

Subject-related Examination and Study Regulations for the Master's programme in Physics, 14 December 2020

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In accordance with the Brandenburg University Act (BbgHG) dated 28 April 2014 (GVBl. (law gazette of the German federal state of Brandenburg) I/14 No. 18), last amended by way of the act dated 23 September 2020 (law gazette of the German federal state of Brandenburg I/20 No. 26), in accordance with Section 5(1), Sentence 2, Section 9(5), Sentence 2, in conjunction with Sections 19(2), Sentence 1, 22(2), Sentence 1, 72(2), Sentence 1, and Section 1(1), of the General Examination and Study Regulations for the Masters Study Programmes at BTU Cottbus–Senftenberg dated 12 September 2016 (official gazette 14/2016), the Brandenburg University of Technology Cottbus–Senftenberg (BTU) issues the following statutes:

Table of contents

Table of contents	2
Section 1 Scope of Validity	2
Section 2 Profile of the content of the study programme, programme goals	2
Section 3 Graduation, degree	3
Section 4 Specific admission and enrolment requirements	3
Section 5 Regular duration of the standard programme, credits for the programme	3
Section 6 Programme structure and form ..	3
Section 7 Special regulations for organisation of examinations	4
Section 8 MasterThesis.....	4
Section 9 Additional regulations	4
Section 10 Efficacy, abrogation.....	4
Annex 1: Overview of the modules, status and credits (LP)	5
Annex 1a: Modules for the Physical Specialisation complex	6
Annex 1b: Modules for the complex minor subject	8
Annex 2: Standard programme plan	9
Annex 3: Internship regulation	10

1. Scope of validity	10
2. Essence and purpose of the internship	10
3. Application for an internship position.....	10
4. Supervision of interns	10
5. Internship report	10

Section 1 Scope of Validity

¹These statutes provide for the subject-related special features of the Master's programme in Physics. ²They supplement the General Examination and Study Regulations (RahmenO-MA) for BTU Master's Degree Programmes dated 12 September 2016 (Official Gazette 14/2016).

Section 2 Profile of the content of the study programme, programme goals

(1) ¹The international Master's programme in Physics with a research-oriented profile provides students with the ability to apply instruments and methods of the subject area and critically classify scientific findings. ²From experience, physicists are active in a wide variety of professional fields, which also extend far into neighbouring natural sciences and other disciplines. ³The basic and methodological studies offered at an advanced level enable graduates to solve tasks that require technical and methodological flexibility as well as scientific independence. ⁴Students shall be introduced to the current state of research in a sub-field of physics and acquire the ability to conduct independent research work, including with the goal of a subsequent doctorate.

(2) ¹The Master's programme in Physics is committed to the goal of internationality and interdisciplinarity. ²The networking of the Institute of Physics of the BTU with non-university research institutes enables students to focus on a broad range of research directions as well as maintain direct contact with the corresponding working groups. ³Instruction in scientific work is supported in particular by a research module, which introduces students to current topics in physics and provides opportunities for project-oriented research work in one of these research fields. ⁴This qualifies graduates of the Master's programme to plan, manage and perform research projects in science and industry, and enables them to act in a qualified and responsible manner in professional practice.

Section 3 Graduation, degree

The degree of “Master of Science” (M. Sc.) shall be awarded upon successful completion of the Master's programme in Physics.

Section 4 Specific admission and enrolment requirements

(1) ¹Admission to the Master's programme in Physics is granted upon furnishing proof of a Bachelor's degree in physics. ²The Bachelor's degree is deemed to have sufficient proximity in terms of content if the training in experimental physics and theoretical physics is comparable in scope to the Bachelor's degree in physics at the BTU.

(2) ¹The Master's programme in Physics is an international programme. ²The language used for teaching and examinations is English. ³For admission to the programme, all applicants must, above all, therefore provide proof of sufficient language skills in accordance with Section 3(3) of the BTU Enrolment Regulations dated 22 January 2020 (official gazette 01/2020).

(3) ¹The evaluation for sufficient proximity to the content of a degree in accordance with Section 4(1) is conducted by the examination board. ²In cases of conditional equivalence, the committee may stipulate that modules from the Bachelor's degree programme in Physics at the BTU with a maximum scope of 18 credit points (LP) be repeated as a condition for admission. ³These conditional modules subject to conditions cannot be credited to the Master's programme in Physics.

(4) ¹Modules subject to conditions can only be selected as German-language modules provided they represent a mandatory module in the Bachelor's programme. ²Where applicable, the German language requirement also applies to compulsory elective modules. ³In these cases, prospective students are recommended to ensure that they have German language skills, which should correspond to approximately level B2, at their own responsibility.

Section 5 Regular duration of the standard programme, credits for the programme

(1) The regular duration of the standard programme of the Master's programme in Physics is four semesters and comprises 120 credits.

(2) Enrolment in the Master's programme in Physics is possible at both the summer and the winter semester.

(3) The Master's programme in Physics is completed as a full-time programme.

(4) Individual part-time study in accordance with Section 6(2) RahmenO-MA is possible.

Section 6 Programme structure and form

(1) ¹The Master's programme in Physics consists of a specialisation phase and a research phase. ²The specialisation phase comprises mandatory modules with a total of 12 credits and compulsory elective modules with a total of 48 credits including the interdisciplinary studies (FÜS) at 6 credits. ³The Research Phase consists of the Research Module II and the Master Thesis with 30 credits each.

(2) ¹The catalogue of compulsory elective modules (Annexes 1a and 1b) shall be regularly adapted and published by the degree programme co-ordinator. ²The ability to study within the regular duration of the standard programme shall be guaranteed in any case. ³The adjustment of the compulsory elective modules shall be notified with binding force by the degree programme co-ordinator to the administration (subject area Student Information System Management) one month before the beginning of the semester.

(3) ¹The content of the modules of the Physical Specialisation complex (Annex 1a) is based on the research focus of the Institute of Physics of the BTU and its partner institutions and includes the topics “Nanophysics”, “Condensed Matter Physics” and “Theory, Simulation and further Topics”. ²Modules from this complex with 30 credits must be selected. ³At least one module with a theoretical focus and at least one module with an experimental focus must be selected.

(4) ¹The Master's programme in Physics includes a freely selectable share of modules from the Minor Subject complex (Annex 1b), which conveys to the students the subject-related versatility and in particular the close connections to chemistry, computer science, mathematics or electrical engineering. ²Alternatively, the Minor Subject can be completed as a 9-week professional internship. ³The activity performed within the framework of such an internship shall reflect the professional

versatility at Master's level of physicists in a corresponding professional field. ⁴Further details are regulated in the internship regulations (Annex 3).

(5) ¹The Master's programme in Physics includes the Research Module II in the third semester of the regular duration of the standard programme. ²This consists of a laboratory internship, the guided planning of a research project and a working group seminar on current research topics. ³More detailed information about this is provided in the module description. ⁴Fifty four credits from the specialisation phase are required to register for Research Module II. ⁵The examination board shall decide on exceptions.

(6) ¹The standard programme plan listed in Annex 2 provides a recommendation for the time selection of the modules and an overview of the module examinations to be taken, including the credits to be acquired. ²The standard programme plan has a guideline character and guarantees compliance with the regular duration of the standard programme with appropriate performance.

(7) ¹Students shall choose a mentor during their studies. ²Electable mentors shall be assigned to each year group from among the teaching staff. ³The mentor should only be changed in justified cases. ⁴Each student shall draw up a study plan on the intended progress of study by the end of the sixth week of the first semester. ⁵The study plan and any changes in the progress of the studies shall be discussed with the mentor, confirmed by the mentor and reported to Admissions and Registrar's Office.

(8) ¹Studies abroad are welcomed. ²Students are recommended to seek individual subject-related counselling to determine the timing of their studies.

Section 7 Special regulations for organisation of examinations

According to Section 17 RahmenO-MA, the Research Module II ranks as a practical study section and is therefore excluded from the free attempt regulation.

Section 8 MasterThesis

(1) ¹The Master thesis has a scope of 30 credits. ²Only students, who have acquired at least 84 credits in total including Research Module II, may be admitted to the Master Thesis. ³The processing time for the written part of the Master's Thesis shall be five months at most.

(2) ¹The Master Thesis shall be supervised by a university lecturer in the field of physics at BTU. ²The examination board shall decide on exceptions.

(3) The candidate may submit proposals for the topic of the Master Thesis.

(4) ¹The Master Thesis shall be written in English. ²In exceptional cases, it may be written in German at the written request of the student with the consent of the supervisor. ³The examination board shall decide on the application.

Section 9 Additional regulations

There are no additional regulations.

Section 10 Efficacy, abrogation

(1) This regulation shall come into force in the summer semester of 2021.

(2) This examination and study regulation shall cease to apply following the last enrolment upon expiry of the regular duration of the standard programme plus four semesters.

Issued on the basis of the decisions of the Faculty Council of Faculty 1 - MINT - Mathematics, Computer Science, Physics, Electrical Engineering and Information Technology dated 29 January 2020 and 5 August 2020, the statement of the Senate dated 23 July 2020 and approval by the President of Brandenburg University of Technology Cottbus-Senftenberg dated 5 October 2020.

Cottbus, 14 December 2020

Professor Dr. Gesine Grande
President

Annex 1: Overview of the modules, status and credits (LP)

Module no.	Complexes and modules	Status	Evaluation	LP
Specialisation Phase				60
13012	Advanced Seminar Experimental Physics	P	Prü	6
13014	Advanced Seminar Theoretical Physics	P	Prü	6
Physical Specialisation with Theoretical Focus				
	(Compulsory elective module from Annex 1a)	WP	Prü	6 - 24
Physical Specialisation with Experimental Focus				
	(Compulsory elective module from Annex 1a)	WP	Prü	6 - 24
Minor Subject				
	compulsory elective module of the minor subject from Annex 1b)	WP	Prü	12
General Studies				
	Compulsory elective modules from the catalogue for General Studies at BTU	WP	Prü	6
Research Phase				60
13008	Research module II	P	Prü	30
13039	Master Thesis	P	Prü	30

P = mandatory module; WP = compulsory elective module; Prü = performance verification

Annex 1a: Modules for the Physical Specialisation complex

I. Nanophysics

No.	Module title	LP	Status	Evaluation	Focus
11222	Photovoltaics: Basics, State of the Art and Solar Cell Materials Research	6	WP	Prü	E
13009	Semiconductor Technology	6	WP	Prü	E
13019	Micro Systems	6	WP	Prü	E
13024	Light and Matter: Introduction	6	WP	Prü	E
13025	Light and Matter: Interaction in Nanostructures	6	WP	Prü	E
13020	Laboratory Techniques and Metrology	6	WP	Prü	E
13023	Introduction to Semiconductor Physics	6	WP	Prü	E, T
13038	Nanoelectronics	6	WP	Prü	E
13052	Nanocatalysis - Fundamentals and Applications	6	WP	Prü	E

II. Condensed Matter Physics

No.	Module title	LP	Status	Evaluation	Focus
13028	Principles of Superconductivity	8	WP	Prü	E, T
13033	Magnetism of Solids	8	WP	Prü	E, T
13026	Solid State Theory	6	WP	Prü	T
13011	Group Theory in Solid State Physics	6	WP	Prü	T
11763	Crystal Growth	6	WP	Prü	E
13021	Surface Physics and 2D Materials	6	WP	Prü	E
13029	Experimental Solid State Physics	6	WP	Prü	E
13016	Characterisation of Micro- and Nanomaterials	6	WP	Prü	E

III. Theory, Simulation and Further Topics

No.	Module title	LP	Status	Evaluation	Focus
11924	Plasma Physics	6	WP	Prü	T
11938	Thermodynamics, Heat and Mass Transfer	6	WP	Prü	T
12288	Computational Electrodynamics	6	WP	Prü	T
13027	Computational Physics	6	WP	Prü	T
13007	Computational Physics II - Partial Differential Equations	6	WP	Prü	T
13010	General Theory of Relativity	6	WP	Prü	T
13440	Waves and Instabilities in Fluids	6	WP	Prü	T
13030	Pattern Formation and Nonlinear Dynamics I	6	WP	Prü	T
13031	Pattern Formation and Nonlinear Dynamics II	6	WP	Prü	T
13015	Particle and Astroparticle Physics	6	WP	Prü	E
13035	Selected Topics in Quantum Theory I	6	WP	Prü	T
13036	Selected Topics in Quantum Theory II	6	WP	Prü	T
13022	Selected Topics in Statistical Physics	6	WP	Prü	T
13037	Linear and Weakly Non-Linear Differential Equations in Physics	6	WP	Prü	T

WP = compulsory elective module; Prü = performance verifications; SL = study performance; T = theoretic focus, E = experimental focus

The list of the compulsory elective modules shall be up-dated and published regularly by the Degree Programme Coordinators in accordance with Section 6(3).

Annex 1b: Modules for the complex minor subject

No.	Module title	LP	Status	Evaluation
11847	Neural Networks and Learning Theory	8	WP	Prü
11859	Cryptography	8	WP	Prü
11864	Wireless Sensor Networks: Concepts, Protocols and Applications	6	WP	Prü
12464	Modelling and Simulation of Discrete Systems	6	WP	Prü
12971	Operations Research for Environmental and Resource Management	6	WP	Prü
12979	Internet Measurements and Forensics	6	WP	Prü
11221	Fundamentals in Power Electronics	6	WP	Prü
11689	Power Generation from Wind Energy	6	WP	Prü
11690	Power Generation from Solar Energy	6	WP	Prü
11691	Energy Storage Technology	6	WP	Prü
11745	Power Generation from Bio Fuels	6	WP	Prü
12165	Renewable Energy Technologies for Power Supply	6	WP	Prü
12233	Experiments in Aerodynamics and Fluid Mechanics	6	WP	Prü
12885	Computational Fluid Dynamics	6	WP	Prü
35413	Energy Information Systems	6	WP	Prü
44108	Thermal Process Engineering and Equilibrium Thermodynamics	6	WP	Prü
13017	Microwave and Millimetre Wave Sensors for Biomedicine: Applications and Physical Foundations	6	WP	Prü
13034	Internship	12	WP	Prü

LP = credits; P = compulsory module; WP = compulsory elective module; Prü = performance verifications; SL = study performances

The list of the compulsory elective modules shall be up-dated and published regularly by the Degree Programme Coordinators in accordance with Section 6(3).

Annex 2: Standard programme plan

	1st Semester	2nd Semester	3rd Semester	4th Semester
	Specialisation Phase		Research Phase	
Mandatory modules	Advanced Seminar (6 LP) Experimental or Theoretical Physics	Advanced Seminar (6 LP) Theoretical or Experimental Physics	Research module II (30 LP)	Master Thesis (30 LP)
Compulsory elective modules	Physical Specialisation Nanophysics, Condensed Matter Physics, Theory, Simulation and Further Topics (Annex 1a) (18 LP)	Physical Specialisation Nanophysics, Condensed Matter Physics, Theory, Simulation and Further Topics (Annex 1a) (12 LP)		
	Minor Subject (Annex 1b) (6 LP)	Minor Subject (Annex 1b) (6 LP)		
		General Studies (6 LP)		
Credits	30	30	30	30

Annex 3: Internship regulation

1. Scope of validity

¹These internship regulations apply to students who carry out the subsidiary subject "Minor Subject" (Section 6(4) of the examination and study regulations of the Master's programme in Physics) as part of an internship. ²Interns within the meaning of these regulations are students of the BTU in the Master's programme in Physics.

2. Essence and purpose of the internship

¹The internship serves to apply, supplement and deepen the material learned in an environment typical of professional practice. ²The students shall acquire the ability to familiarise themselves with the diverse tasks of application and research-related fields of activity and cope with the frequently changing tasks that they will encounter in their later professional life.

3. Application for an internship position

¹Completion of an internship as part of the minor subject shall apply following consultation with the mentor (Section 9(2) RahmenO-MA) and must be approved by the examination board. ²The search for an internship is the responsibility of the student.

4. Supervision of interns

¹The internship shall be supervised by a member of the teaching staff in the field of physics at the BTU and shall be led by a mentor at the institution concerned. ²The mentor shall assign the internship task following consultation with the supervisor.

5. Internship report

¹A written internship report must be prepared on the internship and presented in a public presentation. ²Internship, internship report and presentation are jointly assessed by the supervisor and the mentor.