Examination Regulations for the

Master's Program "Physics" (MSc)

at the University of Münster (WWU)

of 29 July 2020

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In accordance with § 2 (4) and § 64 (1) of the Higher Education Act of the Federal State of North Rhine-Westphalia (HG NRW) in its version of the Act on the Future of Higher Education (*Hochschulzukunftsgesetz*) of 16 September 2014 (GV. NRW 2014, p. 547), most recently amended on 12 July 2019 (GV. NRW 2014, p. 525), in the corrected version of 24 September 2019 (GV. NRW 2014, p. 593), the University of Münster (WWU) has issued the following regulations:

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§ 1
Scope of the Examination Regulations

The following examination regulations apply to the master's program "Physics" at the University of Münster (WWU).

§ 2
Goal of the Program and Aim of the Examination

(1) This master's program builds on the knowledge acquired in a prior undergraduate degree program. In addition to conveying the academic fundamentals of the subject of study, it aims to provide students with the knowledge, skills and methods necessary to meet the demands of the professional world. Students are trained to evaluate complex academic problems in an independent and responsible manner and apply the insights in practical applications.

(2) The master's examination determines whether the students have acquired the necessary knowledge and skills for their prospective professional field, particularly in the areas of research, development and teaching.

§ 3
Master's Degree

After successfully completing the program, the student is awarded the academic degree of "Master of Science" (M.Sc.).

§ 4
Admission to the Program

The admissions requirements for this program are specified in the current version of the "Admissions Regulations for the Master's Program in Physics at the University of Münster" (*"Zugangs- und Zulassungsordnung für den Masterstudiengang Physics an der Westfälischen Wilhelms-Universität"*).

§ 5
Administration of the Program

(1) The Dean of Studies (*Studiendekanin/Studiendekan*) of the Department of Physics is responsible to organise the examinations in the master's program "Physics" and the tasks as put forth in these examination regulations. She/he ensures that the stipulations put forth in these regulations are observed. In particular, she/he is responsible for recognizing degree-relevant examinations and required coursework. The Dean of Studies of the Department of Physics is responsible for resolving contested decisions taken during the examination process.

(2) The Dean's Office (*Dekanat*) can assign specific tasks specified in § 5 (1) to members or commissions of the Department of Physics.

(3) The Examinations Office (*Prüfungsamt der Fachbereiche der Mathematisch-Naturwissenschaftlichen Fakultät*) is the responsible office for examination affairs.

§ 6
Admission to the Master's Examination, Alignment Studies from the Bachelor's Phase

(1) Admission to the master's examination occurs via enrolment in the master's program "Physics" at the University of Münster, assuming the student remains enrolled at the University. The enrolment has to be rejected if the applicant has irrevocably failed a university examination or state examination in a study program "Physics" or another program with substantial closeness.

(2) If the student gains admission on the condition that she/he completes alignment studies (*Angleichungsstudien*) from the bachelor's phase, the student may begin the master's thesis once the alignment studies are completed. The requirements for completion of alignment studies are specified by the "Examination Regulations for the Bachelor's Program 'Physics' of the University of Münster" in their current version. Examinations in alignment studies are not considered in the calculation of the overall grade of the master's examination.

(3) If in the bachelor's program "Physics" at the University of Münster the module "Professional Qualification: Scientific Instrumentation" (*"Berufsfelddifferenzierung: Physikalische Instrumente und Messmethoden"*) has been studied, then the module "Quantum Theory and Statistical Physics" (*"Quantentheorie und Statistische Physik"*) has to be made up during the master's program. The coursework of the module "Professional qualification: Scientific instrumentation", that has been studied within the bachelor's program, can be recognized as a part of the module "Elective Studies in Physics" in the master's program "Physics".

§ 7
Standard Duration, Workload and Credits

(1) The standard duration of the program is two academic years. One academic year consists of two semesters.

(2) In order to obtain the master's degree, students must earn a total of 120 credits (CP) (*Leistungspunkte*, *LP*). Academic credit serves as a quantitative measure of a student's overall workload. This includes attending courses as well as time spent on pre- and post-preparation of the course content (i.e. course attendance and self-study time), taking examinations, preparing for examinations, including term papers and the master's thesis, as well as, if applicable, work placements or other types of courses. One credit is equivalent to 30 hours of academic work. The workload for one academic year thus amounts to 1,800 hours. Consequently, the entire master's program has a workload of 3,600 hours. One credit is equivalent to one ECTS (European Credit Transfer System) point.

§ 8
Structure of the Program and the Examination, Module Descriptions

(1) The program is divided into modules. Modules are units of instruction varying in topic, content and duration which lead to partial qualifications, defined in a learning goal related to the respective academic objective. Modules can consist of courses with different teaching and learning formats. Modules usually consist of courses offered in the same semester, or over several semesters. In accordance with the module descriptions, the students may have a choice of courses within a module.

(2) The master's examination is taken in cumulative form over the course of the program. It consists of the degree-relevant examinations of the modules as well as the master's thesis.

(3) A module is successfully completed if all module-related coursework has been completed and all degree-relevant examinations have been passed. Students earn a certain number of credits per module as specified in the respective module descriptions.

(4) Admission to a module can – in accordance with the module descriptions – depend on certain conditions, in particular the successful completion of one (or several) other module(s).

(5) Admission to a course can – in accordance with the module descriptions – depend on whether the student previously attended another course of the same module or completed coursework of the same module.

(6) The module descriptions specify how frequently each module is offered.

§ 9
Types of Courses and Teaching Language

(1) The following types of courses are offered:

- Lectures
- Exercises
- Seminars
- Laboratory courses
- Research work under scientific supervision

as stipulated in the module descriptions in the appendix of these examination regulations.

(2) The standard language of instruction is English. If all participants of a course agree, the course can be given in German. Degree-relevant examinations and required coursework can be delivered in English or German.

§ 10
Content of the Program

(1) The degree program comprises the study of the following modules including the master's project with the master's thesis as specified by the module descriptions given in the appendix, which are part of these examination regulations:

First year of studies (first and second semester):	Credits	Weight
Module "Elective Studies in Physics" (mandatory module)	6 – 18 CP	0%
Two modules "Physical Specialization" (elective mandatory modules)	14 – 18 CP each	17% each
Module "Interdisciplinary Studies" (elective mandatory module)	12 – 15 (24) CP	16%

The modules "Elective Studies in Physics", "Physical Specialization I", "Physical Specialization II" as well as the module "Interdisciplinary Studies" must add up to at least 60 credits. The modules Elective Studies in Physics and Physical Specialization I and II must comprise in total at least 8 credits from laboratory courses. At least one of the modules Physical Specialization I and II should contain theoretical parts of at least 5 credits. The exceptional value of 24 credits for the Interdisciplinary Studies given in parentheses only holds if one of the modules "Business Administration" or "Economics" is chosen.

Candidates can choose as modules of Physical Specialization without prior application one of the following elective mandatory modules:

- Nuclear and Particle Physics
- Materials Physics
- Nano and Quantum Technologies
- Nonlinear Physics
- Photonics and Magnonics
- Physics of Solid State Nanosystems

Furthermore, upon request of a student the Dean of Studies of the Department of Physics can furthermore admit a module which has been compiled by the student from the courses offered by the Department of Physics, provided the courses combined in this module are sufficiently coherent.

Depending on the courses offered by the contributing departments, one of the following modules can be chosen without prior application as the module "Interdisciplinary Studies":

- Business Administration
- German as a Foreign Language[1]
- Geophysics
- Computer Science
- Mathematics
- Molecular Biophysics
- Philosophy
- Psychology
- Economics

In addition to these pre-defined alternatives, students may also compile a thematically coherent module based on courses offered by the Department of Physics and other disciplines at the University of Münster. Upon application and with the consent of all providers of the chosen courses the Dean of Studies may approve such a module provided it has a reasonable relation with the studies of physics or it serves for the professional qualification. The contribution of other disciplines to this module should comprise at least 10 credits. The chosen courses should in their majority be part of master's programs or of bachelor's programs for the fifth or higher semester of the respective discipline. A repetition of courses taken during the bachelor's studies is excluded.

Second year of studies (third and fourth semester):	Credits	Weight
Professional Specialization and Project Design (mandatory module)	30 CP	5%
Master's Project (includes master's thesis, mandatory module)	30 CP	45%

(2) Students are required to earn a total of 120 credits to complete the master's program, of which the master's thesis accounts for 28 credits

(3) A recommended study plan and the handbook of modules are given in the appendix of these examination regulations.

§ 11
Required Coursework and Degree-relevant Examinations, Registration

(1) The prerequisites for participation in specific courses are outlined in the module descriptions.

(2) In each module at least one degree-relevant examination (*Prüfungsleistung*) has to be passed. In addition, students may have to complete additional coursework (*Studienleistungen*) which is not relevant for the module grade. Such examinations and coursework may include written or oral examinations, written solutions of exercises, presentations of exercise solutions, protocols of laboratory experiments and oral presentations. All required coursework and degree-relevant examinations have to be delivered in English or German. The instructor may admit another language.

(3) The module descriptions define the internal structure of the modules. They determine for each course the number of credits obtainable as well as the degree-relevant examinations of the respective module in type, duration and scope. These examinations form part of the master's examination. They can refer to one or more module courses, or to the entire module.

[1] This module can only be chosen by students who have started their master's studies with a limited knowledge of the German language below the level DSH-2.

(4) In order to take part in any degree-relevant examination or coursework, students must register in advance. The registration deadlines are announced by the examinations office. Students may withdraw their registration without explanation within these deadlines. Registration and withdrawal are carried out by the students via the electronic examinations administration system of the University of Münster. For modules offered by other departments different rules may apply. Details are given in the module description.

(5) Upon agreement by the Dean of Studies, the types of examinations specified in § 11 (2) can also be executed end evaluated software-based in electronic form or in the form of electronic communication; the form of the examination will be announced by the instructor in suitable form at the beginning of the course. If such an examination has the character of an oral examination, the regulations pertinent to oral examinations hold with the stipulation that the specification in sentence 1 can only be realized subject to the written agreement of the student as well as the participating examiner and assessor; in the other cases the regulations for written examinations hold correspondingly.

§ 12
Master's Thesis

(1) The master's thesis should demonstrate that a student is capable of independently working within a specified period of time on a physical problem by using scientific methods and that she/he is able to document the results appropriately. The length of the thesis should not exceed 80 pages. The master's thesis as well as parts of the master's thesis must not have been in the same form part of another examination procedure.

(2) An examiner appointed in accordance with § 14 assigns the topic of the master's thesis and supervises the thesis process. The student has the right to propose both the topic and supervisor of her/his choice. In case the supervisor is not member of the Department of Physics of the University of Münster, the assignment of the topic of the master's thesis has to be approved by the Dean of Studies.

(3) Upon receiving the student's application, the topic of the master's thesis is assigned to the student by the Examinations Office on behalf of the Dean of Studies. Topics can only be assigned on the condition that the student has already earned a total of 60 credits. If the student gained admission on the condition that she/he complete alignment studies in accordance with the admission regulations for the master's program "Physics", the topic of the master's thesis may only be assigned upon completion of the alignment studies. The date of the topic assignment must be put on record.

(4) The master's thesis must be completed within six months. The topic, task and scope of the thesis are to be limited in such a manner that it meets the allocated workload of 28 credits. The student is permitted to change her/his topic only once, and only within a week of receiving the topic.

(5) Upon justified request by the candidate the submission deadline of the master's thesis may be extended once by up to four weeks. In case of substantial reasons which considerable impede the work on the master's thesis or prohibit the work for a certain time, the submission date can be extended correspondingly upon request by the student. Substantial reasons for such an extension could include severe illness of the candidate or immutable technical difficulties in the realization of the project. Other substantial reasons can be the care for one's own children up to the age of 12 years, to care or nurse for the spouse, the registered civil partner or a direct relative or first-degree relative by marriage if such care or assistance is necessary. The Dean of Studies is responsible for deciding on and granting extensions (see § 12 (5) sentences 1 and 2). On demand of the Dean of Studies, the candidate must present proof of a "valid reason". Instead of extending the deadline, the Dean of Studies can, with regard to sentence 2, also assign a new topic for the master's thesis if the candidate was unable to work on the thesis for longer than one year. In this case, the assignment of a new topic does not count as a second attempt at the master's thesis in the sense of § 17 (2).

(6) The master's thesis must include a title page, a table of contents and a list of works and sources cited. All parts of the thesis that contain wording or content taken from other sources must be identified as such and cited accordingly. The candidate must attach a written declaration to the thesis which states that she/he has written the thesis herself/himself, has not used sources and means other than those indicated and has identified all direct quotes. Such a declaration must also be made regarding tables, sketches, drawings, graphic illustrations etc. The master's thesis can be written in English or German language.

§ 13
Acceptance and Grading of the Master's Thesis

(1) Candidates are required to submit two copies of the master's thesis (typewritten, bound and paginated) as well as two digital copies in a suitable format for a possible plagiarism check to the Examinations Office by the given deadline. Its submission is only considered on time and complete if both the bound and digital copies are submitted to the Examinations Office before the deadline. With the submission of the thesis the student has to submit a written consent permitting the electronic plagiarism checking and for this purpose the storage of the thesis in a data base as well as its comparison with other texts in order to find matchings. The date of submission must be put on record. If the master's thesis is submitted after the deadline or not in due form, it is graded as a fail (*nicht ausreichend*, 5.0) (see § 22 (1)).

(2) The master's thesis must be read and graded by two examiners. One of the examiners should be the person who assigned the topic. The second examiner is appointed by the Dean of Studies among the admitted examiners, she/he can be proposed by the candidate. At least one of the examiners has to be professor or "*Privatdozent*" at the Department of Physics of the University of Münster. Both grades must conform to § 18 (1) and be justified in written form. The overall grade is then determined as the arithmetic mean (see § 18 (4) sentences 4 and 5), provided the difference between the grades is no greater than 2.0. If the difference is greater than 2.0 or if one examiner grades the thesis as a fail while the other grade is at least a pass, then a third examiner is to be appointed by the Dean of Studies to grade the master's thesis. In this case, the grade is calculated as the arithmetic mean of the three examiners' grades. The grade can only be a pass (4.0) or better, however, if at least two of the examiners grade the thesis with a pass (4.0) or better.

(3) The grading period for the master's thesis may not exceed eight weeks, or 16 weeks if a third examiner is involved.

§ 14
Examiners and Assessors

(1) Examiners are admitted by the Dean's Office among the persons who are entitled to serve as an examiner. This admission can be restricted to specific examinations.

(2) Any individual who regularly holds relevant courses in the subject of the degree-relevant examination or master's thesis is entitled to serve as an examiner in accordance with § 65 (1) (HG NRW). The Dean of Studies of the Department of Physics is responsible for deciding on exceptions to this rule.

(3) Oral examinations are conducted by an examiner in the presence of an assessor. Before determining the grade, the examiner must hear the assessor's evaluation. The grade and key themes of the oral examination are recorded in minutes which are signed by the examiner and the assessor.

(4) The assessors for oral examinations are appointed by the examiner. Only individuals who hold a relevant *Diplom*, master's degree or academic qualification of an equivalent or higher-level degree can serve as an assessor.

(5) Examiners and assessors are independent in their examination activity. For written examinations, correction assistants can devise exercises and carry out preliminary corrections on behalf of the examiner.

(6) Written degree-relevant module examinations are graded by a single examiner. The master's thesis is graded in accordance with § 13.

(7) The examination must be graded by at least two examiners if an oral or written degree-relevant examination is the final attempt according to § 17 (2) before a possible permanent fail of the master's examination. In this case, the grade is calculated as the arithmetic mean of the two individual grades. § 18 (4), sentences 3 and 4 apply accordingly.

(8) Students of the same degree program may attend oral examinations if the candidate does not object. This does not apply to the discussion of the grade and its announcement to the candidate.

§ 15
Recognition of Required Coursework and Degree-relevant Examinations

(1) Required coursework (*Studienleistungen*) and degree-relevant examinations (*Prüfungsleistungen*) from within the same program at other German universities are recognized upon request unless these differ substantially with the prescribed objectives of the program; a determination of equivalence is not conducted. The same applies to required coursework and degree-relevant examinations completed in other degree programs at the University of Münster or other German universities.

(2) Based on the recognition procedures outlined in § 15 (1), the student must upon request be granted placement in the semester determined by the ratio of number of credits recognized to total number of credits obtainable in the program. If the first place after the decimal is smaller than five, the semester number is rounded down. Otherwise it is rounded up.

(3) § 15 (1) and (2) apply accordingly to the recognition of required coursework and degree-relevant examinations completed in state-recognized distance-learning study programs, in distance-learning units developed by the state of North Rhine-Westphalia together with the other German states or the federal government, at state or state-recognized universities of cooperative education (*Berufsakademien*), in degree programs at foreign state or state-recognized universities or in further education study programs (see § 62 HG NRW).

(4) The basis for determining whether essential differences exist is a comparison of the content, workload and requirements of the respective coursework and examinations. The determination of equivalence should not be based on a schematic comparison, but rather on an overall assessment. For the equivalence of required coursework and degree-relevant examinations from foreign universities, the equivalence agreements of the Standing Conference of the Ministers of Education and Cultural Affairs of the Federal Republic of Germany (KMK) and the German Rectors' Conference (HRK) apply. In case of doubt concerning equivalence, the Central Office for Foreign Education (Zentralstelle für ausländisches Bildungswesen) may be consulted.

(5) If students are allowed to enter the program at a higher semester after passing a placement examination, they receive academic credit in terms of both required coursework and degree-relevant examinations for the knowledge and skills they demonstrated in the placement examination. The Dean of Studies is legally bound by the assessments made in that examination.

(6) Additional skills and qualifications for which documentation is provided can be taken into consideration upon the student's request, provided that the required coursework and degree-relevant examinations which they replace are equivalent in terms of content and level. At most, up to half of the coursework and examinations can be replaced in this way.

(7) If external examinations are recognized as degree-relevant examinations and the grading systems are comparable, the grades may be used to calculate part of the overall grade. In the case of non-comparable grading systems, examinations are marked as passed (*bestanden*). The recognition of examinations is indicated in the degree certificate. If a module grade cannot be calculated due to the recognition of examinations from a non-comparable grading system, then this module is excluded from the calculation of the overall grade.

(8) The student is responsible for providing the documents necessary for deciding on recognition. These must include information on the knowledge and qualifications for which equivalence is to be recognized. If the student requests recognition for coursework from other degree programs, the student must, as a rule, provide the corresponding examination regulations and module descriptions as well as the transcript of records (ToR) or equivalent document.

(9) The Dean of Studies of the Department of Physics is responsible for recognizing academic achievement. Before equivalence can be determined, members of staff representing the subject in question must be consulted.

(10) The student is to be informed about the decision on recognition within four weeks after the application has been made and the required documents have been submitted. Any rejection must be justified.

§ 16
Compensation for Disadvantages

(1) If a student can demonstrate that she/he is partially or entirely unable to complete required coursework or degree-relevant examinations in their intended form due to a disability or chronic illness, the Dean of Studies must – at the student's request – make allowances with respect to the form and duration of the examination and the use of aids or assistants to ensure equal opportunity. The same applies to the requirements for participation in the modules and completion of the corresponding coursework and degree-relevant examinations as put forth in these examination regulations.

(2) At the student's request, the faculty representative for students with disabilities must be consulted with regard to decisions specified in § 16 (1). If consultation with a representative is not possible within the faculty, the WWU Representative for Students with a Disability or Chronic Illness is to be consulted.

(3) Compensation for disadvantages as put forth in § 16 (1) is granted on a case-by-case basis. Students may be required to submit adequate documentation substantiating their chronic illness or disability. This includes, for example, medical certificates or, if applicable, a disability certificate (*Behindertenausweis*).

(4) Provided that the condition/status of the student's illness or disability will foreseeably remain unchanged, the compensation for disadvantages as put forth in § 16 (1) extends to all required coursework and degree-relevant examinations that have to be completed during the master's program.

(5) If a female student is unable to complete required coursework or degree-relevant examinations in part or whole on account of maternity protection regulations, § 16 (1-3) apply accordingly.

§ 17
Passing of the Master's Examination, Retaking

(1) The master's examination has been passed when the candidate has passed all of the modules in accordance with § 8, § 10, § 11 and the module descriptions as well as the master's thesis with at least a passing grade (4.0; *ausreichend*) (§ 17 (1)). The candidate must have also obtained a total of 120 credits.

(2) Except for the master's thesis, students are granted three attempts at passing any examination within a module. Additional attempts to improve her/his grade in an examination which has already received a passing grade are not allowed. After all permissible attempts to retake a failed module examination are exhausted, the module is considered permanently failed.

(3) If one of the modules "Physical Specialization" is permanently failed, the student can at most in one additional of the offered elective mandatory modules try to pass the degree-relevant examinations. If the module "Interdisciplinary Studies" is permanently failed, the student can at most in one additional of the offered elective mandatory modules try to pass the degree-relevant examinations.

(4) If the candidate receives a fail for the master's thesis, she/he is granted one more attempt to write the thesis on a newly assigned topic. A third attempt is not allowed. During the second attempt, the topic can only be handed back within the time specified in § 12 (4) sentence 3 if the candidate did not make use of this possibility in her/his first attempt.

(5) The terms for participating in and passing degree-relevant examinations and required coursework in modules offered by other departments/faculties are regulated by their corresponding requirements; details are provided in the module descriptions.

(6) If the candidate has permanently failed a mandatory module (Pflichtmodul) or the master's thesis, or if she/he has permanently failed an elective mandatory module and there is no more possibility to successfully pass another module, then the master's examination is considered permanently failed.

(7) If the candidate has permanently failed the master's examination, she/he may request a university transcript listing all of the completed coursework/examinations and, if applicable, respective grades. In order to receive a transcript, the candidate must present her/his certificate of de-registration (*Exmatrikulationsbescheinigung*) and proof of the completed coursework/examinations. The transcript is signed by the Head of the Department of Physics and authenticated with the faculty seal.

§ 18
Grading of Individual Examinations, Module Grades and Calculation of the Overall Grade

(1) Unless otherwise stated in the module descriptions, all degree-relevant examinations receive a grade. The following grades should be used:

1 = *sehr gut* (excellent)	= an excellent achievement
2 = *gut* (good)	= a significantly above-average achievement
3 = *befriedigend* (satisfactory)	= an average achievement
4 = *ausreichend* (pass)	= an adequate achievement, despite shortcomings
5 = *nicht ausreichend* (fail)	= an inadequate achievement due to serious shortcomings

Intermediate values may be used to differentiate assessments by raising and lowering the grades by 0.3. The grades 0.7, 4.3, 4.7 and 5.3 are excluded, however. The module descriptions can allow for the grading of non-degree-relevant coursework.

(2) Grades for oral degree-relevant examinations must be communicated to the student and the responsible Examinations Office within a one-week period, the grades for written degree-relevant examinations within a four-week period.

(3) The candidate receives electronic or written notification of grades obtained for degree-relevant examinations and the master's thesis. The time of notification must be put on record. Electronic notification occurs via the electronic

examination administration system of the University of Münster. Students who do not pass a degree-relevant examination after the final attempt receive individual written notification which includes information on the legal remedies available to her/him.

(4) For each module requiring at least one graded examination, an overall grade is determined on the basis of the individual degree-relevant examinations assigned to that module. The module descriptions determine the weight of the individual grades for the final module grade. For the calculation of the module grade, all decimal places except for the first are deleted without rounding. This results in the following grades:

less or equal 1.5	= *sehr gut* (excellent)
1.6 – 2.5	= *gut* (good)
2.6 – 3.5	= *befriedigend* (satisfactory)
3.6 – 4.0	= *ausreichend* (pass)
above 4.0	= *nicht ausreichend* (fail)

(5) Based on the grades of the modules and the master's thesis an overall grade is calculated. The module descriptions determine the weight of the module grades for the final overall grade. For the calculation of the overall grade, all decimal places except for the first are deleted without rounding. This results in the following grades:

less or equal 1.5	= *sehr gut* (excellent)
1.6 – 2.5	= *gut* (good)
2.6 – 3.5	= *befriedigend* (satisfactory)
3.6 – 4.0	= *ausreichend* (pass)
above 4.0	= *nicht ausreichend* (fail)

If in all degree-relevant examinations the best grade 1.0 is achieved, the master's examination is awarded the appellation "passed with distinction" (*mit Auszeichnung*).

(6) In addition to the overall grade, as determined according to § 18 (5), a comparative grade based on the ECTS grading scale is also calculated.

§ 19
Master's Certificate and Master's Diploma

(1) When a student has successfully completed the master's program, she/he receives a master's certificate. This certificate contains the following information:

a) grade of the master's thesis
b) title of the master's thesis
c) overall grade for the master's examination
d) number of semesters required to complete the master's program.

(2) The certificate bears the date of the day of the last degree-relevant examination.

(3) In addition to the certificate, the student receives a diploma of the same date, confirming the conferral of the master's degree (see § 3).

(4) Both the certificate and the diploma are issued with an English version of the same.

(5) The master's certificate and the master's diploma are signed by the Head of the Department of Physics and authenticated with the faculty seal.

§ 20
Diploma Supplement with Transcript of Records

(1) In addition to the certificate, the student receives a diploma supplement which includes a transcript of records (ToR). The diploma supplement contains detailed information about the individual study program, the courses and modules attended, the required coursework and degree-relevant examinations completed and their respective grades, along with the individual subject-related profile chosen by the student in the program.

(2) The diploma supplement is issued in accordance with the recommendations of the German Rectors' Conference (HRK).

§ 21
Access to the Examination Files

After completing each degree-relevant examination, students can, upon request, gain access to the examination papers, the examiners' assessments and examination minutes. Students are generally permitted to make copies or other faithful reproductions of the original documents while viewing the examination files. Requests must be filed with the Examinations Office no later than two weeks after the results of the examination are announced. The Examinations Office stipulates the time and place of access on behalf of the Dean of Studies. The same applies with regard to the master's thesis. § 29 VwVfG NRW remains unaffected.

§ 22
Absence, Withdrawal, Deception and Violation of Regulations

(1) A degree-relevant examination is considered a fail (*nicht ausreichend*, 5.0) if the student, for no valid reason, does not appear at the examination on the designated date, or if she/he withdraws for no valid reason after beginning an examination. The same applies if a written degree-relevant examination or the master's thesis is not completed within the allocated time limit. Examples of valid reasons include an inability to take an examination due to illness, claims to maternity or paternity leave as provided by the Federal Parental Benefit Act (*Bundeselterngeld- und Elternzeitgesetz*), or nursing/caring for a spouse, a registered civil partner, a direct relative or a first-degree relative by marriage if such care or assistance is necessary.

(2) If a female student may not meet her academic requirements on account of the Maternity Protection Act (*Mutterschutzgesetz*), the administration of examinations is also not permitted.

(3) The reasons for absence or withdrawal according to § 22 (1) must immediately be submitted and substantiated in writing to the examinations office. In the case of illness, the Dean of Studies may request a medical certificate. If the reasons given are not accepted, the student is notified in writing. If the student does not receive written notification within a four-week period, then the reasons have been accepted.

(4) If a student withdraws on account of illness, yet there is sufficient reason to believe that the student was capable of taking the examination or that another form of proof would be more appropriate, the Dean of Studies may request a medical certificate from a University-appointed physician (*Vertrauensarzt*) in accordance with § 63 (7) HG. With respect to § 22 (3) sentence 1, sufficient reasons exist e.g. if the student has failed to appear to more than four examinations or has withdrawn more than twice from the same examination due to illness in accordance with § 22 (1). The student is to be immediately notified of this decision and provided with the names of at least three physicians, designated by the University of Münster, from one of whom the student must obtain a medical certificate.

(5) If a student attempts to influence the outcome of a degree-relevant examination or the master's thesis through dishonest means such as the use of unauthorized material or devices, the examination is regarded as not having

been completed and is considered a fail (*nicht ausreichend*, 5.0). A student who disrupts an examination may, usually after a warning by the invigilator, be excluded from continuing that particular examination. In this case, the degree-relevant examination is regarded as not having been completed and is considered a fail (5.0). In serious cases, the Head of the Department of Physics may exclude the student from the master's examination entirely, in which case the master's examination is marked as permanently failed. The reason(s) for exclusion must be put on record.

(6) Adverse decisions must be immediately disclosed to the student concerned in written form. The decision(s) must be justified and accompanied by information on the legal remedies available. Before a decision can be made, the student must be given the opportunity to state her/his case.

§ 23
Invalidity of Individual Examinations

(1) If a student knowingly manipulates the results of a degree-relevant examination or the master's thesis and if this fact comes to light only after the master's certificate has been issued, the Head of the Department of Physics can retroactively correct the result and, if applicable, the grades of the degree-relevant examination(s) or the master's thesis accordingly and declare these examinations in part or whole as failed.

(2) If the requirements for admission to a degree-relevant examination or the master's thesis were not met and the student had no intention of acting dishonestly and if this fact becomes apparent only after she/he passed the degree-relevant examination in question, the successful completion of the examination rectifies the mistake. However, if the student is found to have deliberately gained admission through wrongful means, the Head of the Department is responsible for deciding on the legal consequences, subject to the Administrative Procedures Act for North Rhine-Westphalia (*Verwaltungsverfahrensgesetz für das Land Nordrhein-Westfalen,* VwVfG NRW).

(3) If the requirements for admission to a module were not met and the student had no intention of acting dishonestly and if this fact becomes apparent only after she/he passed the module in question, the successful completion of the module rectifies the mistake. However, if the student is found to have deliberately gained admission through wrongful means, the Head of the Department is responsible for deciding on the legal consequences, subject to the Administrative Procedures Act for North Rhine-Westphalia (*Verwaltungsverfahrensgesetz für das Land Nordrhein-Westfalen*, VwVfG NRW).

(4) If the requirements for enrolment in the program and thus the requirements for admission to the master's examination were not met and the student had no intention of acting dishonestly and if this fact becomes apparent only after the master's certificate has been issued, the successful completion of the program rectifies the mistake. However, if the student is found to have deliberately gained admission through wrongful means, the Head of the Department is responsible for deciding on the legal consequences, subject to the Administrative Procedures Act for North Rhine-Westphalia (VwVfG NRW).

(5) Before a final decision is made, the student has the right to state her/his case.

(6) The erroneous certificate must be handed back and is replaced with a new certificate if applicable. A decision in accordance with § 23 (1), sentence 2 of (2), (3) and (4) is no longer possible after a period of five years from the issue date of the certificate.

§ 24
Revocation of the Master's Degree

The master's degree may be revoked if it becomes apparent at a later date that the student obtained it through deception or if essential requirements for conferral were erroneously presumed to have been met. § 23 applies accordingly. The Head of the Department is responsible for such decisions.

§ 25
Coming into Force and Publication

These regulations (in their original German version) come into force on the day following their publication in the Official Announcements (*Amtliche Bekanntmachungen*) of the University of Münster. They apply to all students who began their studies in the master's program Physics in or after the winter semester of 2020/21.

Issued (in the original German version) upon resolution by the faculty board of the Department of Physics of the University of Münster on 13 May 2020. These regulations (in the original German version) are hereby announced.

Please note that in accordance with § 12 (5) of the Higher Education Act of the State of North Rhine-Westphalia (HG NRW) violations of procedural regulation as put forth by regulatory laws or other legal provisions pertaining to university autonomy may no longer be claimed after one year following this announcement, unless

1. the regulations were not properly announced,
2. the Rectorate previously raised an objection to the resolution passed by the deciding committee,
3. the University was issued a reprimand for the formal or procedural defect, and was informed of the violated legal provision and the fact that resulted in the defect,
4 the legal consequence of exclusion resulting from such reprimand was not included in the public announcement of the regulations.

Münster, 29 May 2020

The Rector

Prof. Dr. Johannes Wessels

Glossary of English-German translations

alignment studies	*Angleichungsstudien*
assessor	*Beisitzerin/Beisitzer*
Central Office for Foreign Education	*Zentralstelle für ausländisches Bildungswesen*
credit (CP)	*Leistungspunkt (LP)*
Dean of Studies	*Studiendekanin/Studiendekan*
degree-relevant examination	*Prüfungsleistung*
disability certificate	*Behindertenausweis*
elective mandatory module (EM)	*Wahlpflichtmodul (P)*
final module examination (FME)	*Modulabschlussprüfung (MAP)*
examinations office	*Prüfungsamt*
examination regulations	*Prüfungsordnung*
examiner	*Prüferin/Prüfer*
faculty/department	*Fachbereich*
faculty board	*Fachbereichsrat*
German Rectors' Conference	*Hochschulrektorenkonferenz*
Head of Department	*Dekanin/Dekan*
mandatory module (M)	*Pflichtmodul (P)*
module cumulative examination (MCE)	*Modulteilprüfung (MTP)*
required coursework	*Studienleistung*
Standing Conference of the Ministers of Education and Cultural Affairs of the Federal Republic of Germany	*Kultusministerkonferenz (KMK)*

Overview, Recommended Study Plan and Module Descriptions

Module No.	Module	CP	Weight
1	Elective Studies in Physics	6 – 18	0%
2	Professional Specialization and Project Design	30	5%
3	Master's Project	30	45%
4	Physical Specialization I and II (Template module)	14 – 18	17% each
5	Interdisciplinary Studies (Template module)	12 – 15	16%
6	Physical Specialization: Nuclear and Particle Physics	14 – 18	
7	Physical Specialization: Materials Physics	14 – 18	
8	Physical Specialization: Nano and Quantum Technologies	14 – 18	
9	Physical Specialization: Nonlinear Physics	14 – 18	
10	Physical Specialization: Photonics and Magnonics	14 – 18	
11	Physical Specialization: Physics of Solid State-Nanosystems	14 – 18	
12	Interdisciplinary Studies: Business Administration	24	
13	Interdisciplinary Studies: German as a Foreign Language	12 – 15	
14	Interdisciplinary Studies: Geophysics	12 – 15	
15	Interdisciplinary Studies: Computer Science	12 – 15	
16	Interdisciplinary Studies: Mathematics	12 – 15	
17	Interdisciplinary Studies: Molecular Biophysics	12 – 15	
18	Interdisciplinary Studies: Philosophy for Physicists		
18a	with prior Knowledge in Philosophy	12 – 15	
18b	without prior Knowledge in Philosophy	15	
19	Interdisciplinary Studies: Psychology	12	
20	Interdisciplinary Studies: Economics	24	

<table>
<tr><td>Semester</td><td colspan="4">Modules in the M.Sc. Physics program</td></tr>
<tr><td>1</td><td rowspan="2">Elective Studies in Physics

6 – 18 CP (M)</td><td rowspan="2">Physical Specialization I

14 – 18 CP (EM)</td><td rowspan="2">Physical Specialization II

14 – 18 CP (EM)</td><td rowspan="2">Interdisciplinary Studies

12–15 (24) CP (EM)</td></tr>
<tr><td>2</td></tr>
<tr><td>3</td><td colspan="4">Professional Specialization and Project Design

30 CP (M)</td></tr>
<tr><td>4</td><td colspan="4">Master’s Project

30 CP (M)</td></tr>
</table>

M: Mandatory Module EM: Elective Mandatory Module

The modules “Elective Studies in Physics”, “Physical Specialization I”, “Physical Specialization II” as well as the module “Interdisciplinary Studies” must add up to at least 60 credits. The modules Elective Studies in Physics and Physical Specialization I and II must comprise in total at least 8 credits from laboratory courses. At least one of the modules Physical Specialization I and II should contain theoretical parts of at least 5 credits. The exceptional value of 24 credits for the Interdisciplinary Studies given in parentheses only holds if one of the modules “Business Administration” or “Economics” is chosen.

Degree program	**Physics (Master of Science)**
Module	**Elective Studies in Physics**
Module number	1

1	**Basic data**
Program semester	1, 2
Credits (CP)	6 – 18
Workload (h) in total	180 – 540
Module duration	2 semesters
Module status (M/EM)	M

2	**Profile**
Aim of the module / Integration in the curriculum	
The focus of the study program in physics in the first year of the master's program lies on the exemplary deepening of the physical knowledge in the two modules Physical Specialization I and II. Within the module Elective Studies in Physics, students can broaden their competences according to their own interests and career plans by a free choice of courses on advanced physical subjects offered by the Department of Physics, in special cases and upon approval by the Dean of Studies, also by the Department of Mathematics and Computer Science.	
Teaching content	
Upon agreement with the respective providers of the course.	
Learning outcomes	
The students are able to organize independent learning in their own responsibility. The students acquire competences according to their own career plans. With the chosen courses the students have the ability to integrate new knowledge and to make well-founded decisions regarding further specialization in the elective mandatory modules Physical Specialization I and II.	

3	**Structure**					
Module components						
No.	Course category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1			Lectures, exercises, seminars, laboratory courses	EM		
Elective options within the module			From the courses offered by the Department of Physics, in special cases and upon approval by the Dean of Studies also by the Department of Mathematics and Computer Science, the student chooses courses with advanced physical			

	content according to her/his individual interests and career plans. Courses that have already been part of the bachelor's study program of the student cannot be taken again for the master's program.

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	One degree-relevant examination has to be taken. In general, it is related to an exercise, a seminar or a laboratory course. Different from § 18 (1) it is graded only as "passed" ("*bestanden*") or "failed" ("*nicht bestanden*"). Degree-relevant examinations may be: Related to an exercise: Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The solutions of the exercises are graded. Passing usually requires the correct solution of 50 % of the exercises. Related to a seminar: Presentation of a talk. The content and presentation of the talk are graded. Related to laboratory courses: Preparation, carrying out and written elaboration of all required experiments are graded. The individual grades of each experiment will be combined in a total grade, which decides on pass or fail.	Exercise sheets on a weekly or biweekly basis Talk 30 – 45 min Experimental protocols		100%
Weight of the module grade for the final overall grade		The module is graded only in terms of "passed" or "failed". The module grade does not contribute to the final overall grade.			
Required coursework					
No.		Type	Duration/ Scope	Connection to course No., if appl.	
1		Depending on the respective course the credits obtained for the course may be based on required coursework, unless the course is taken for the degree-relevant examination. Required coursework may be: Related to an exercise: Exercise sheets are worked on in self-studies, checked, presented and discussed in small			

	exercise groups by the students. The solutions of the exercises are graded. The successful participation usually requires the correct solution of 50 % of the exercises. Related to a seminar: Presentation of a talk. Related to laboratory courses: Successful, testified implementation and assessment of all required experiments.	Exercise sheets on a weekly or biweekly basis Talk 30 – 45 min Experimental protocols		

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. A regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target. Depending on the chosen module, physical attendance in additional courses may be required.

6	**CP allocation**	
Participation (= attendance time)	No. 1	0,5 CP per SWS
	[…]	
Degree-relevant examination(s)	No. 1	2 CP
Required coursework	No. 1	Exercise: 1,5 CP per SWS Seminar: 1 CP Laboratory course: 1 CP per SWS
	[…]	
Total CP		6 – 18 CP

7	**Module administration**
Frequency	Every semester
Module representative	The Dean of Studies
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	
Module title German	Physikalische Wahlstudien
German translation of the module components from field 3	Course No. 1: Vorlesungen, Seminare, Praktika

9	**Miscellaneous**
	By selecting a sufficient number of courses, the student must ensure that the required total amount of 120 credits for completion of the master's program and the minimal requirements for laboratory courses (see § 10) have to be earned. If courses from outside the Department of Physics are taken, the terms for registration and withdrawal as well as for the participation and the passing of required coursework and degree-relevant examinations are regulated by the examination regulations of the responsible discipline in their current version.

Degree program	**Physics (Master of Science)**
Modul	**Professional Specialization and Project Design**
Module number	2

1	**Basic data**
Program semester	3
Credits (CP)	30
Workload (h) in total	900
Module duration	1 semester
Module status (M/EM)	M

2	**Profile**
Aim of the module / Integration in the curriculum	
Based on research-oriented special courses and the individual familiarization with the subject, the module imparts the scientific basis for the independent work on the master's thesis. The student becomes familiar with the independent acquisition of relevant information, data and literature. Special technical and numerical or mathematic skills forming the basis for the master's thesis are acquired. The cooperation with technical staff of the workshops and the institutes is trained.	
Teaching content	
Introduction to scientific work, elaboration of the detailed contents of the chosen scientific area, familiarization with the current research literature in the field of the planned master's thesis.	
Learning outcomes	
Depending on the requirements of the chosen subject area, the student is familiar with relevant complex experimental facilities, is able to select necessary components and to procure them commercially, knows how to structure extensive calculations in such a way that the results are reliable or to implement numerical algorithms on different computer architectures. For this module the student is already integrated in a scientific research group. By means of this integration she/he has become acquainted with efficient group work and the optimal use of informal knowledge in the close environment.	

3	**Structure**					
Module components						
No.	Course category	Course form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1			Professional specialization and project design	M	0	900

Elective options within the module	Upon arrangement with the module representative the participation in laboratory courses, in research seminars including the presentation of a talk or in further courses may be required.

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Final presentation in the form of a talk or a poster on the subject of the planned master's thesis with discussion in the respective research group	30 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 5% to the final overall grade.			
Required coursework					
No.		Type	Duration/ Scope	Connection to course No., if appl.	

5	**Requirements**
Module-related requirements for participation	At least 30 CP from the master's program has to be achieved.
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	The preparation of the project usually requires participation in the activities of the research group of the supervisor. In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. Depending on the research group the physical attendance in other courses may be required.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	0 CP
Degree-relevant examination(s)	No. 1	30 CP
Required coursework		
Total CP		30 CP

7	**Module administration**
Frequency	Every semester
Module representative	The supervisor of the master's thesis
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	
Module title German	Fachliche Spezialisierung und Projektplanung
German translation of the module components from field 3	Course No. 1: Fachliche Spezialisierung und Projektplanung

9	**Miscellaneous**

Degree program	**Physics (Master of Science)**
Modul	**Master's Project**
Module number	3

1	**Basic data**
Program semester	4
Credits (CP)	30
Workload (h) in total	900
Module duration	1 semester
Module status (M/EM)	M

2	**Profile**
Aim of the module / Integration in the curriculum	
The master's project serves for the scientific formation. In this project the student demonstrates that she/he is able to elaborate independently on a well-defined scientific problem within a research area by using scientific methods, to present the results in scientific diction in written form in master's thesis and in oral form in the final presentation.	
Teaching content	
Upon agreement with the module representative. In the research area chosen for the master's project the student elaborates under the guidance of a scientific supervisor a topical scientific problem.	
Learning outcomes	
In addition to the scientific contents the student has become familiar with relevant key qualifications for the work as a scientist: communication skills (also in the English language), literature research, evaluation of published data and their interpretation, accuracy in experimental work, testing strategies for newly developed programs, the will and power of endurance, writing of scientific papers, if applicable presentation of the results and exchange with other scientists at conferences, if applicable communication with suppliers and workshops.	

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1			Master's project	M	0	900
Elective options within the module			None			

4	Examination structure				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight inthe module grade
1	FME	Master's thesis The master's thesis is evaluated and graded by the examiners. The evaluations are handed in at the Examinations Office by the examiners after the presentation of the talk.	In general at most 80 pages	1	100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 45% to the final overall grade.			
Required coursework					
No.		Type	Duration/ Scope	Connection to Course No., if appl.	
1		Talk on the subject of the master's thesis with subsequent discussion under the participation of first and second examiner.	30 – 45 min	1	

5	Requirements
Module-related requirements for participation	At least 60 CP from the master's program have to be achieved. If the admission to the master's program had been granted under the condition of alignment studies, the successful completion has to be proven before starting with the master's thesis.
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	The experimental and theoretical works of the project require the active participation in the research group of the supervisor corresponding to a full-time occupation.

6	CP allocation	
Participation (= attendance time)	Course No. 1	0 CP
Degree-relevant examination(s)	No. 1	28 CP
Required coursework	No. 1	2 CP
Total CP		30 CP

7	Module administration
Frequency	Every semester
Module representative	The supervisor of the master's thesis
Responsible department	Department of Physics

8	Recognition
Usability in other degree programs	
Module title German	Masterprojekt
German translation of the module components from field 3	Course No. 1: Masterarbeit

9	Miscellaneous

Degree program	**Physics (Master of Science)**
Modul	**Physical Specialization**
Module number	4

1	**Basic data**
Program semester	1, 2
Credits (CP)	14 – 18
Workload (h) in total	420 – 540
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
During their first year in the master's program in physics the students deepen their knowledge exemplarily in two areas of modern physics. This is done in the modules Physical Specialization I and II. As a substitute for one of the predefined modules covering various topical research areas, the Dean of Studies may, upon request of the student, approve a coherent module, which is individually assembled from courses offered by the Department of Physics. The present module description serves as a template for the compilation of an individual module description in consultation with a module representative from the chosen research area.	
Teaching content	
Upon agreement with the module representative.	
Learning outcomes	
The students have acquired advanced knowledge in the subject area of the chosen specialization module and can explain the relevant physical content. They are able to apply their knowledge to current topics in the area. The students can familiarize themselves with an advanced topic within the chosen subject area, prepare a talk addressed to a specific audience, present the talk and defend it in the subsequent discussion. They have the ability to contribute adequately to the scientific discussions on the subjects of the seminar talks.	

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1			Lectures, exercises, seminars, laboratory courses according to the individual module description	EM		

Elective options within the module	Based on prior agreement with a module representative chosen by the student and upon approval by the Dean of Studies thematically coherent courses offered by the Department of Physics with a total workload of 14 – 18 credits are chosen. A module description defining the specific structure of the module is set up and signed by the module representative and the Dean of Studies.

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Oral final examination on the subjects of the module.	30 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 17% to the final overall grade.			

Required coursework				
No.	Type	Duration/ Scope	Connection to course No., if appl.	
1	Depending on the respective course the credits obtained for the course may be based on required coursework, unless the course is taken for the degree-relevant examination. Required coursework may be: Related to an exercise: Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The solutions of the exercises are graded. The successful participation usually requires the correct solution of 50 % of the exercises. Related to a seminar: Presentation of a talk. Related to laboratory courses: Successful, testified implementation and assessment of all required experiments. The amount and form of the required coursework is specified in the individually prepared module description.	Exercise sheets on a weekly or biweekly basis Talk 30 – 45 min Experimental protocols	1	

5	**Requirements**
Module-related requirements for participation	Upon agreement with the module representative.

Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. A regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target. Depending on the chosen module, the physical attendance in further courses may be required.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	0,5 CP per SWS
	[…]	
Degree-relevant examination(s)	No. 1	2 CP
Required coursework	No. 1	Exercise: 1,5 CP per SWS Seminar: 1 CP Laboratory course: 1 CP per SWS
	[…]	
Total CP		14 – 18 CP

7	**Module administration**
Frequency	Every semester
Module representative	University teacher chosen by the student
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	
Module title German	Physikalische Vertiefung
German translation of the module components from field 3	Course No. 1: Vorlesungen, Übungen, Seminare, Praktika

9	**Miscellaneous**
	This module structure serves as a template for an individually composed module “Physical Specialization”. Before starting with the module, the consent of the designated module representative (she/he is also the examiner of the oral final module examination) and the approval by the Dean of Studies have to be obtained. Together with the module representative a module description has to be compiled which in particular defines the amount and form of the required coursework. This module description is signed by the module representative and the Dean of Studies.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary Studies**
Module number	5

1	**Basic data**
Program semester	1, 2
Credits (CP)	12 – 15
Workload (h) in total	360 – 450
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
The goal of the Interdisciplinary studies is to complement the formation in physics by the acquisition of advanced knowledge in another discipline. As a substitute to the predefined modules for different disciplines, upon request of the student the Dean of Studies may approve an individually compiled, coherent module of Interdisciplinary Studies provided it has a reasonable relation with the studies of physics or it serves for the professional qualification. The present module description serves as a template for the compilation of an individual module description in consultation with a module representative from the chosen discipline.	
Teaching content	
Upon agreement with the module representative.	
Learning outcomes	
The students have acquired advanced knowledge in the chosen field and are able to apply this to current topics in the field.	

3	**Structure**					
Module components						
No.	Course-category	Course form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
Elective options within the module			Based on prior agreement with a module representative chosen by the student and upon approval by the Dean of Studies thematically coherent courses in a non-physical discipline with a total workload of 12 – 15 credits are combined. The chosen courses must be in their majority part of master's programs or of bachelor's			

	programs for the fifth or higher semester of the respective discipline. A repetition of courses taken during the bachelor's studies is excluded. The contribution of other disciplines should comprise at least 10 credits. A module description defining the specific structure of the module is set up and signed by the module representative and the Dean of Studies.

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
		Upon agreement with the module representative at least one degree-relevant examination has to be taken. If the module includes more than one examination, the module final grade is determined as the average, weighted by the credits. The number and form of degree-relevant examinations are specified in the individually prepared module description.			
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
	Upon agreement with the module representative at least one required coursework has to be delivered. The amount and form of the required coursework are specified in the individually prepared module description.				

5	**Requirements**
Module-related requirements for participation	Upon agreement with the module representative.
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	Upon agreement with the module representative depending on the necessity of the chosen course.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	X CP
	Course No. 2	X CP
	[…]	

Degree-relevant examination(s)	No. 1	X CP
	[…]	
Required coursework	No. 1	X CP
	[…]	
Total CP		12 – 15 CP

7	**Module administration**
Frequency	Every semester
Module representative	University teacher chosen by the student
Responsible department	Faculty/department of the module representative

8	**Recognition**
Usability in other degree programs	
Module title German	Fachübergreifende Studien
German translation of the module components from field 3	Course No. 1:
	Course No. 2:
	…

9	**Miscellaneous**
	This module structure serves as a template for an individually composed module “Interdisciplinary Studies”. The participation in courses offered by other departments is only possible if there are free capacities. Before starting with the module, the consent of the designated module representative and the approval by the Dean of Studies have to be obtained. Together with the module representative of the responsible department a module description has to be compiled which in particular defines the amount and form of the required coursework and of the degree-relevant examinations. This module description is signed by the module representative and the Dean of Studies.

Degree program	**Physics (Master of Science)**
Modul	**Physical Specialization: Nuclear and Particle Physics**
Module number	6

1	**Basic data**
Program semester	1, 2
Credits (CP)	14 – 18
Workload (h) in total	420 – 540
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

Modern nuclear and particle physics extends our understanding of the fundamental structure of matter into the subatomic range. On length scales of few femtometers three fundamental interactions (strong, electromagnetic and weak) dominate which are described theoretically in the standard model of particle physics. Its predictions, limitations and possible extensions are being experimentally tested in complex accelerator systems and have direct consequences for the evolution of the universe. In the framework of the basic research both theory and experiment operate at the limits of mathematics as well as computer, accelerator and detector technology.

In this module the students are introduced to the relevant experimental techniques and theoretical concepts of nuclear and particle physics.

Teaching content

- Experimental techniques of nuclear and particle physics
- Advanced knowledge on the fundamental constituents of matter and their interactions
- Aspects of the standard model of particle physics and cosmology

Learning outcomes

The students have acquired advanced knowledge in nuclear and particle physics and are able to explain the relevant physical relationships. They know the essential concepts of the standard model of particle physics, the key experiments and current topics in the field.

The students can familiarize themselves with an advanced topic in the field of nuclear and particle physics, prepare a talk addressed to a specific audience, present the talk and defend it in the subsequent discussion. They have the ability to contribute adequately to the scientific discussions on the subjects of the seminar talks.

3	Structure					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1	Lecture		Advanced lecture in the field of nuclear and particle physics: "Nuclear and Particle Physics 2" or "Introduction to quantum field theory"	M	60 h / 4 SWS	60 h
2	Seminar		Seminar in the field of experimental or theoretical nuclear and particle physics	M	30 h / 2 SWS	30 h
3	Laboratory course		Laboratory course on nuclear and particle physics	M	60 h/4 SWS	120 h
4			Advanced lecture, exercise, seminar or laboratory course in the field of nuclear and particle physics	M	depending on the course	depending on the course
Elective options within the module			If the master's thesis is to be written in the field of experimental nuclear and particle physics the lecture "Nuclear and particle physics 2" as well as another advanced lecture from the module are mandatory. If the master's thesis is to be written in the field of theoretical nuclear and particle physics the lectures "Introduction to quantum field theory" and "Introduction to the standard model of particle physics" as well as the successful participation in one of the exercises to these courses are mandatory. Taking into account the subject area and the above-mentioned structural conditions, a free choice of courses offered by the Department of Physics is possible. The individual realization of the module has to be agreed on with the module representative prior to the participation in courses.			

4	Examination structure				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Oral final examination on the subjects of the module.	30 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 17% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	Presentation of a talk.		30 – 45 min	2	

2	Successful, testified implementation and assessment of all required experiments.	Experimental protocols	3	
3	If applicable, depending on the choice of the courses: Solution of exercises, presentation of a talk or successful, testified implementation and assessment of experiments.		4	

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. A regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	2 CP
	Course No. 2	1 CP
	Course No. 3	2 CP
	Course No. 4	0,5 – 6 CP
Degree-relevant examination(s)	No. 1	2 CP
Required coursework	No. 1	1 CP
	No. 2	4 CP
	No. 3	0 – 5,5 CP
Total CP		14 – 18 CP

7	**Module administration**
Frequency	Every semester
Module representative	Prof. Dr. J. Heitger, Prof. Dr. C. Klein-Bösing
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	
Module title German	Physikalische Vertiefung: Kern- und Teilchenphysik
German translation of the module components from field 3	Course No. 1: Vertiefende Vorlesung aus dem Gebiet der Kern- und Teilchenphysik: „Kern- und Teilchenphysik 2“ oder „Einführung in die Quantenfeldtheorie“
	Course No. 2: Seminar auf dem Gebiet der experimentellen oder theoretischen Kern- und Teilchenphysik

	Course No. 3: Praktikum zur Kern- und Teilchenphysik
	Course No. 4: Vertiefende Vorlesung, Übung, Seminar oder Laborpraktikum auf dem Gebiet der Kern- und Teilchenphysik

9	**Miscellaneous**

Degree program	**Physics (Master of Science)**
Modul	**Physical Specialization: Materials Physics**
Module number	*7*

1	**Basic data**
Program semester	1, 2
Credits (CP)	14 – 18
Workload (h) in total	420 – 540
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

The evolution of our society has been and is strongly affected by materials with particular properties. Steel, as an example, consisting of a mixture of iron and carbon, has allowed one to construct buildings of several hundred meters height. High purity silicon as the basic ingredient for the fabrication of electronic devices is at the heart of the digital revolution of our society and is currently partially replaced by organic-inorganic composite materials. The macroscopic properties of a material are essentially determined by defects of different dimensionality, defined as deviations from the ideal crystal structure, which constitute the so-called microstructure of a material. In the examples given above, but also beyond and in the vast majority of all materials the specific macroscopic properties of a material, like, e.g. its hardness or electrical conductivity, are directly related to the often complex and different length scale-covering microstructure and therefore refrain from being accessible by a simple consideration.

In the module, the students are introduced to the description of single- and multi-component materials and their microstructure as well as the coupling between microstructure and property. The description of defects of the crystal lattice as well as their properties and their characterization by using modern methods of materials research are discussed to provide the students with a fundamental understanding of the properties of functional materials.

Teaching content

Lecture materials physics: structure and crystal defects, thermodynamics and constitution, diffusion, phase transitions and reaction kinetics, mechanical properties, classes of functional materials

Laboratory course of materials physics: experimental techniques and basic physical properties of materials

Advanced lectures: choice of, e.g., atomic transport, physics of soft matter and biomaterials, semiconductor physics, polymer physics, material mechanics, nanostructured materials, numerical methods of materials physics

Learning outcomes

The students have acquired advanced knowledge in the physical concepts and methods of materials physics. They are able to contribute to pertinent current research activities.

3	Structure

Module components

No.		Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
						Attendance time (h)/SWS	Self studies (h)
1	1a	Lecture		Materials physics I	M	30 h / 2 SWS	30 h
	1b	Exercise		Exercises to materials physics I	M	15 h / 1 SWS	45 h
2	2a	Lecture		Materials physics II	M	30 h / 2 SWS	30 h
	2b	Exercise		Exercises to materials physics II	M	15 h / 1 SWS	45 h
3		Laboratory course		Laboratory course on materials physics	M	45 h / 3 SWS	105 h
4				At least one advanced lecture, possibly with exercise, or a seminar in the field of materials physics or experimental or theoretical solid-state physics or Implementation of a short research project in a materials physics research group (“mini research”) or Implementation of a project in the context of an internship in industry under scientific supervision of a university teacher of the module	M	depending on the course	depending on the course
Elective options within the module				The courses no.1 – 3 are mandatory. Courses related to no. 4 can be chosen upon agreement with a module representative.			

4	Examination structure

Degree-relevant examination(s)

No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Oral final examination on the subjections of the module.	30 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 17% to the final overall grade.			
Required coursework					

No.	Type	Duration/ Scope	Connection to course No., if appl.	
1	Successful participation in the “Exercises to materials physics I”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The solutions of the exercises are graded. The successful participation usually requires the correct solution of 50 % of the exercises.	Exercise sheets on a weekly or biweekly basis	1b	
2	Successful participation in the “Exercises to materials physics I”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The solutions of the exercises are graded. The successful participation usually requires the correct solution of 50 % of the exercises.	Exercise sheets on a weekly or biweekly basis	2b	
3	Successful, testified implementation and assessment of all required experiments.	10 experimental protocols	3	
4	If applicable, depending on the choice of the courses: Solution of exercises, presentation of a talk or delivery of a final report on the project.		4	

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. If under course. Nr 4 a seminar is chosen, a regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1a	1 CP
	Course No. 1b	0,5 CP
	Course No. 2a	1 CP
	Course No. 2b	0,5 CP
	Course No. 3	1,5 CP
	Course No. 4	0 – 5 CP
Degree-relevant examination(s)	No. 1	2 CP
Required coursework	No. 1	1,5 CP
	No. 2	1,5 CP
	No. 3	3,5 CP

	No. 4	0 – 5 CP
Total CP		14 – 18 CP

7	**Module administration**
Frequency	Every semester
Module representative	Prof. Dr. G. Wilde
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	M.Sc. Geophysics
Module title German	Physikalische Vertiefung: Materialphysik
German translation of the module components from field 3	Course No. 1a: Materialphysik I
	Course No. 1b: Übungen zu Materialphysik I
	Course No. 2a: Materialphysik II
	Course No. 2b: Übungen zu Materialphysik II
	Course No. 3: Praktikum der Materialphysik
	Course No. 4: Mindestens eine vertiefende Vorlesung, ggf. mit Übung, oder ein Seminar aus dem Bereich der Material- oder der experimentellen oder theoretischen Festkörperphysik, oder Durchführung eines kurzen Forschungsprojekts in einer materialphysikalischen Arbeitsgruppe (Miniforschung), oder Durchführung eines Projekts im Rahmen eines Praktikums in der Industrie unter wissenschaftlicher Begleitung durch eine Hochschullehrerin/einen Hochschullehrer des Wahlpflichtmoduls

9	**Miscellaneous**

Degree program	**Physics (Master of Science)**
Modul	**Physical Specialization: Nano and Quantum Technologies**
Module number	8

1	**Basic data**
Program semester	1, 2
Credits (CP)	14 – 18
Workload (h) in total	420 – 540
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

The development of nano and quantum technologies lays the foundations for a variety of revolutionary techniques like semiconductor technology, laser, atomic clock or self-organizing systems. Today, a second round of utilization of quantum technologies can be observed, at the heart of which is the specific manipulation, transfer and read-out of the quantum state of single or coupled quantum systems. Thereby, again completely novel opportunities for applications in information transfer and processing, imaging or sensorics are created. To realize these applications, precise control on the shortest length and time scales and thus the access to nanostructures systems is required. This comprises high-resolution analytical methods for the characterization of the fabricated nanostructures.

In this module, the students are introduced to the physics, technology and characterization methods of nano and quantum systems as well as their properties and potentials. The fabrication and application as well as their characterization by modern methods of quantum physics and analytics are discussed to provide a fundamental understanding of nano and quantum technologies. A special focus of the module is on the practical teaching and the presentation of interdisciplinary content.

Teaching content

The module provides fundamentals and applications of current nano and quantum technologies. This comprises the fields quantum computing, quantum communication, quantum simulation and quantum sensorics as well as modern analytical methods of nanotechnologies. In addition to the application, the practical fabrication of nanostructures and their analytics is subject of the module.

Learning outcomes

The students have acquired advanced knowledge in the field of nano and quantum technologies and become familiar with modern techniques for the fabrication and characterization of nanostructures. They know the current research topics in the field and can contribute actively to the current research. The students have obtained basic knowledge in nanofabrication and nanoanalytics based on practical work in the clean room and the lab.

The students are able to familiarize themselves with an advanced topic in the field of nano and quantum technologies, prepare a talk addressed to a specific audience, present the talk and defend it in the subsequent

discussion. They have the ability to contribute adequately to the scientific discussions on the subjects of the seminar talks.

3	Structure					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1	Lecture		Two advanced lectures in the field of nanotechnology and quantum technology	M	60 h / 4 SWS	60 h
2	Seminar		Seminar on Nano and Quantum Technology: Fundamentals and Applications	M	30 h / 2 SWS	30 h
3	Laboratory course		Laboratory Course: Nanofabrication and Nanoanalytics	M	60 h / 4 SWS	120 h
4			At least one additional course with subjects related to nano and quantum technology	M	depending on the course	depending on the course
Elective options within the module			Taking into account the subject area and the above-mentioned structural conditions, a free choice of courses offered by the Department of Physics is possible. The individual realization of the module has to be agreed on with the module representative prior to the participation in courses.			

4	Examination structure				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Oral final examination on the subjects of the module	30 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 17% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	Presentation of a talk.		30 – 45 min	2	
2	Successful, testified implementation and assessment of all required experiments in the field of nanofabrication and nanoanalytics.		Final report	3	
3	If applicable, depending on the choice of the courses: Solution of exercises, presentation of a talk or successful, testified implementation and assessment of experiments.			4	

5	Requirements
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. A regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target.

6	CP allocation	
Participation (= attendance time)	Course No. 1	2 CP
	Course No. 2	1 CP
	Course No. 3	2 CP
	Course No. 4	0 – 6 CP
Degree-relevant examination(s)	No. 1	2 CP
Required coursework	No. 1	1 CP
	No. 2	4 CP
	No. 3	0 – 6 CP
Total CP		14 – 18 CP

7	Module administration
Frequency	Every semester
Module representative	Prof. Dr. W. Pernice, Prof. Dr. H. F. Arlinghaus
Responsible department	Department of Physics

8	Recognition
Usability in other degree programs	
Module title German	Physikalische Vertiefung: Nano- und Quantentechnologien
German translation of the module components from field 3	Course No. 1: Zwei vertiefende Vorlesungen aus dem Gebiet der Nano- und Quantentechnologie
	Course No. 2: Seminar zur Nano- und Quantentechnologie: Grundlagen und Anwendungen
	Course No. 3: Praktikum zur Nanofertigung und Nanoanalytik
	Course No. 4: Mindestens eine weitere Veranstaltung nach Wahl mit Inhalten der Nano- und Quantentechnologie

9	Miscellaneous

Degree program	**Physics (Master of Science)**
Modul	**Physical Specialization: Nonlinear Physics**
Module number	*9*

1	**Basic data**
Program semester	1, 2
Credits (CP)	14 – 18
Workload (h) in total	420 – 540
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

Nonlinear effects show up in everyday life and in nature. Particularly fascinating examples are patterns on animal fur, turbulent weather phenomena, spatio-temporal structures in the behavior of sand or optical patterns. But also, collective phenomena in biology and social sciences like the formation of swarms, neural network structures or group dynamics can be studied by using methods of nonlinear physics. In many physical, chemical, biological or also social systems which, due to energy or information flow, are kept far from thermal equilibrium, nonlinear effects lead to the formation of spatio-temporal patterns.

The goal of the module is to introduce important phenomena and the terminology of nonlinear physics in a general form and to address in depth selected topics. For this purpose, it involves both theoretical and experimental approaches. Students get a comprehensive understanding of nonlinear physics, ranging from the classification of stationary, oscillating and chaotic behavior in systems with few degrees of freedom via the spontaneous formation of structures in spatially extended systems up to nonlinear wave phenomena and turbulence, and apply it to examples in hydrodynamics, nanophysics, biophysics and optics. The module furthermore provides the opportunity to participate in the activities of the interdisciplinary Center for Nonlinear Science. Thus, in addition to many examples in the field of physics also complex systems in biology, chemistry, medicine or social sciences are addressed.

Teaching content

The module contains theoretical and experimental topics. The focus of the studies can be more on the theoretical or the experimental side. In each combination of courses, the fundamental concepts of nonlinear physics like signatures of nonlinear and complex systems, emergence, self-organization, bifurcations, attractors or pattern formation will be addressed and specific examples of nonlinear systems will be treated. Thereby, typical nonlinear model equations and their generic properties as well as exemplary experimental systems and their applications will be discussed.

Learning outcomes

The students have developed an understanding of the fundamental concepts of nonlinear physics and are able to understand on this basis the role of nonlinearities in various physical, chemical or biological systems. They

have learned relevant methods for the theoretical and/or experimental analysis of nonlinear systems and developed skills to apply those to specific theoretical or experimental physical problems.

The students can familiarize themselves with an advanced topic in the field of nonlinear physics, prepare a talk addressed to a specific audience, present the talk and defend it in the subsequent discussion. They have the ability to contribute adequately to the scientific discussions on the subjects of the seminar talks.

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1 1a	Lecture		Two basic or advanced lectures in the field of nonlinear physics	M	60 h / 4 SWS	30 – 60 h
1b	Exercise		Exercises to a lecture from No. 1a	M	15 h / 1 SWS	45 h
2	Seminar		Seminar on nonlinear physics	M	30 h / 2 SWS	30 h
3	Laboratory course		Laboratory Course: Nonlinear Physics	M	45 h / 3 SWS	90 h
4			Additional lecture, possibly with exercises, or seminar in the field of Nonlinear Physics or Research project on a nonlinear physical problem ("mini-research") or implementation of a project within the framework of the interdisciplinary course "Nonlinear Modeling in Science" or internship in business or an external university or research institution under the scientific supervision of a university teacher of the module.	M	depending on the course	depending on the course
Elective options within the module			Taking into account the subject area and the above-mentioned structural conditions, a free choice of courses offered by the Department of Physics is possible. The individual realization of the module has to be agreed on with the module representative prior to the participation in courses.			

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course no., if appl.	Weight in the module grade

1	FME	Oral final examination on the subjects of the module.	30 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 17% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course no., if appl.	
1	Successful participation in an exercise. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The solutions of the exercises are graded. The successful participation usually requires the correct solution of 50 % of the exercises.		Exercise sheets on a weekly or biweekly basis	1b	
2	Presentation of a talk.		30 – 45 min	2	
3	Successful, testified implementation and assessment of all required experiments.		Experimental protocols	3	
4	If applicable, depending on the choice of the courses: Solution of exercises, presentation of a talk or successful, testified implementation and assessment of experimental and/or theoretical tasks.			4	

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. A regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1a	2 CP
	Course No. 1b	0,5 CP
	Course No. 2	1 CP
	Course No. 3	1,5 CP
	Course No. 4	0 – 5,5 CP
Degree-relevant examination(s)	No. 1	2 CP
Required coursework	No. 1	1,5 CP
	No. 2	1 CP
	No. 3	3 CP

	No. 4	0 – 5,5 CP
Total CP		14 – 18 CP

7	**Module administration**
Frequency	Every semester
Module representative	Prof. Dr. C. Denz, Prof. Dr. S. Linz
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	M.Sc. Geophysics
Module title German	Physikalische Vertiefung: Nichtlineare Physik
German translation of the module components from field 3	Course No. 1a: Zwei Vorlesungen auf grundlegendem oder vertieftem Niveau aus dem Bereich der nichtlinearen Physik
	Course No. 1b: Übungen zu einer Vorlesung aus Nr. 1a
	Course No. 2: Seminar zur Nichtlinearen Physik
	Course No. 3: Praktikum zur Nichtlinearen Physik
	Course No. 4: Weitere Vorlesung, ggf. mit Übungen, oder Seminar aus dem Gebiet der Nichtlinearen Physik, oder Forschungsprojekt zu einem nichtlinear-physikalischen Problem („Mini-Forschung“), oder Durchführung eines Projekts im Rahmen des interdisziplinären Praktikums „Nichtlineare Modellierung in den Naturwissenschaften“, oder Durchführung eines Praktikums in der Wirtschaft oder einer auswärtigen Universität oder Forschungseinrichtung unter wissenschaftlicher Begleitung durch eine Hochschullehrerin/einen Hochschullehrer des Wahlpflichtmoduls.

9	**Miscellaneous**

Degree program	**Physics (Master of Science)**
Modul	**Physical Specialization: Photonics and Magnonics**
Module number	10

1	**Basic data**
Program semester	1, 2
Credits (CP)	14 – 18
Workload (h) in total	420 – 540
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

For many years the physics of waves and their applications in optics, electronics and magnetism has been driving important application fields like photonics and magnonics. They are considered as disruptive technologies of information processing of tomorrow. At the same time optics and magnetism are distinctive for current quantum technologies.

In this module students learn, building upon the basics of wave physics, the description of optics and magnetism from the point of view of quantum and information technologies. After basic introductions in the subject this application perspective leads to topical areas like spintronics, the physics of ultrashort laser pulses as well as to micro-, nano- and biophotonics, which are taught with modern interactive, experimental and digital teaching methods.

Teaching content

Treatment of application-related problems by means of case studies; systematic treatment of an application area from optics, photonics, magnonics and the application of waves.

Learning outcomes

Based on the example of photonics and magnonics, the students have learned to transfer basic physical insights to application-relevant problems. They have acquired advanced knowledge in optics, photonics, magnonics and the application of waves and developed an understanding of the role of non-physical (e.g. economic and social) aspects.

The students can familiarize themselves with an advanced topic in the field of photonics and magnonics, prepare a talk addressed to a specific audience, present the talk and defend it in the subsequent discussion. They have the ability to contribute adequately to the scientific discussions on the subjects of the seminar talks.

3	Structure					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1 1a	Lecture		Basic and advanced lectures in the field of photonics and magnonics	M	30 h / 2 SWS	30 – 60 h
1 1b	Exercise		Exercises to a lecture from No. 1a or No. 4	M	15 h / 1 SWS	45 h
2	Seminar		Seminar on Photonics and Magnonics	M	30 h / 2 SWS	30 h
3	Laboratory course		Laboratory Course: Photonics and Magnonics	M	45 h / 3 SWS	90 h
4			Additional course in the field of Photonics and Magnonics or Additional laboratory course in Photonics and Magnonics or Research project on an application-related problem ("mini-research") or Implementation of a physical-technical project as part of an internship in business or an external university or research institution under the scientific supervision of a university teacher of the module	M	depending on the course	depending on the course
Elective options within the module			Taking into account the subject area and the above-mentioned structural conditions, a free choice of courses offered by the Department of Physics is possible. The individual realization of the module has to be agreed on with the module representative prior to the participation in courses.			

4	Examination structure				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Oral final examination on the subjects of the module.	30 – 45 min		100%

Weight of the module grade for the final overall grade		The module grade contributes with the weight 17% to the final overall grade.		
Required coursework				
No.	Type	Duration/ Scope	Connection to course No., if appl.	
1	Successful participation in an exercise. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The solutions of the exercises are graded. The successful participation usually requires the correct solution of 50 % of the exercises.	Exercise sheets on a weekly or biweekly basis	1b	
2	Presentation of a talk.	30 – 45 min	2	
3	Successful, testified implementation and assessment of all required experiments.	Experimental protocols	3	
4	Successful completion of the experimental and applied tasks and documentation of the solutions.	Final report	4	

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. A regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1a	1 CP
	Course No. 1b	0,5 CP
	Course No. 2	1 CP
	Course No. 3	1,5 CP
	Course No. 4	0 – 6,5 CP
Degree-relevant examination(s)	No. 1	2 CP
Required coursework	No. 1	1,5 CP
	No. 2	1 CP
	No. 3	3 CP
	No. 4	0 – 6,5 CP
Total CP		14 – 18 CP

7	**Module administration**
Frequency	Every semester
Module representative	Prof. Dr. C. Denz, Prof. Dr. S. Demokritov
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	
Module title German	Physikalische Vertiefung: Photonik und Magnonik
German translation of the module components from field 3	Course No. 1a: Grundlegende oder vertiefende Vorlesung aus dem Bereich der Photonik und Magnonik
	Course No. 1b: Übung zu einer Vorlesung aus No. 1a oder No. 4
	Course No. 2: Seminar zur Photonik und Magnonik
	Course No. 3: Praktikum zur Photonik und Magnonik
	Course No. 4: Weitere Vorlesung, ggf. mit Übungen, oder Seminar aus dem Gebiet der Photonik und Magnonik, oder zusätzliche Versuche im Forschungsbereich, oder Forschungsprojekt zu einem anwendungsbezogenen Problem ("Mini-Forschung"), oder Durchführung eines physikalisch-technischen Projekts im Rahmen eines Praktikums in der Wirtschaft oder einer auswärtigen Universität oder Forschungseinrichtung unter wissenschaftlicher Begleitung durch eine Hochschullehrerin/einen Hochschullehrer des Wahlpflichtmoduls.

9	**Miscellaneous**

Degree program	**Physics (Master of Science)**
Modul	**Physical Specialization: Physics of Solid State Nanosystems**
Module number	11

1	**Basic data**
Program semester	1, 2
Credits (CP)	14 – 18
Workload (h) in total	450 – 540
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

Solid state structures with characteristic dimensions in the nanometer range constitute the basis for most devices in the field of modern electronics, spintronics and optoelectronics. Modern material systems like, e.g., graphene, two-dimensional semiconductors, topological materials or quantum dot structures are furthermore subjects of many topical research activities, since the spatial confinement of electrons, phonons, photons or other quasiparticles on a nanometer scale results in a variety of new effects, which are not present in macroscopic solids.

In the module, students are introduced to experimental techniques and theoretical concepts used in current research activities for the investigation and description of such solid-state nanosystems.

Teaching content

Experimental and theoretical treatment of selected chapters of solid-state physics regarding structures with characteristic dimensions in the nanometer range.

Learning outcomes

The students have acquired advanced knowledge in the field of physics of solid-state systems with characteristic dimension in the nanometer range. They are familiar with experimental techniques for their investigation and theoretical models for their description. They have become acquainted with the qualitatively new effects resulting from the spatial confinement on a nanometer scale and their relevance for applications.

The students can familiarize themselves with an advanced topic in the field of physics of solid-state nanosystems, prepare a talk addressed to a specific audience, present the talk and defend it in the subsequent discussion. They have the ability to contribute adequately to the scientific discussions on the subjects of the seminar talks.

3	**Structure**

Module components

No.		Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
						Attendance time (h)/SWS	Self studies (h)
1	1a	Lecture		Quantum Theory of Solids	M	45 h / 3 SWS	45 h
	1b	Exercise		Exercises to Quantum Theory of Solids	M	15 h / 1 SWS	45 h
2		Lecture		Lecture in the field of modern experimental solid-state physics	M	30 h / 2 SWS	30 h
3		Seminar		Seminar on current topics of experimental or theoretical solid-state physics	M	30 h / 2 SWS	30 h
4		Laboratory course		Laboratory Course: Solid-State Spectroscopy	M	45 h / 3 SWS	90 h
5				At least one additional lecture in the field of modern experimental or theoretical solid-state physics, possibly with exercises, or Additional laboratory course in the field of solid-state spectroscopy	M	depending on the course	depending on the course
Elective options within the module				Taking into account the subject area and the above-mentioned structural conditions, a free choice of courses offered by the Department of Physics is possible. The individual realization of the module has to be agreed on with the module representative prior to the participation in courses.			

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Oral final examination on the subject of the module.	30 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 17% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	Successful participation in the “Exercises to quantum theory of solids”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The solutions of the exercises are graded. The successful participation		Exercise sheets on a weekly or biweekly basis	1b	

	usually requires the correct solution of 50 % of the exercises.			
2	Presentation of a talk.	30 – 45 min	3	
3	Successful, testified implementation and assessment of all required experiments.	Experimental protocols	4	
4	If applicable, depending on the choice of the courses: Solution of exercises, presentation of a talk or successful, testified implementation and assessment of the additional experiments on solid-state spectroscopy.		5	

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is necessary because the competence to perform physics experiments can be acquired only by actually dealing with the provided laboratory equipment. In case of absence for a substantial reason alternative dates are offered. A regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1a	1,5 CP
	Course No. 1b	0,5 CP
	Course No. 2	1 CP
	Course No. 3	1 CP
	Course No. 4	1,5 CP
	Course No. 5	0 – 5 CP
Degree-relevant examination(s)	No. 1	2 CP
Required coursework	No. 1	1,5 CP
	No. 2	1 CP
	No. 3	3 CP
	No. 4	0 – 5 CP
Total CP		14 – 18 CP

7	**Module administration**
Frequency	Every semester
Module representative	Prof. Dr. M. Donath, Prof. Dr. T. Kuhn
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	
Module title German	Physikalische Vertiefung: Physik von Festkörper-Nanosystemen

German translation of the module components from field 3	Course No. 1a: Quantentheorie des Festkörpers
	Course No. 1b: Übungen zur Quantentheorie des Festkörpers
	Course No. 2: Vorlesung aus dem Gebiet der modernen experimentellen Festkörperphysik
	Course No. 3: Seminar zu aktuellen Problemen der experimentellen oder theoretischen Festkörperphysik
	Course No. 4: Praktikum zur Festkörperspektroskopie
	Course No. 5: Mindestens eine weitere Vorlesung aus der modernen experimentellen oder theoretischen Festkörperphysik, ggf. mit Übungen, oder zusätzliche Versuche im Forschungsbereich

9	**Miscellaneous**

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary Studies: Business Administration**
Module number	12

1	**Basic data**
Program semester	1, 2
Credits (CP)	24
Workload (h) in total	720
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

The students deepen their knowledge in business administration acquired during the bachelor's program in a focus area of business administration (accounting, finance or marketing).

Teaching content

The students have to choose exactly one of the following three specializations (Minor):

1. Minor Accounting:

   Courses as specified from the elective mandatory area I and elective mandatory area II have to be taken.

   Elective mandatory area I: (1 out of 3 courses with 6 CP each from the bachelor's program in business administration)
   - balance sheets I (summer semester)
   - Fundamentals of business taxation (summer semester)
   - Controlling (winter semester)

   Elective mandatory area II (3 out of 5 courses with 6 CP each from the master's program in business administration:
   - Strategic Management Accounting (winter semester)
   - Financial Accounting (winter semester)
   - International business taxation (winter semester)
   - International Controlling (summer semester)
   - From Data to Insights: Driving Corporate Performance (summer semester)

2. Minor Finance:

Mandatory: Corporate Finance (6 CP, summer semester) (from the bachelor's program in business administration)
Elective mandatory (3 out of 4 courses with 6 CP each from the master's program in business administration):

- Introduction to Advanced Finance (winter semester)
- Behavioral Finance (winter semester)
- Derivatives I (winter semester)
- Finance intermediation I (summer semester)

3. Minor Marketing:

Mandatory: Fundamentals of Marketing (6 CP, winter semester) (from the bachelor's program in business administration)
Elective mandatory: (3 out of 4 courses with 6 CP each from the master's program in business administration):

- Advanced Market Research (winter semester)
- Consumer Behavior (winter semester)
- Media Marketing (winter semester)
- Innovation Management (winter semester)

Learning outcomes
The students have gained deeper insights in special areas of business administration.

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1	Lecture/ Exercise		Specialization course in Business Administration I	M	60 h / 4 SWS	120 h
2	Lecture/ Exercise		Specialization course in Business Administration II	M	60 h / 4 SWS	120 h
3	Lecture/ Exercise		Specialization course in Business Administration III	M	60 h / 4 SWS	120 h
4	Lecture/ Exercise		Specialization course in Business Administration IV	M	60 h / 4 SWS	120 h
Elective options within the module			Exactly one Minor out of the three available Minors (Accounting, Finance, Marketing) has to be chosen. Within the Minor Finance and the Minor Marketing there is one mandatory course (6 CP). Furthermore, three out of four elective mandatory courses (6 CP each) have to be chosen. Within the Minor Accounting there are two elective mandatory areas. In the elective mandatory area I exactly one course (6 CP) has to be chosen, in the elective mandatory area II three out of five courses (6 CP each) have to be chosen.			

4	**Examination structure**
Degree-relevant examination(s)	

No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1		Depending on the chosen specialization. The required degree-relevant examinations can be found in the currently valid examination regulations of the B.Sc. and M.Sc. programs in Business Administration.			
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.		Type	Duration/ Scope	Connection to course No., if appl.	
1		Depending on the chosen specialization. The required coursework can be found in the currently valid examination regulations of the bachelor's and master's programs in Business Administration.			

5	**Requirements**
Module-related requirements for participation	Proven knowledge in business administration or economics based on appropriate courses amounting to 18 CP (e.g. from Interdisciplinary Studies in the Bachelor's program in Physics).
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	-

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	2 CP
	Course No. 2	2 CP
	Course No. 3	2 CP
	Course No. 4	2 CP
Prüfungs-/Required coursework	No. 1	4 CP
	No. 2	4 CP
	No. 3	4 CP
	No. 4	4 CP
Total CP		24 CP

7	**Module administration**
Frequency	Every semester
Module representative	Depending on the chosen courses
Responsible department	Faculty of Business and Economics (FB 04)

8	Recognition	
Usability in other degree programs		Depending on the course: Bachelor Business Administration or Master Business Administration
Module title German		Fachübergreifende Studien: Betriebswirtschaftslehre
German translation of the module components from field 3		Course No. 1: BWL-Modul I
		Course No. 2: BWL-Modul II
		Course No. 3: BWL-Modul III
		Course No. 4: BWL-Modul IV

9	Miscellaneous
	The terms for registration and withdrawal as well as for the participation and the passing of required coursework and degree-relevant examinations are regulated by the examination regulations of the Faculty of Business and Economics. The participation in any degree-relevant examination requires the prior registration either electronically or in person at the Examinations Office of the Faculty of Business and Economics.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary Studies: German as a Foreign Language**
Module number	13

1	**Basic data**
Program semester	1, 2
Credits (CP)	12 – 15
Workload (h) in total	360 – 450
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
The goal of the module is to provide or improve the knowledge of the German language for students who have started the master's program in physics without or with limited knowledge in German. In different courses the listening understanding, reading understanding, the ability to express themselves in oral and written way are enhanced and thus the capability to communicate in the German language is provided.	
Teaching content	
The teaching content depends on the chosen courses.	
Learning outcomes	
The students are enabled to deal with every day and study-related communication situations.	

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1	Course	Language course	Level A1.1 – German for Beginners	EM	60 h / 4 SWS	120 h
2	Course	Language course	Level A1.2 – Basic level 1: German for Advanced Beginners	EM	60 h / 4 SWS	120 h
3	Course	Language course	Level A2 – Basic level 2: German for Advanced Students	EM	60 h / 4 SWS	120 h

4	Course	Language course	Level A2 – Basic level 2: German Phonetics	EM	30 h / 2 SWS	60 h
5	Exercise	Language course	Level B1 – Intermediate level 1: German Conversation and Listening Comprehension	EM	60 h / 4 SWS	120 h
6	Exercise	Language course	Level B1 – Intermediate level 1: Communicative Exercises to train Intercultural Competence, Target Culture Germany (Workshop)	EM	15 h / 1 SWS	45 h
7	Exercise	Language course	Level B1 – Intermediate level 1: Exercises in Reading Comprehension	EM	30 h / 2 SWS	60 h
8	Exercise	Language course	Level B1 – Intermediate level 1: Exercises in Writing	EM	30 h / 2 SWS	60 h
9	Exercise	Language course	Level B1 – Intermediate level 1: Communicative Grammar	EM	30 h / 2 SWS	60 h
10	Exercise	Language course	Level B1 – Intermediate level 1: German Phonetics	EM	30 h / 2 SWS	60 h
11	Exercise	Language course	Level B1 – Intermediate level 1 or for level B2 – Intermediate level 2: Listening Comprehension Self-study Module	EM	30 h / 2 SWS	60 h
12	Exercise	Language course	Level B2 - Intermediate level 2: German Conversation and Listening Comprehension	EM	60 h / 4 SWS	120 h
13	Course	Language course	Level B2 – Intermediate level 2 or for level C1 – advanced level: German for Specific Purposes: Natural Science, Medicine and Pharmacy (Emphasis: Writing Skills)	EM	30 h / 2 SWS	60 h
14	Course	Language course	Level B2 – Intermediate level 2 or for level C1 – advanced level: German for Specific Purposes: Natural Science, Medicine and Pharmacy (Emphasis: Reading Skills)	EM	30 h / 2 SWS	60 h
15	Exercise	Language course	Level B2 – Intermediate level 2: Communicative Grammar	EM	30 h / 2 SWS	60 h
Elective options within the module			Depending on the initial level of the student different courses from the program offered by the language center that lead at least to final level A1.2 can be compiled individually. The sum of credits has to be at least 12 CP. The courses are selected in consultation with the module representative.			

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade

1	MCE	Depending on the chosen course an examination has to be passed. Depending on the course, the degree-relevant examinations are conducted as a written examination, an oral examination, a term paper and/or an oral presentation. The type of the examination will be announced at the beginning of the respective course.	Written examination: 90 min, oral examination: 10 min, term paper 7-9 pages, oral presentation: 15 min	1 – 15	The module grade is calculated as average of the individual grades weighted by the credits.
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	In each course required coursework has to be completed. The type of the required coursework will be announced at the beginning of the course.		7.5 h/week	1, 2, 3, 5, 12	
2	In each course required coursework has to be completed. The type of the required coursework will be announced at the beginning of the course.		2.5 h/week	4, 7, 8, 9, 10, 11, 13, 14, 15	
3	In each course required coursework has to be completed. The type of the required coursework will be announced at the beginning of the course.		1.5 h/week	6	

5	**Requirements**
Module-related requirements for participation	This module can only be taken by students who have started the master's program with a limited language competence in German below the level DSH-2 Level (C1). Precondition for participation in the courses starting from the level A1.2 is an outcome of the entry-level test (*C-Test*) according to the respective level of the course.
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	Regular physical attendance is required since language competence is acquired by mutual communication. In courses with a weekly scope of 4 h (4 SWS) at most 8 hours (4 course meetings), in courses with a weekly scope of 2 h (2 SWS) at most 4 hours (2 course meetings) may be missed. In case of missing of the obligation of physical attendance participation in the examination of the respective course is not possible.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1, 2, 3, 5, 12	2 CP per course
	Course No. 4, 7, 8, 9, 10, 11, 13, 14, 15	1 CP per course
	Course No. 6	0,5 CP

Degree-relevant examination(s)	No. 1	1 CP per course no. 1 – 15
Required coursework	No. 1	3 CP per course no. 1, 2, 3, 5, 12
	No. 2	1 CP per course no. 4, 7, 8, 9, 10, 11, 13, 14, 15
	No. 3	0,5 CP course no. 6
Total CP		12 – 15 CP

7	**Module administration**
Frequency	Every semester except for the technical language courses (summer semester: focus writing; winter semester: focus reading)
Module representative	The Head of the Language Center (*Sprachenzentrum)*/ The coordinator German as a Foreign Language parallel to studies
Responsible department	Language Center (*Sprachenzentrum*)

8	**Recognition**
Usability in other degree programs	
Module title German	Fachübergreifende Studien: Deutsch als Fremdsprache
German translation of the module components from field 3	Course No. 1: Niveau A1.1 – Deutsch für Anfänger
	Course No. 2: Niveau A1.2 – Grundstufe 1: Deutsch für fortgeschrittene Anfänger
	Course No. 3: Niveau A2 – Grundstufe 2: Deutsch für Fortgeschrittene
	Course No. 4: Niveau A2 – Grundstufe 2: Phonetik Deutsch
	Course No. 5: Niveau B1 – Mittelstufe 1: Konversationsübungen und Übungen zum Hörverstehen
	Course No. 6: Niveau B1 – Mittelstufe 1: Kommunikative Übungen zur Schulung der interkulturellen Kompetenz, Zielkultur Deutschland (Workshop)
	Course No. 7: Niveau B1 – Mittelstufe 1: Übungen zum Leseverstehen
	Course No. 8: Niveau B1 – Mittelstufe 1: Übungen zum Schreiben
	Course No. 9: Niveau B1 – Mittelstufe 1: Grammatik kommunikativ
	Course No. 10: Niveau B1 – Mittelstufe 1: Phonetik Deutsch
	Course No. 11: Niveau B1 – Mittelstufe 1 oder Niveau B2 – Mittelstufe 2: Selbstlernmodul zur Verbesserung des Hörverstehens
	Course No. 12: Niveau B2 – Mittelstufe 2: Konversationsübungen und Übungen zum Hörverstehen
	Course No. 13: Niveau B2 – Mittelstufe 2 oder Niveau C1 – Oberstufe: Fachsprache Medizin, Naturwissenschaften und Pharmazie (Schwerpunkt Schreiben)
	Course No. 14: Niveau B2 – Mittelstufe 2 oder Niveau C1 – Oberstufe: Fachsprache Medizin, Naturwissenschaften und Pharmazie (Schwerpunkt Lesen)
	Course No. 15: Niveau B2 – Mittelstufe 2: Grammatik kommunikativ

9	**Miscellaneous**
	The terms for registration and withdrawal as well as for the participation and the passing of required coursework and degree-relevant examinations are regulated by the Language center (*Sprachenzentrums*).

	Remark: Students who successfully pass this module do not obtain a certificate. In particular, they don't obtain the right to be admitted to a study program which requires knowledge of the German language on the level DSH-1 or DSH-2. However, students can obtain the certificate UNIcert II (corresponding to B2) or UNIcert III (corresponding to DSH-2) at the language center, if after successful participation in the conversation, reading and writing courses they pass a final examination.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary studies: Geophysics**
Module number	14

1	**Basic data**
Program semester	1, 2
Credits (CP)	12 – 15
Workload (h) in total	360 – 450
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

The module enables the students to acquire specialized knowledge from different areas of geophysics. Depending on their interest they can combine courses from theoretical geophysics (course blocks 1 – 3), seismology (course blocks 4 and 5) or applied geophysics (course blocks 6 – 8).

Teaching content

Geophysical continuum and fluid dynamics:
Basic concepts for the description of geophysical continua; mechanical and thermodynamical conservation laws to describe continuum mechanical processes in geophysics; material laws and rheology; fundamental equations for the description of the dynamics of the atmosphere, ocean cryosphere and earth mantle.

Advanced geophysical fluid dynamics:
Recapitulation of the basic general continuum mechanical and fluid dynamical equations; in geophysics used simplifications of these equations; flows in rotating systems; important boundary layer phenomena in geophysics; flows in stable layered fluids; gravity waves, instability and turbulence in geophysical systems; convection; dynamics of the earth mantle.

Numerical simulation of geophysical processes:
Generally used numerical techniques for the simulation of geophysical systems; finite differences, finite volumes, finite elements and spectral methods; advanced techniques for the solution of linear and nonlinear systems of equations.

Global seismology, structures and processes in the interior of the earth:
Global seismology, anisotropy, damping, scattering; seismological investigation of earth structures; fundamentals of seismic modelling.

Advanced seismology:
Advanced seismological concepts for the study of the earth, e.g. Green's functions, noise studies, monitoring, herd inversion, array seismology, mislocation vectors, conceptual design of arras and advanced signal processing and modelling of wave propagation.

Applied geophysics 2:

Theoretical basis of potential methods; theoretical basis of electromagnetic induction techniques; Debye potentials, sources, Green's functions, model responses of layered half spaces; special applications in exploration geophysics.

Modelling and inversion:
Methods for the solution of linear and non-linear inversion problems; deterministic and probabilistic solution techniques, distance methods, application of vector spaces, regularization of badly posed problems, robust regression, gradient methods.

Magnetotellurics:
Theory and practice of the methods for electromagnetic deep sounding and in particular magnetotellurics, processing of time series, analysis of transfer functions, inversion, application fields in lithosphere research and exploration geophysics.

Learning outcomes

Advanced knowledge in fields related to the research areas of the Institute of Geophysics (theoretical geophysics, seismology and applied geophysics) is obtained.

3	**Structure**					
Module components						
No.		Course-category	Course-form	Course	Status (M/EM)	Workload (h)
						Attendance time (h)/SWS / Self studies (h)
1	1a	Lecture		Geophysical Continuum and Fluid Dynamics	EM	30 h/ 2 SWS / 30 h
	1b	Exercise		Geophysical Continuum and Fluid Dynamics (Practical)	EM	30 h / 2SWS / 45 h
2	2a	Lecture		Advanced Geophysical Fluid Dynamics	EM	30 h / 2 SWS / 30 h
	2b	Exercise		Advanced Geophysical Fluid Dynamics (Practical)	EM	15 h / 1 SWS / 45 h
3	3a	Lecture		Numerical Simulation of Geophysical Processes	EM	30 h / 2 SWS / 30 h
	3b	Exercise		Numerical Simulation of Geophysical Processes (Practical)	EM	30 h / 2SWS / 90 h
4	4a	Lecture		Global Seismology, Structure and Processes in the Interior of the Earth	EM	30 h / 2 SWS / 30 h
	4b	Exercise		Global Seismology, Structure and Processes in the Interior of the Earth (Practical)	EM	15 h / 1 SWS / 45 h
5	5a	Lecture		Advanced Seismology	EM	30 h / 2 SWS / 30 h
	5b	Exercise		Advanced Seismology (Practical)	EM	30 h / 2 SWS / 90 h
6	6a	Lecture		Applied Geophysics 2	EM	30 h / 2 SWS / 30 h
	6b	Exercise		Applied Geophysics 2 (Practical)	EM	15 h / 1 SWS / 45 h
7	7a	Lecture		Modelling and Inversion	EM	30 h / 2 SWS / 30 h
	7b	Exercise		Modelling and Inversion (Practical)	EM	15 h / 1 SWS / 45 h
8	8a	Lecture		Magnetotellurics	EM	30 h / 2 SWS / 30 h
	8b	Exercise		Magnetotellurics (Practical)	EM	15 h / 1 SWS / 45 h
Elective options within the module				The student chooses three out of the eight course blocks 1 – 8. When choosing the blocks 2 or 3, it is recommended to choose also the block 1 "Geophysical continuum and fluid dynamics". Students can earn at most 15 credits.		

4	Examination structure				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Oral final examination on the chosen subjects of the module. The participation in the final module examination requires the prior successful completion of all required coursework in the chosen course blocks.	40 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	Successful participation in the Exercises to the lecture “Geophysical continuum and fluid dynamics”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The successful participation usually requires the correct solution of 50 % of the exercises.		Weekly exercise sheets	1b	
2	Successful participation in the Exercises to the lecture “Advanced geophysical fluid dynamics”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The successful participation usually requires the correct solution of 50 % of the exercises.		Weekly exercise sheets	2b	
3	Successful participation in the Exercises to the lecture “Numerical simulation of geophysical processes”. The students develop by themselves in given weekly steps a complex program for the simulation of a geophysical flow problem. The advances are checked on a weekly basis and discussed in small exercise groups. In addition to the practical part small theoretical problems which, according to their nature cannot be studied in the practical part, have to be solved on a weekly basis. The successful participation usually requires the individual complete implementation of the simulation program as well as the correct solution of 50 % of the theoretical exercises.		Weekly exercise sheets containing practical and theoretical tasks	3b	

4	Successful participation in the Exercises to the lecture “Global seismology structures and processes in the interior of the earth”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The successful participation usually requires the correct solution of 50 % of the exercises.	Weekly exercise sheets	4b	
5	Successful participation in the practical exercises to the lecture “Advanced seismology”. In the practical exercises the subjects of the lecture are deepened. The successful participation usually requires the solution of the exercises and the preparation of a final report.	Weekly exercise sheets and a report of about 10 pages	5b	
6	Successful participation in the Exercises to the lecture “Applied geophysics 2”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The successful participation usually requires the correct solution of 50 % of the exercises.	Weekly exercise sheets	6b	
7	E Successful participation in the Exercises to the lecture “Modelling and inversion”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The successful participation usually requires the correct solution of 50 % of the exercises.	Weekly exercise sheets	7b	
8	Successful participation in the Exercises to the lecture “Magnetotellurics”. Exercise sheets are worked on in self-studies. They are checked, presented and discussed in small exercise groups by the students. The successful participation usually requires the correct solution of 50 % of the exercises.	Weekly exercise sheets	8b	

5	**Requirements**
Module-related requirements for participation	None. In particular the module can also be chosen without prior knowledge in geophysics.
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	-

6	**CP allocation**	
Participation (= attendance time)	Course No. 1a	1 CP
	Course No. 1b	1 CP
	Course No. 2a	1 CP
	Course No. 2b	0,5 CP
	Course No. 3a	1 CP
	Course No. 3b	1 CP
	Course No. 4a	1 CP
	Course No. 4b	0,5 CP

	Course No. 5a	1 CP
	Course No. 5b	1 CP
	Course No. 6a	1 CP
	Course No. 6b	0,5 CP
	Course No. 7a	1 CP
	Course No. 7b	0,5 CP
	Course No. 8a	1 CP
	Course No. 8b	0,5 CP
Degree-relevant examination(s)	No. 1	3 CP
Required coursework	No. 1	1,5 CP
	No. 2	1,5 CP
	No. 3	3 CP
	No. 4	1,5 CP
	No. 5	3 CP
	No. 6	1,5 CP
	No. 7	1,5 CP
	No. 8	1,5 CP
Total CP		12 – 15 CP

7	**Module administration**
Frequency	Every winter semester
Module representative	Prof. Dr. U. Hansen, Prof. Dr. C. Thomas
Responsible department	Department of Physics

8	**Recognition**
Usability in other degree programs	None
Module title German	Fachübergreifende Studien: Geophysik
German translation of the module components from field 3	Course No. 1a: Geophysikalische Kontinuums- und Fluiddynamik
	Course No. 1b: Übungen zur Vorlesung “Geophysikalische Kontinuums- und Fluiddynamik“
	Course No. 2a: Fortgeschrittene geophysikalische Fluiddynamik
	Course No. 2b: Übungen zur Vorlesung “Fortgeschrittene geophysikalische Fluiddynamik“
	Course No. 3a: Numerische Simulation geophysikalischer Prozesse
	Course No. 3b: Übungen zur Vorlesung “Numerische Simulation geophysikalischer Prozesse“
	Course No. 4a: Globale Seismologie, Strukturen und Prozesse im Erdinneren
	Course No. 4b: Übungen zur Vorlesung “Globale Seismologie, Strukturen und Prozesse im Erdinneren”
	Course No. 5a: Fortgeschrittene Seismologie
	Course No. 5b: Übungen zur Vorlesung “Fortgeschrittene Seismologie“
	Course No. 6a: Angewandte Geophysik II
	Course No. 6b: Übungen zur Vorlesung “Angewandte Geophysik II“
	Course No. 7a: Modellierung und Inversion
	Course No. 7b: Übungen zur Vorlesung “Modellierung und Inversion“

	Course No. 8a: Magnetotellurik
	Course No. 8b: Übungen zur Vorlesung “Magnetotellurik”

9	**Miscellaneous**
	The module can be studied without prior knowledge in geophysics.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary Studies: Computer Science**
Module number	15

1	**Basic data**
Program semester	1, 2
Credits (CP)	12 – 15
Workload (h) in total	360 – 450
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
The use of computers plays a central role in physics. It ranges from the control of experiments via the evaluation of the data obtained from the experiments and the solution of theoretical problems to the simulation of complex physical systems. In this module, students have the opportunity to gain advanced knowledge in freely chosen areas of computer science.	
Teaching content	
Upon agreement with the module representative.	
Learning outcomes	
The students have obtained advanced knowledge in selected areas of computer science. They are able to apply the knowledge and capabilities acquired in the module to the solution of physical problems in theory and/or experiment.	

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
Elective options within the module			Based on prior agreement with a module representative chosen by the student and upon approval by the Dean of Studies of the Department of Physics subject-specific courses from the third year of the programs B.Sc. Computer Science/Bachelor with two subjects Computer Science or of the M.Sc. program Computer Science are combined which have a meaningful relationship to Physics and comprise the required amount of 12 – 15 CP. A module description defining the specific structure			

	of the module is set up and signed by the module representative and the Dean of Studies of the Department of Physics.

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1		Upon agreement with the module representative at least one degree-relevant examination has to be taken. If the module includes more than one examination, the module final grade is determined as the average, weighted by the credits. The number and type of degree-relevant examinations are specified in the individually prepared module description.			
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	The required coursework corresponding to the chosen courses as specified in the regulations of the programs B.Sc. Computer Science/Bachelor with two subjects Computer Science/M.Sc. Computer Science has to be completed.				

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	Upon necessity in the chosen courses.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	X CP
	Course No. 2	X CP
	[…]	
Degree-relevant examination(s)	No. 1	X CP
	[…]	

Required coursework	No. 1	X CP
	[…]	
Total CP		12 – 15 CP

7	**Module administration**
Frequency	Every semester
Module representative	University teacher chosen by the student
Responsible department	Department of Mathematics and Computer Science (FB 10)

8	**Recognition**
Usability in other degree programs	
Module title German	Fachübergreifende Studien: Informatik
German translation of the module components from field 3	Course No. 1:
	Course No. 2:
	…

9	**Miscellaneous**
	The terms for registration and withdrawal as well as for the participation and the passing of degree-relevant examinations are regulated by the examination regulations of the programs B.Sc. Computer Science/Bachelor with two subjects Computer Science/M.Sc. Computer Science. In particular, the admission to module cumulative examinations can be based on the successful completion of corresponding required coursework. Before starting with the module, together with the module representative a module description has to be compiled which in particular defines the amount and form of the required coursework and of the degree-relevant examinations. This module description is signed by the module representative and the Dean of Studies of the Department of Physics.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary Studies: Mathematics**
Module number	16

1	**Basic data**
Program semester	1, 2
Credits (CP)	12 – 15
Workload (h) in total	360 – 450
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
Mathematics plays a central role for the description of physical phenomena. In this module, students have the opportunity to gain advanced knowledge in freely chosen areas of mathematics.	
Teaching content	
Upon agreement with the module representative.	
Learning outcomes	
The students have obtained advanced knowledge in selected areas of mathematics. They are able to apply the mathematical terminology, context and methods studied in the module to the solution of theoretical problems.	

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
Elective options within the module			Based on prior agreement with a module representative chosen by the student and upon approval by the Dean of Studies of the Department of Physics subject-specific courses from the third year of the programs B.Sc. Mathematics/Bachelor with two subjects Mathematics or of the M.Sc. program Mathematics are combined which have a meaningful relationship to Physics and comprise the required amount of 12 – 15 CP. A module description defining the specific structure of the			

	module is set up and signed by the module representative and the Dean of Studies of the Department of Physics.

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1		Upon agreement with the module representative at least one degree-relevant examination has to be taken. If the module includes more than one examination, the module final grade is determined as the average, weighted by the credits. The number and type of degree-relevant examinations are specified in the individually prepared module description.			
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	The required coursework corresponding to the chosen courses as specified in the regulations of the programs B.Sc. Mathematics/Bachelor with two subjects Mathematics/M.Sc. Mathematics has to be completed.				

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	Upon necessity of the chosen courses.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	X CP
	Course No. 2	X CP
	[…]	
Degree-relevant examination(s)	No. 1	X CP
	[…]	
Required coursework	No. 1	X CP

	[…]	
Total CP		12 – 15 CP

7	**Module administration**
Frequency	Every semester
Module representative	University teacher chosen by the student
Responsible department	Department of Mathematics and Computer Science (FB 10)

8	**Recognition**
Usability in other degree programs	
Module title German	Fachübergreifende Studien: Mathematik
German translation of the module components from field 3	Course No. 1:
	Course No. 2:
	…

9	**Miscellaneous**
	The terms for registration and withdrawal as well as for the participation and the passing of degree-relevant examinations are regulated by the examination regulations of the programs B.Sc. Mathematics/Bachelor with two subjects Mathematics/M.Sc. Mathematics. In particular, the admission to module cumulative examinations can be based on the successful completion of corresponding required coursework. Before starting with the module, together with the module representative a module description has to be compiled which in particular defines the amount and form of the required coursework and of the degree-relevant examinations. This module description is signed by the module representative and the Dean of Studies of the Department of Physics.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary Studies: Molecular Biophysics**
Module number	17

1	**Basic data**
Program semester	1, 2
Credits (CP)	15
Workload (h) in total	450
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
The module provides knowledge in the field of molecular biophysics and the capability for competent handling of biophysical standard techniques.	
Teaching content	
Molecular biophysics of cells and tissues, biophysical methods of molecular biology, cell biology and physiology. Choice of: (i) Fundamentals and Applications of Biomedical Mass Spectrometry (laser and electrospray mass spectrometry) or (ii) Fundamentals, techniques and cell biological applications of high-resolution fluorescence microscopy or (iii) Fundamentals of non-invasive and molecular imaging, in particular NMR/MRT.	
Learning outcomes	
The students have obtained knowledge in molecular biophysics and biophysical methods in the fields of molecular biology, cell biology and physiology. They are able to competently work with the corresponding biophysical techniques.	

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)

1		Lecture		Molecular Biophysics of Cells and Tissues I	M	30 h / 2 SWS	30 h
2		Lecture		Molecular Biophysics of Cells and Tissues II	M	30 h / 2 SWS	30 h
3		Laboratory course		Biophysical Methods of Molecular Biology, Cell Biology and Physiology (Lab course)	M	45 h / 3 SWS	105 h
4		Lecture		Biophysical Methods of Molecular Biology, Cell Biology and Physiology (Accompanying lecture to the lab course)	M	30 h / 2 SWS	30 h
5		Seminar		Selected Topics in Molecular Biophysics (Block seminar)	M	15 h / 1 SWS	15 h
6	6a	Lecture		**Mass Spectrometric Analysis:** Fundamentals and Applications of Biomedical Mass Spectrometry I and II	EM	15 h + 15 h / 1 + 1 SWS	30 h
	6b	Seminar		Fundamentals, Techniques and Applications of Laser and Electrospray Mass Spectrometry	EM	15 h / 1 SWS	15 h
7	7a	Lecture		**Fluorescence Microscopy:** Fluorescence Microscopy: Fundamentals and Latest Developments I and II	EM	15 h + 15 h / 1 + 1 SWS	30 h
	7b	Seminar		Fundamentals, Techniques and Cell Biological Applications of High-Resolution Fluorescence Microscopy	EM	15 h / 1 SWS	15 h
8	8a	Lecture		**Non-Invasive Imaging:** Magnetic Resonance Imaging and Other Non-Invasive Imaging Methods I and II	EM	15 h + 15 h / 1 + 1 SWS	30 h
	8b	Seminar		Techniques and Applications of Molecular Imaging	EM	15 h / 1 SWS	15 h
Elective options within the module				The courses no. 1 – 5 are mandatory. In addition, one of the course combinations no. 6 – 8 (part a and b) has to be chosen.			

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Final oral examination on the chosen subjects of the module.	30 – 45 min		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					

No.	Type	Duration/ Scope	Connection to course No., if appl.	
1	Testified experimental protocols		3	
2	Presentation of a talk.		5	
3	Presentation of a talk.		6b, 7b or 8b	

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	In the laboratory courses physical attendance is required. A regular participation in the seminar is explicitly recommended because the ability to actively participate in the scientific discussion following the talks is an essential learning target.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	1 CP
	Course No. 2	1 CP
	Course No. 3	1,5 CP
	Course No. 4	1 CP
	Course No. 5	0,5 CP
	Course No. 6a, 7a or 8a	1 CP
	Course No. 6b, 7b or 8b	0,5 CP
Degree-relevant examination(s)	No. 1	4 CP
Required coursework	No. 1	3,5 CP
	No. 2	0,5 CP
	No. 3	0,5 CP
Total CP		15 CP

7	**Module administration**
Frequency	Every winter semester
Module representative	Prof. Dr. Dreisewerd, Dr. Mormann
Responsible department	Faculty of Medicine (FB 05)

8	**Recognition**
Usability in other degree programs	
Module title German	Fachübergreifende Studien: Molekulare Biophysik
German translation of the module components from field 3	Course No. 1: Molekulare Biophysik der Zellen und Gewebe I
	Course No. 2: Molekulare Biophysik der Zellen und Gewebe II

	Course No. 3: Biophysikalische Methoden der Molekularbiologie, Zellbiologie und Physiologie (Blockpraktikum)
	Course No. 4: Biophysikalische Methoden der Molekularbiologie, Zellbiologie und Physiologie (Praktikumsbegleitende Vorlesung)
	Course No. 5: Ausgewählte Themen aus der molekularen Biophysik (Blockseminar)
	Course No. 6a: Massenspektrometrische Analytik: Grundlagen und Anwendungen der Biomedizinischen Massenspektrometrie I und II
	Course No. 6b: Grundlagen, Techniken und Anwendungen der Laser- und Elektrospray-Massenspektrometrie
	Course No. 7a: Fluoreszenzmikroskopie: Grundlagen und neueste Entwicklungen I und II
	Course No. 7b: Grundlagen, Techniken und zellbiologische Anwendungen der hochauflösenden Fluoreszenzmikroskopie
	Course No. 8a: Nicht-invasive Bildgebung: Magnetresonanz-Tomographie und andere Verfahren der nicht-invasiven Bildgebung I und II
	Course No. 8b: Techniken und Anwendungen der molekularen Bildgebung

9	**Miscellaneous**
	The terms for registration and withdrawal as well as for the participation and the passing of required course work and degree-relevant examinations are regulated by the Faculty of Medicine.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary studies: Philosophy for Physicists with prior Knowledge in Philosophy**
Module number	18a

1	**Basic data**
Program semester	1, 2
Credits (CP)	12 – 15
Workload (h) in total	360 – 450
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
In this module students with prior knowledge in philosophy will acquire further knowledge in philosophy of science and a philosophic discipline of their choice (either again philosophy of science or another philosophical discipline), which are of interest for prospective physicists.	
Teaching content	
In courses related to philosophy of science questions regarding, e.g., the status of natural laws, the concept of causality, the relation between natural sciences, social sciences and humanities, etc. will be addressed. Courses related to other philosophical disciplines will treat questions regarding, e.g., natural philosophy, ontology, bioethics, ethics of research, the fair distribution of resources etc.	
Learning outcomes	
Students acquire advanced knowledge on terminology, questions and/or problems of philosophy of science and, if applicable, another philosophical discipline. The have the competence to relate different subjects in the field of philosophy of science in a meaningful way to each other and clearly separate different problem statements from each other. Furthermore, they obtain the methodological tools to elaborate by themselves on topics in philosophy of science and, if applicable, another philosophical discipline and they are able to present the results of their work both in oral and written form in precise and structured way. In addition, in this module students develop their capabilities to (a) open up demanding texts, (b) analyze and, if necessary criticize arguments, (c) identify contradictions and unclear terminology as such, (d) argument in a consistent way, (e) discuss in an objective and subject-oriented way, (f) be open for unusual solutions and look for those by themselves in a creative way. All competences in interpretation, extraction, argumentation and judgement will be achieved both in written form and in discussions.	

3	**Structure**					
Module components						
No.	Course-category	Course-form	Lehrveranstaltung	Status (M/EM/E)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1	Seminar		Advanced Seminar on Philosophy	M	30 h / 2 SWS	90 – 210 h (depending on the choice of the examination)
2	Seminar		Advanced Seminar on Philosophy of Science	M	30 h / 2 SWS	90 – 210 h (depending on the choice of the examination)
3	Study group or Seminar		Study Group Philosophy of Science or further Advanced Seminar	E	30 h / 2 SWS	60 – 180 h (depending on the choice of the examination)
Elective options within the module			In total 12 or 15 CP may be reached. 12 CP are reached by the choice of two advanced seminars including the corresponding required coursework and the passing of the respective examination. By participating in the Study Group or in another seminar including the corresponding required coursework additional 3 CP may be reached. Both within the mandatory and the elective part of the module there is choice among different courses.			

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Term paper on a subject related to one of the courses *or* Portfolio on subjects of at least two courses of the module with oral presentation/examination on the content of the portfolio *or* Study project, thesis paper and oral presentation or examination	15 – 18 p. about 10 p. portfolio, 20 min oral presentation / examination 30 h reading and consultation, 2 – 3	1, 2, 3	100%

		Concerning the choice of the examination type see field “Miscellaneous”. The examination can be taken as soon as the two mandatory parts of the module have been completed.	p. thesis paper, 30 min oral presentation / examination		
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	Argument analysis (analyses) (written or oral), documentation of the reading (e.g. reading/learning diary, excerpt, summary, preparation), session(s) documentation (e.g. protocol) or impulse presentation(s). The type of the required coursework depends on the seminar topics and will be announce at the beginning of the seminar.		5 – 10 p. / about 30 min	1	
2	Argument analysis (analyses) (written or oral), documentation of the reading (e.g. reading/learning diary, excerpt, summary, preparation), session(s) documentation (e.g. protocol) or impulse presentation(s). The type of the required coursework depends on the seminar topics and will be announce at the beginning of the seminar.		5 – 10 p. / about 30 min	2	
3	Argument analysis (analyses) (written or oral), documentation of the reading (e.g. reading/learning diary, excerpt, summary, preparation), session(s) documentation (e.g. protocol) or impulse presentation(s). The type of the required coursework depends on the seminar topics and will be announce at the beginning of the seminar.		5 – 8 p. / about 20 min	3	

5	**Requirements**
Module-related requirements for participation	Previous knowledge in philosophy at an amount of 6 CP or two courses are required.
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	For the study project physical attendance in the meetings with the supervisor is required.

6	CP allocation	
Participation (= attendance time)	Course No. 1	1 CP
	Course No. 2	1 CP
	Course No. 3. (optional)	1 CP
Degree-relevant examination(s)	No. 1	4 CP
Required coursework	No. 1	3 CP
	No. 2	3 CP
	No. 3 (optional)	2 CP
Total CP		12 – 15 CP

7	Module administration
Frequency	Every semester
Module representative	Prof. Dr. U Krohs
Responsible department	Department of History and Philosophy (FB 08)

8	Recognition
Usability in other degree programs	-
Module title German	Fachübergreifende Studien: Philosophie für Studierende der Physik mit philosophischen Vorkenntnissen
German translation of the module components from field 3	Course No. 1: Aufbauseminar Philosophie
	Course No. 2: Aufbauseminar Wissenschaftsphilosophie
	Course No. 3: Arbeitskreis Wissenschaftstheorie oder weiteres Aufbauseminar

9	Miscellaneous
	The decision on the choice of the type of examination is left to the examiners' discretion. Students may propose an examination type of their choice. If the study project with term paper and presentation is chosen as examination type, the students conclude an agreement with a supervisor defining the subjects and contents of the project. The supervisor is also the examiner. They are thoroughly advised by their supervisor if questions and problems related to the project arise. The advice also serves to ensure that the project can be completed in appropriate time. The terms for registration and withdrawal as well as for the participation and the passing of degree-relevant examinations are regulated by the Department of History and Philosophy.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary studies: Philosophy for Physicists without prior Knowledge in Philosophy**
Module number	18b

1	**Basic data**
Program semester	1, 2
Credits (CP)	15
Workload (h) in total	450
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
In this module students without prior knowledge in philosophy will, after completing a basic seminar or an introductory lecture on epistemology, acquire further knowledge in philosophy of science and a philosophic discipline of their choice (either again philosophy of science or another philosophical discipline), which are of interest for prospective physicists.	
Teaching content	
In courses related to philosophy of science questions regarding, e.g., the status of natural laws, the concept of causality, the relation between natural sciences, social sciences and humanities, etc. will be addressed. Courses related to other philosophical disciplines will treat questions regarding, e.g., natural philosophy, ontology, bioethics, ethics of research, the fair distribution of resources etc.	
Learning outcomes	
Students acquire advanced knowledge on terminology, questions and/or problems of philosophy of science and, if applicable, another philosophical discipline. The have the competence to relate different subjects in the field of philosophy of science in a meaningful way to each other and clearly separate different problem statements from each other. Furthermore, they obtain the methodological tools to elaborate by themselves on topics in philosophy of science and, if applicable, another philosophical discipline and they are able to present the results of their work both in oral and written form in precise and structured way. In addition, in this module students develop their capabilities to (a) open up demanding texts, (b) analyze and, if necessary criticize arguments, (c) identify contradictions and unclear terminology as such, (d) argument in a consistent way, (e) discuss in an objective and subject-oriented way, (f) be open for unusual solutions and look for those by themselves in a creative way. All competences in interpretation, extraction, argumentation and judgement will be achieved both in written form and in discussions.	

3	**Structure**
Module components	

No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1	Seminar		Basic Seminar on Philosophy	EM	30 h / 2 SWS	60 h
2	Lecture		Lecture: Epistemology	EM	30 h / 2 SWS	60 h
3	Seminar		Advanced Seminar on Philosophy	M	30 h / 2 SWS	90 – 240 h
4	Seminar		Advanced Seminar on Philosophy of Science	M	30 h / 2 SWS	90 – 240 h
Elective options within the module			Students either participate in a basic seminar of their choice or in the lecture in epistemology. There is a choice of different basic seminars. Also, for the advanced seminars there is choice among different courses.			

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	FME	Term paper on a subject related to one of the advanced seminars *or* Portfolio on subjects of the two advanced seminars of the module with oral presentation/examination on the content of the portfolio *or* Study project, thesis paper and oral presentation or examination Concerning the choice of the examination type see field "Miscellaneous". The examination can be taken as soon as the two mandatory parts of the module have been completed.	15 – 18 p. about 10 p. portfolio, 20 min oral presentation / examination 30 h reading and consultation, 2 – 3 p. thesis paper, 30 min oral presentation/examination		100%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.	Type		Duration/ Scope	Connection to course No., if appl.	
1	Written examination or essay or presentation/oral examination. The type of the required coursework will be announced at the beginning of course in an appropriate manner.		45 min (written examination) / 5 – 6 p. (essay) / 20 min (oral examination)	1	

2	Written examination (in justified exceptional cases the written examination can be replaced by an essay or an oral examination, scope/duration see required coursework 1). The type of the required coursework will be announced at the beginning of course in an appropriate manner.	45 min	2
3	Argument analysis (analyses) (written or oral), documentation of the reading (e.g. reading/learning diary, excerpt, summary, preparation), session(s) documentation (e.g. protocol) or impulse presentation(s). The type of the required coursework depends on the seminar topics and will be announce at the beginning of the seminar.	5 – 10 p. / about 30 min	3
4	Argument analysis (analyses) (written or oral), documentation of the reading (e.g. reading/learning diary, excerpt, summary, preparation), session(s) documentation (e.g. protocol) or impulse presentation(s). The type of the required coursework depends on the seminar topics and will be announce at the beginning of the seminar.	5 – 10 p. / about 30 min	4

5	**Requirements**
Module-related requirements for participation	None
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	For the study project physical attendance in the meetings with the supervisor is required.

6	**CP allocation**	
Participation (= attendance time)	Course No. 1 or Course No. 2	1 CP
	Course No. 3	1 CP
	Course No. 4	1 CP
Degree-relevant examination(s)	No. 1	4 CP
Required coursework	No. 1 or No. 2	2 CP
	No. 3	3 CP
	No. 4	3 CP
Total CP		15 CP

7	**Module administration**
Frequency	Every semester
Module representative	Prof. Dr. U Krohs
Responsible department	Department of History and Philosophy (FB 08)

8	Recognition	
Usability in other degree programs		-
Module title German		Fachübergreifende Studien: Philosophie für Studierende der Physik ohne philosophische Vorkenntnisse
German translation of the module components from field 3		Course No. 1: Basisseminar Philosophie
		Course No. 2: Vorlesung: Erkenntnistheorie
		Course No. 3: Aufbauseminar Philosophie
		Course No. 4: Aufbauseminar Wissenschaftsphilosophie

9	Miscellaneous	
		The decision on the choice of the type of examination is left to the examiners' discretion. Students may propose an examination type of their choice. If the study project with term paper and presentation is chosen as examination type, the students conclude an agreement with a supervisor defining the subjects and contents of the project. The supervisor is also the examiner. They are thoroughly advised by their supervisor if questions and problems related to the project arise. The advice also serves to ensure that the project can be completed in appropriate time. The terms for registration and withdrawal as well as for the participation and the passing of degree-relevant examinations are regulated by the Department of History and Philosophy.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary Studies: Psychology**
Module number	19

1	**Basic data**
Program semester	1, 2
Credits (CP)	12
Workload (h) insgesamt	360
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**
Aim of the module / Integration in the curriculum	
The module provides advanced knowledge in the field of cognitive neurosciences.	
Teaching content	
In these lectures the neurocognitive basis of behavior and the methods that are used in cognitive neurosciences to investigate behavior are presented. This includes the neuropsychological and psychological theories of cognitive functions and their functional neuro-anatomic basis. The problems of cognitive neurosciences are presented regarding both unimpaired and impaired neurocognitve activity.	
Learning outcomes	
The students have acquired profound knowledge on current research in the field of cognitive neurosciences. They are familiar with the methods used as well as with their fields of applicability. They are able to critically reflect the currently accepted scientific opinion of psychology and relate the different disciplines of cognitive neurosciences to each other.	

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1	Lecture		Neural structures, functions and failures	M	30 h / 2 SWS	150 h
2	Lecture		Experimental Methods of Neuro- and Behavioral Research	M	30 h / 2 SWS	150 h

Elective options within the module	None

4	Examination structure				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course No., if appl.	Weight in the module grade
1	MCE	Written or oral examination, as chosen by the examiner. The examiner announces the type of the examination in due time at the beginning of the course in appropriate form.	90 min (written examination) or 30 min (oral examination)	1	50%
2	MCE	Written or oral examination, as chosen by the examiner. The examiner announces the type of the examination in due time at the beginning of the course in appropriate form.	90 min (written examination) or 30 min (oral examination)	2	50%
Weight of the module grade for the final overall grade		The module grade contributes with the weight 16% to the final overall grade.			
Required coursework					
No.		Type	Duration/ Scope	Connection to course No., if appl.	
	none				

5	Requirements
Module-related requirements for participation	Precondition for participation in this module is the successful completion of the module “Interdisciplinary Studies: Theoretical Basics of Psychology” of the bachelor’s program in Physics.
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	-

6	CP allocation	
Participation (= attendance time)	Course No. 1	1 CP
	Course No. 2	1 CP
Degree-relevant examination(s)	No. 1	5 CP
	No. 2	5 CP
Required coursework		
Total CP		12 CP

7	Module administration
Frequency	Every winter semester
Module representative	Prof. Dr. M. Lappe
Responsible department	Department of Psychology and Sports Sciences (FB 07)

8	Recognition
Usability in other degree programs	
Module title German	Fachübergreifende Studien: Psychologie
German translation of the module components from field 3	Course No. 1: Neuronale Strukturen, Funktionen und Fehlleistungen
	Course No. 2: Experimentelle Methoden der Neuro- und Verhaltensforschung

9	Miscellaneous
	The terms for registration and withdrawal as well as for the participation and the passing of degree-relevant examinations are regulated by the Department of Psychology and Sports Sciences.

Degree program	**Physics (Master of Science)**
Modul	**Interdisciplinary Studies: Economics**
Module number	20

1	**Basic data**
Program semester	1, 2
Credits (CP)	24
Workload (h) in total	720
Module duration	2 semesters
Module status (M/EM)	EM

2	**Profile**

Aim of the module / Integration in the curriculum

The students deepen their knowledge acquired during the bachelor's program and may create their own profile.

Teaching content

The modules can be freely chosen from the modules of the master's program "Volkswirtschaftslehre/Economics". The module descriptions can be found in the currently valid version of the examination regulations of the MSc program "Volkswirtschaftslehre/Economics". Excluded is the module "Projektstudium".

Due to the rather limited prior knowledge, in particular the following combinations are recommended:

- Economic policy, energy economics or resource economics or Fundamentals of environmental and climate economics (at most one out of three courses from the bachelor's program in economics); applied energy economics and/or environmental economics and/or energy economics (two out of three courses from the master's program in economics)
- Economic policy, business cooperation: governance or business cooperation: management (from the bachelor's program in economics, only one of the two modules may be chosen) business cooperation: mergers and acquisitions, specialization economics 1: current M&A cases
- Mathematical methods, financial economics, financial policy, international financial economics
- Economic policy, regulations economics, fundamentals of transport economics (from the bachelor's program in economics), advanced transportation economics
- Advanced statistics (from the bachelor's program in economics), empirical methods, time series analysis, econometry of financial markets
- Industrial economics, advanced microeconomics I, advanced microeconomics II, applied microeconomics (only for very theoretically oriented students!)

Learning outcomes
The students have gained deeper insight in special areas of economics.

3	**Structure**					
Module components						
No.	Course-category	Course-form	Course	Status (M/EM)	Workload (h)	
					Attendance time (h)/SWS	Self studies (h)
1	Lecture, exercise or seminar, depending on the chosen module		Specialization course in Economics I	WP	60 h / 4 SWS (for lecture / exercise) or 30 h / 2 SWS (for seminar)	120 h or 150 h
2	Lecture, exercise or seminar, depending on the chosen module		Specialization course in Economics II	WP	60 h / 4 SWS (for lecture / exercise) or 30 h / 2 SWS (for seminar)	120 h or 150 h
3	Lecture, exercise or seminar, depending on the chosen module		Specialization course in Economics III	WP	60 h / 4 SWS (for lecture / exercise) or 30 h / 2 SWS (for seminar)	120 h or 150 h
4	Lecture, exercise or seminar, depending on the chosen module		Specialization course in Economics IV	WP	60 h / 4 SWS (for lecture / exercise) or 30 h / 2 SWS (for seminar)	120 h or 150 h
Elective options within the module			The modules can be freely chosen from the modules of the MSc program "Volkswirtschaftslehre/Economics". The module descriptions can be found in the currently valid version of the examination regulations of the MSc program "Volkswirtschaftslehre/Economics". Excluded is the module "Projektstudium".			

4	**Examination structure**				
Degree-relevant examination(s)					
No.	FME/ MCE	Type	Duration/ Scope	Connection to course	Weight in the module grade

				No., if appl.	
1	MCE	Written examination or term paper with oral presentation, depending on the chosen module, see examination regulations of the M.Sc. program “Volkswirtschaftslehre/Economics”.	Written examination: max. 2 h Term paper and presentation: max. 20 p. and max. 90 min.	1	25%
2	MCE	Written examination or term paper with oral presentation, depending on the chosen module, see examination regulations of the M.Sc. program “Volkswirtschaftslehre/Economics”.	Written examination: max. 2 h Term paper and presentation: max. 20 p. and max. 90 min.	2	25%
3	MCE	Written examination or term paper with oral presentation, depending on the chosen module, see examination regulations of the M.Sc. program “Volkswirtschaftslehre/Economics”.	Written examination: max. 2 h Term paper and presentation: max. 20 p. and max. 90 min.	3	25%
4	MCE	Written examination or term paper with oral presentation, depending on the chosen module, see examination regulations of the M.Sc. program “Volkswirtschaftslehre/Economics”.	Written examination: max. 2 h Term paper and presentation: max. 20 p. and max. 90 min.	4	25%

Weight of the module grade for the final overall grade	The module grade contributes with the weight 16% to the final overall grade.

Required coursework

No.	Type	Duration/ Scope	Connection to course No., if appl.	
	none			

5	**Requirements**
Module-related requirements for participation	Basic knowledge in economics obtained during the bachelor’s program are required.
Awarding credits	Academic credit is awarded upon completion of the entire module, i.e. when students have proven that they have achieved the learning outcomes in their entirety as provided by the module.
Rules on course attendance	Depending on the module

6	**CP allocation**	
Participation (= attendance time)	Course No. 1	1 CP or 2 CP, depending on the chosen module
	Course No. 2	1 CP or 2 CP, depending on the chosen module
	Course No. 3	1 CP or 2 CP, depending on the chosen module

	Course No. 4	1 CP or 2 CP, depending on the chosen module
Degree-relevant examination(s)	No. 1	4 CP or 5 CP, depending on the chosen module
	No. 2	4 CP or 5 CP, depending on the chosen module
	No. 3	4 CP or 5 CP, depending on the chosen module
	No. 4	4 CP or 5 CP, depending on the chosen module
Total CP		24 CP

7	**Module administration**
Frequency	Every winter semester
Module representative	Depending on the chosen courses
Responsible department	Faculty of Business and Economics (FB 04)

8	**Recognition**
Usability in other degree programs	Bachelor Economics or Master Economics, depending on chosen course
Module title German	Fachübergreifende Studien: Volkswirtschaftslehre
German translation of the module components from field 3	Course No. 1: VWL-Modul I
	Course No. 2: VWL-Modul II
	Course No. 3: VWL-Modul III
	Course No. 4: VWL-Modul IV

9	**Miscellaneous**
	The terms for registration and withdrawal as well as for the participation and the passing of required coursework and degree-relevant examinations are regulated by the examination regulations of the Faculty of Business and Economics. The participation in any degree-relevant examination requires the prior registration either electronically or in person at the Examinations Office of the Faculty of Business and Economics.