entitled

„.....“

and after passing the oral defense

on

with the final grade of

.....
(.....)

Osnabrück,

Dean of School

Prof. Dr.

Seal

Anlage 6

Muster einer Urkunde für eine Promotion im Rahmen eines gemeinsamen Betreuungsverfahrens
(Cotutelle de thèse) von einer deutschen und einer ausländischen Universität

**Der Fachbereich Sprach- und Literaturwissenschaft
der Universität Osnabrück
und**

die Fakultät (Name der Fakultät)
der Universität (Name der ausländischen Universität)

verleihen gemeinsam

Frau / Herrn ^P(Name)

geboren am (Datum) in (Ort)

den Grad

einer Doktorin / eines Doktors ^P der Philosophie (Dr. phil.)

Sie / Er* hat in einem ordnungsgemäßen, gemeinsam von den beiden Fakultäten betreuten
Promotionsverfahren durch die mit (Note / Prädikat) beurteilte Dissertation mit dem Thema

(Titel der Dissertation)

sowie in einer am (Datum) abgehaltenen mündlichen Prüfung
(in den Fächern / in dem Fach – Bezeichnung der Prüfungsfächer)
ihre / seine wissenschaftliche Befähigung erwiesen und dabei das

Gesamturteil (Note / Bewertung)

erhalten

(Siegel)

(Siegel der ausländischen Universität)

(Ort, Datum)

(Ort, Datum)

Die Dekanin / Der Dekan ^P
Fachbereich Sprach- und Literaturwissenschaft
der Universität Osnabrück

**Die Präsidentin / Der Präsident /
Die Dekanin / Der Dekan** ^P
der (Name der ausländischen Universität / Fakultät)

Professorin/Professor^P

Professorin/Professor ^P

Frau / Herr (Name) hat das Recht, den Doktorgrad entweder in der deutschen oder ausländischen Form zu führen. In Klammern können die Namen der beiden Universitäten, die das Promotionsverfahren betreut haben, hinzugefügt werden. Dieser Doktorgrad bedarf zur Führung in der Bundesrepublik keiner weiteren staatlichen Genehmigung. Diese Urkunde gilt nur in Verbindung mit der Promotionsurkunde des (ausländischen) Erziehungsministeriums Nr. ... vom

^P Nichtzutreffendes streichen

**Text der Vorderseite
in ausländischer Sprache !**



Agreement of Cooperation and Exchange
between the Osnabrück University,
represented by its president Prof. Dr. Susanne Menzel-Riedl,
Neuer Graben 29, 49074 Osnabrück, Germany
Institute of Art/Art Education
and the University of West Bohemia,
represented by its Vice-Rector Ing. Dita Hommerová, Ph.D., MBA,
Univerzitní 8, 306 14 Pilsen, Czech Republic

I. General

Osnabrück University (UOS), Institute of Art/Art Education, Germany and the University of West Bohemia (UWB), hereby agree to cooperate under the terms described below in order to promote academic and educational cooperation and exchange between the two institutions towards the internationalization of higher education.

Subject to mutual consent, the areas of cooperation shall include any academic program offered at either institution considered of interest to the parties, and that according to the latter, will contribute to the fostering and development of cooperation initiatives, which include in particular but are not limited to:

- the exchange of students (graduate and undergraduate)
- the exchange of faculty and/or other staff
- the exchange of publications
- the promotion of scientific, academic and cultural activities such as short term courses, seminars, workshops and conferences of mutual interest
- joint research projects

II. Terms of the Agreement

1. Student Exchange

- 1.1 The universities agree to accept students for one or two terms yearly from the other university. The number of exchange students will be defined and agreed upon annually on the basis of exchange seats available in both institutions.

- 1.2 The home institutions will nominate candidates for the exchange. Exchange candidates must apply formally for admission to the host institution, providing application documents required by the host institution. All nominations will be made bearing in mind the normal requirements of the receiving institution, which will decide on the acceptability of the students nominated. The host institution reserves the right to make final judgments on the admission of exchange students.
- 1.3 Exchange students will be permitted to choose courses at the host institution which correspond on type and level to courses that they are required to take in their home university, thus they will be eligible for transfer. Exchange students will be enrolled as full-time non-degree students at the host institution. Thus, exchange students must take sufficient courses at the host institution to be considered full time students. Both institutions will provide each other with a transcript of courses for each student who has participated in the exchange.
- 1.4 Students who wish to enroll in a degree program at the host university must have undergone the normal admission procedures of that institution.
- 1.5 The exchange student should demonstrate language proficiency at an adequate level in the host country's language and/or in English.
- 1.6 Each host institution will waive tuition and other fees incurred by the exchange student for registration and admission. At Osnabrück University, however, all students (locals and international) must pay a "social fee" per semester (including semester ticket for free use of public transport in Osnabrück) that cannot be waived.
- 1.7 Both institutions will reserve accommodation for the incoming exchange students in university accommodation or will assist exchange students in finding suitable accommodation.
- 1.8 Exchange students must have sufficient funds to cover any expenses not covered by the home or host institution. Exchange students will be responsible for transportation to and from the host institution, medical insurance, accommodation and meals, textbooks and personal expenses and all debts incurred during the exchange period.
- 1.9 Exchange students shall have all the rights and duties at the host institution which the institution establishes for its own fulltime students. Therefore, exchange students must abide by all rules and regulations of the host institution for the duration of the exchange.
- 1.10 Upon completion of the exchange period, the exchange students are expected to return to their home institution. Any extension of the stay must be approved in writing by the designated official of each department in question upon recommendation of the liaison officer.

2. Faculty/Staff Exchange

- 2.1 In cases agreed upon, members of the academic staff will be invited to the host institution for teaching and/or research visits. The duration shall be determined on a case-to-case basis and after mutual agreement. Visiting faculty must have a sufficient command of the language of instruction, if they are invited to teach.
- 2.2 The home institution will maintain their staff member on full salary during the period of exchange. The host institution will provide work space, access to the

library and other facilities and will assist the staff member in finding accommodation.

- 2.3 Traveling expenses from the home institution to the host institution will be covered by the institution sending out its member or members. Any other terms regarding necessary travel fees, accommodation and daily allowance inside the host country will be agreed upon in writing at least two months before the commencement of the respective exchange.
- 2.4 Each faculty and research exchange participant must obtain medical insurance coverage during the exchange period. It is understood that the host institution accepts no responsibility or liability for providing health care services or health care insurance for visiting scholars.
- 2.5 Exchange faculty and researchers shall be responsible for obtaining any necessary visas and complying with all immigration laws and regulations of the country of the host institution. The host institution shall cooperate in such efforts, but will not be responsible to assure the granting of any visas, permits or approvals.
- 2.6 Should any faculty and research collaboration result in any potential for intellectual property, the Parties shall meet through designated representatives and seek an equitable and fair understanding as to ownership and other property interests that may arise. Any such discussions shall at all times strive to preserve a harmonious and continuing relationship between the Parties.

3. Other exchanges and joint projects

As for joint projects, special short-term academic programs, joint seminars, joint meetings or other exchanges and activities, the terms shall be mutually discussed and agreed upon in writing by both parties prior to the initiation of the activity.

Such agreements will constitute appendixes to this Memorandum of Agreement and will state the objective, duration, budget, activities to be carried out by each party and other conditions. They shall be approved by the corresponding authority of each institution.

III. Administrative and legal guidelines

Each institution designates an individual who will serve as the liaison officer for this agreement. The liaison officer will be responsible for coordinating the specific aspects of the cooperation. The designated liaison officers for this Memorandum of Agreement are:

For Osnabrück University:

Name: Prof. Sigrun Jakubaschke-Ehlers
Position: Chairperson of the Institute of Art/Art Education
Address: Seminarstr. 33, 49074 Osnabrück
Telephone: +49 541 9694157
E-mail: sigrun.jakubaschke-ehlers@uos.de

For University of West Bohemia:

Name: Ph Dr. Věra Uhl Skřivanová, Ph.D.
Position: Head of the Department of Art Education and Culture
Address: Klatovská 51, Plzeň
Telephone: +420 377 636 470
E-mail: uhl@kvk.zcu.cz

This agreement of cooperation will be valid for a period of five (5) years. It may be extended by the written mutual consent of the Parties.

The Agreement may be terminated by either Party by giving written notice at least 6 (six) months in advance to the other Party.

Amendments or changes to the contract must be made in writing and with the mutual consent of the two partners.

This agreement takes immediate effect after its approval and ratification by both partners and the appropriate signatures. In witness hereof, the parties hereby affix their signatures to this document in two counterparts.

For Osnabrück University

For the University of West Bohemia
(UWB)

Prof. Dr. Susanne Menzel-Riedl
President


Date: 09.11.2022

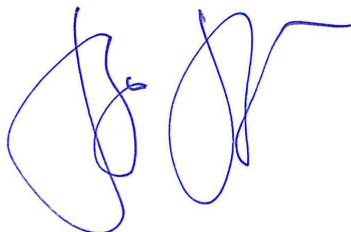
Ing. Dita Hommerová, Ph.D., MBA
Vice-Rector


Date: 12. 10. 2022



Prof. Dr. Hajo Holst
Dean
School of Cultural Studies
and Social Sciences

Date: 21.10.2022



K



Agreement of Cooperation and Exchange
between the Osnabrück University,
represented by its president Prof. Dr. Susanne Menzel-Riedl,
Neuer Graben 29, 49074 Osnabrück, Germany
Law Department/FB 10
and the National University "Odesa Law Academy",
represented by its President Prof. Dr. Serhii Kivalov,
Fontanska doroga 23, 65009
Odesa, Ukraine

I. General

Osnabrück University (UOS), Law Department/10, Germany and the National University "Odesa Law Academy", hereby agree to cooperate under the terms described below in order to promote academic and educational cooperation and exchange between the two institutions towards the internationalization of higher education.

Subject to mutual consent, the areas of cooperation shall include any academic program offered at either institution considered of interest to the parties, and that according to the latter, will contribute to the fostering and development of cooperation initiatives, which include in particular but are not limited to:

- the exchange of students (graduate and undergraduate)
- the exchange of faculty and/or other staff
- the exchange of publications
- the promotion of scientific, academic and cultural activities such as short term courses, seminars, workshops and conferences of mutual interest
- joint research projects

II. Terms of the Agreement

1. Student Exchange

1. The universities agree to accept students for one or two terms yearly from the other university. The number of exchange students will be defined and agreed upon annually on the basis of exchange seats available in both institutions.
2. The home institutions will nominate candidates for the exchange. Exchange candidates must apply formally for admission to the host institution, providing application documents required by the host institution. All nominations will be made bearing in mind the normal requirements of the receiving institution, which will decide on the acceptability of the students nominated. The host institution reserves the right to make final judgments on the admission of exchange students.
3. Exchange students will be permitted to choose courses at the host institution which correspond on type and level to courses that they are required to take in their home university, thus they will be eligible for transfer. Exchange students will be enrolled as full-time non-degree students at the host institution. Thus, exchange students must take sufficient courses at the host institution to be considered full time students. Both institutions will provide each other with a transcript of courses for each student who has participated in the exchange.
4. Students who wish to enroll in a degree program at the host university must have undergone the normal admission procedures of that institution.
5. The exchange student should demonstrate language proficiency at an adequate level in the host country's language and/or in English.
6. Each host institution will waive tuition and other fees incurred by the exchange student for registration and admission. At Osnabrück University, however, all students (locals and international) must pay a "social fee" per semester (including semester ticket for free use of public transport in Osnabrück) that cannot be waived.
7. Both institutions will reserve accommodation for the incoming exchange students in university accommodation or will assist exchange students in finding suitable accommodation.
8. Exchange students must have sufficient funds to cover any expenses not covered by the home or host institution. Exchange students will be responsible for transportation to and from the host institution, medical insurance, accommodation and meals, textbooks and personal expenses and all debts incurred during the exchange period.
9. Exchange students shall have all the rights and duties at the host institution which the institution establishes for its own fulltime students. Therefore, exchange students must abide by all rules and regulations of the host institution for the duration of the exchange.
10. Upon completion of the exchange period, the exchange students are expected to return to their home institution. Any extension of the stay must be approved in writing by the designated official of each department in question upon recommendation of the liaison officer.

2. Faculty/Staff Exchange

1. In cases agreed upon, members of the academic staff will be invited to the host institution for teaching and/or research visits. The duration shall be determined on a case-to-case basis and after mutual agreement. Visiting faculty must have a sufficient command of the language of instruction, if they are invited to teach.
2. The home institution will maintain their staff member on full salary during the period of exchange. The host institution will provide work space, access to the library and other facilities and will assist the staff member in finding accommodation.
3. Traveling expenses from the home institution to the host institution will be covered by the institution sending out its member or members. Any other terms regarding necessary travel fees, accommodation and daily allowance inside the host country will be agreed upon in writing at least two months before the commencement of the respective exchange.
4. Each faculty and research exchange participant must obtain medical insurance coverage during the exchange period. It is understood that the host institution accepts no responsibility or liability for providing health care services or health care insurance for visiting scholars.
5. Exchange faculty and researchers shall be responsible for obtaining any necessary visas and complying with all immigration laws and regulations of the country of the host institution. The host institution shall cooperate in such efforts, but will not be responsible to assure the granting of any visas, permits or approvals.
6. Should any faculty and research collaboration result in any potential for intellectual property, the Parties shall meet through designated representatives and seek an equitable and fair understanding as to ownership and other property interests that may arise. Any such discussions shall at all times strive to preserve a harmonious and continuing relationship between the Parties.

3. Other exchanges and joint projects

As for joint projects, special short-term academic programs, joint seminars, joint meetings or other exchanges and activities, the terms shall be mutually discussed and agreed upon in writing by both parties prior to the initiation of the activity.

Such agreements will constitute appendixes to this Memorandum of Agreement and will state the objective, duration, budget, activities to be carried out by each party and other conditions. They shall be approved by the corresponding authority of each institution.

III. Administrative and legal guidelines

Each institution designates an individual who will serve as the liaison officer for this agreement. The liaison officer will be responsible for coordinating the specific aspects of the cooperation. The designated liaison officers for this Memorandum of Agreement are:

For Osnabrück University:

Name: Dr. Matthew LeMieux
 Position: International Department Coordinator
 Address: Süsterstraße 28, 49074 Osnabrück, Room: 44/307
 Telephone: +49(0)541 969-4626 or 0176/ 781 72 619
 Fax: -
 E-mail: mlemieu@uos.de

For National University "Odesa Law Academy":

Name: Prof. Andrii Neugodnikov
 Position: Vice-rector for International relations
 Address: Fontanska doroga 23, 65009 Odesa, Room: 207
 Telephone: +380487196215, +30 (048) 719-88-01
 Fax: -
 E-mail: international@onua.edu.ua

This agreement of cooperation will be valid for a period of five (5) years and will be renewed for a single further five (5) year period if neither of the two contractual partners has given written notice of cancellation at least six months before the contract expires.

Amendments or changes to the contract must be made in writing and with the mutual consent of the two partners.

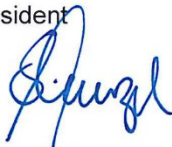
This agreement takes immediate effect after its approval and ratification by both partners and the appropriate signatures. In witness hereof, the parties hereby affix their signatures to this document in two counterparts.

For Osnabrück University

For the National University "Odesa Law Academy"

Prof. Dr. Susanne Menzel-Riedl
 President

Prof. Dr. Serhii Kivalov
 President




Date: 26.11.22

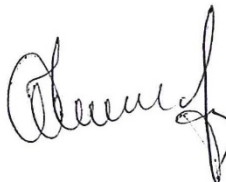
Date:

Dean Prof. Dr. Oliver Dörr
 Law Department

Prof. Andrii Neugodnikov
 Vice-rector for International relations



Date: 18.11.22



Date:



Letter of Renewal
between
National Cheng Kung University, College of Social Sciences
represented by its Dean Prof. Dr. Fu-Zen Shaw,
National Cheng Kung University, College of Social Sciences
and
Osnabrück University
represented by its president Prof. Dr. Susanne Menzel-Riedl
Neuer Graben 29, 49074 Osnabrück, Germany
Department of Law

National Cheng Kung University, College of Social Sciences and Osnabrück University, Department of Law, in consideration of the Exchange Agreement signed on 20.12.2017 and in consideration of the Memorandum of Understanding signed on 20.12.2017 agree to renew the said agreements in accordance with all of their declarations and clauses.

This Letter of Renewal will come into effect from 20.12.2022, and will be valid for a period of five years.

Both parties reserve the right to terminate this agreement upon written notice given six months prior to the termination date becoming effective.

In witness whereof, the parties hereto have offered their signatures:

For National Cheng Kung University,
College of Social Sciences

Handwritten signature of Prof. Dr. Fu-Zen Shaw in black ink.

Prof. Dr. Fu-Zen Shaw
Dean

Date: 19. Sep. 2022

For Osnabrück University

Handwritten signature of Prof. Dr. Susanne Menzel-Riedl in blue ink.

Prof. Dr. Susanne Menzel-Riedl
President

Date: 17.11.2022

Handwritten signature of Prof. Dr. Oliver Dörr in blue ink.

Prof. Dr. Oliver Dörr
Dean
School of Law

Date: 12/10/22

RENEWAL OF INTER-INSTITUTIONAL AGREEMENT OF COOPERATION

by and between


Bryn Athyn College
of the New Church,
Philadelphia, PA, United States of America


and


Osnabrück University,
represented by its president Prof. Dr. Susanne Menzel-Riedl
Neuer Graben 29, 49074 Osnabrück, Germany,
Division for Language and Literature (Fachbereich 7)

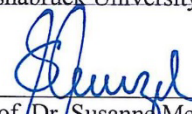
As of the twelfth day of September, 2022

The parties hereby agree to renew the Inter-Institutional Agreement of Cooperation by and between Bryn Athyn College of the New Church and Osnabrück University, signed on the 15th of December, 2008 in accordance with all of its declarations and clauses for an additional period of three years from 12 September 2022 to 11 September 2025.

By:  _____ Date: Nov. 4, 2022
Prof. Dr. Jonathan Kline
Dean of Academics at Bryn Athyn College of the New Church, USA

By:  _____ Date: Nov. 4, 2022
Mr. Brian Blair
President of Bryn Athyn College of the New Church, USA

By:  _____ Date: Nov 18, 2022
Prof. Dr. Alexander Bergs
Dean of the Division for Language and Literature (FB7),
Osnabrück University, Germany

By:  _____ Date: Nov 29, 22
Prof. Dr. Susanne Menzel-Riedl
President of Osnabrück University, Germany