Subject-Related Examination and Study Regulations for the Master's Degree Programme in Micro- and Nanoelectronics from 15 March 2024

English translation, not legally binding!

In accordance with the Brandenburg Higher Education Act (Brandenburgisches Hochschulgesetz – BbgHG) of 28 April 2014 (GVBI. I/14 Nr. 18), last amended by the act of 23 September 2020 (GVBI. I/20, Nr. 26), according to Section 5 Paragraph 1 Sentence 2, and Section 9 Paragraph 5 Sentence 2 in conjunction with Section 19 Paragraph 2 Sentence 1, Section 22 Paragraph 2 Sentence 1, Section 72 Paragraph 2 Sentence 1 of BbgHG and Section 1 Paragraph 1 of the General Examination and Study Regulations for Master's Degree Programmes at the Brandenburg University of Technology Cottbus-Senftenberg from 12 September 2016 (AMbl. 14/2016), last amended by the third amending statutes of 21 April 2023 (AMbl. 07/2023), Brandenburg University of Technology Cottbus-Senftenberg (BTU) has adopted the following statutes:

Contents

§ 1 Scope of Validity

[1]These statutes outlines the subject-related specifics for the Master's Programme "Micro- and Nanoelectronics." [2]It is a supplement to the General Examination and Study Regulations for Master's Degree Programmes at BTU (RahmenO-MA) from 12 September 2016 (AMbl. 14/2016), last amended by the third amending statutes of 21 April 2023 (AMbl. 07/2023).

§ 2 Content Profile of the Programme, Goals of Studies

(1) [1]Micro- and nanoelectronics is a key technology for innovations in areas ranging from energy technology and medical technology to industrial automation and communication. [2]Micro- and nanotechnology itself is a highly dynamic and innovative field of science and technology. [3]In practice, working with and on the latest semiconductor technologies requires multidisciplinary knowledge ranging from physics, technology and electronics to system applications.[4]For example, the successful development of future semiconductor technologies (classically assigned to physics) requires a sound knowledge of circuit technology (classically assigned to electrical engineering). [5]On the other hand, the design of integrated circuits also benefits from a good understanding of semiconductor physics and technology. [6]The English-language Master's degree programme Micro- and Nanoelectronics imparts this knowledge and skills from the related fields of physics and electrical engineering, and thus lays a solid foundation for work in science or research and development in the field of micro- and nanoelectronics, from semiconductor physics to the integration of electronic systems. [7]The degree programme is designed to prepare its graduates to work in related fields of semiconductor technology, solid state physics or electronics.

(2) [1]The English taught Master's degree program in Micro- and Nanoelectronics provides students with the ability to apply the instruments and methods of the field and to critically classify scientific findings. [2]Graduates would not only acquire sound knowledge in the areas relevant to the subject, but they would also be able to react flexibly to future requirements and changes in the field. [3]To this end, the basic and method-oriented courses offered at an advanced level enable graduates to solve tasks that require technical and methodological flexibility as well as academic independence. [4]Students will be introduced to the current state of research and acquire the ability to carry out independent research work, also with the aim of a subsequent doctorate. [5]In addition, students will acquire the ability to critically question the prerequisites, limits, and effects of the application of physical and engineering solutions to socially relevant problems.

(3) [1]The Master's degree programme in Micro- and Nanoelectronics is committed to the goal of internationality and interdisciplinarity. [2]Networking with non-university research institutes enables students to specialize in a wide range of research areas and to have direct contact with the relevant working groups. [3]Instruction in scientific work is supported in particular by a research module which introduces students to current topics in micro- and nanoelectronics and gives them the opportunity to carry out project-oriented research work in one of the research fields. [4]This qualifies graduates of the Master's degree programme in Micro- and Nanoelectronics to plan, manage, and carry out research projects in science and industry and enables them to act in a qualified and responsible manner in professional practice.

§ 3 Graduation, Degree

Upon successful completion of the Master Study Programme in Micro- and Nanoelectronics the academic degree "Master of Science" (M. Sc.) will be awarded.

§ 4 Special Admission and Enrolment Requirements

(1) [1]The primary admission requirement is a first professionally qualifying degree (at least a Bachelor's degree) in a subject-related to Micro- and Nanoelectronics degree program. [2]A degree is considered to be sufficiently close in content if

- the study programme content in mathematics, theoretical physics, and experimental physics is comparable to that of the Bachelor's degree program in Physics at the BTU,
- or the study programme content in physics, mathematics, electronics, and systems and field theory is comparable in scope to the Bachelor's degree program in Electrical Engineering with a focus on information technology or electronics at BTU.

(2) [1]The language of instruction and examination in the Master's degree programme in Micro- and Nanoelectronics is English. [2]For admission into the study programme it is required that students provide proof of sufficient English language skills according to Section 3 Paragraph 3 of the Enrolment Regulations from 22 January 2020 (AMbl. 01/2020) of the BTU.

(3) [1]The Examination Board shall examine whether the content of a degree is sufficiently close in accordance with Section 4 Paragraph 1. [2]In cases of conditional equivalence, the Examination Board may stipulate the completion of modules from the Bachelor's degree programmes in Physics and Electrical Engineering at BTU up to a maximum of 18 credit points (CP) as a condition for admission. [3]These supplementary modules, however, cannot be credited to the Master's degree programme in Micro- and Nanoelectronics.

(4) [1]The supplementary modules are determined according to content aspects from the BTU module programme. [2]If no corresponding English-language taught module is offered at BTU, a German-language taught module can also be specified. [3]In these cases, applicants with little or no knowledge of German are strongly recommended to acquire German language skills at level B2 by the end of the second semester.

§ 5 Regular Duration and Scope of the Programme

(1) [1]The regular duration of studies for this programme is 4 semesters. [2]The master's study programme comprises of completion of 120 credit points (CP), where one credit point corresponds to 30 hours of work.

(2) The programme commenced in the winter semester.

(3) [1]The master study programme in Micro- and Nanoelectronics is offered as a full-time study programme. [2]An individual part-time study option in accordance with Section 6 RahmenO MA is also possible.

§ 6 Programme Structure and Organisation

(1) The Master's degree program in Micro- and Nanoelectronics comprises according to Annex 1:

- A compulsory Foundation Module of 6 credit points (CP) at the first semester,
- Compulsory Elective Modules totalling 66 credit points (CP) from the three subject/thematic areas (complexes) of Technology and Devices, Circuit Design, and Applications,
- a module on General Interdisciplinary Studies (FÜS) of 6 credit points in accordance with the regulations of the BTU,
- Research Module (Research Project) of 12 credits points at the third semester,
- Master Thesis of 30 credit points at the fourth semester.

(2) [1]The Foundation Module serves to harmonize different prior knowledge. [2]If sufficient knowledge is available in both disciplines in accordance with Section 4 Paragraph 1, the examination board can specify an alternative Foundation Module.

(3) The Master's degree programme in Micro- and Nanoelectronics is divided into three subject/thematic areas:

- modules within Technology and Devices thematic area deal with topics of semiconductor physics and technology,
- modules within Circuit Design thematic area deal with the design of circuits and electronic systems,
- modules within Applications thematic area deal with a broader sense with applications that have a strong connection to electronic systems or are based on electronic components or sensors.

(4) [1]At least 12 credit points each has to be taken from the three thematic subject areas within the Compulsory Elective Modules. [2]In addition, the choice of modules must take into account the previous knowledge from the Bachelor's degree program and the individual specialisation.

(5) [1]The modules within Compulsory Elective Modules from the three thematic subject areas (Annex 1) will be adapted and published by the study programme head each semester. [2]The ability to study within the standard period must be guaranteed in all cases. [3]Adjustments to the course offerings will be notified by the study programme head to the administration (Campus Management System Process Support) one month before the start of the semester.

(6) [1]The Master's degree programme in Micro- and Nanoelectronics includes the research project (Research Module) in the third semester of the standard period of study. [2]This is intended to involve students in current research and development projects and, in addition to a defined subject-specific topic, impart skills for the practical implementation of technical and scientific work. [3]This includes working in a team, work organisation and time management, methods of carrying out technical developments and scientific experiments as well as the practical mastery of the required software tools, measuring devices and equipment. [4]The research project is supervised by a university lecturer in the field of electrical engineering or physics at BTU. [5]It can be carried out in a BTU department or in one of the non-university research institutes associated with BTU. [6]Further details can be found in the module description. [7]At least 42 credit points have been completed to register for the research module. [8]The Examination Board decides on exceptions.

(7) [1]The standard study plan listed in Appendix 2 provides a recommendation for the timing of the modules and an overview of the module examinations to be taken, including the credit points to be earned. [2]The standard study plan is of an indicative nature and guarantees that the standard period of study will be adhered to, subject to appropriate performance.

(8) [1]Students will be assigned a mentor from among the teaching staff in the first semester. [2]A change of mentor should only take place in justified cases and should be agreed with the Examination Board. [3]Each student shall draw up a study plan for the intended course of study by the end of the sixth week of the first semester. [4]The study plan and any changes during the course of studies must be discussed with the mentor, confirmed by the mentor and reported to Student Services.

§ 7 Special Regulations for the Organisation of Examinations

The research project (Research Module) is one of the practical study sections according to Section 17 Paragraph 4 of the RahmenO-MA practical study sections and is therefore excluded from the free attempt regulation.

§ 8 Master Thesis

(1) [1]The Master's thesis has a total of 30 credit points. [2]Only students who have acquired a total of at least 84 credit points, including the 12 credit points from the Research Module, at the time of registration are allowed to register for the Master's thesis. [3]The completion time for the written part of the Master's thesis is five months.

(2) [1]The Master's thesis is supervised by a university lecturer in the field of electrical engineering or physics at BTU. [2]The Examination Board decides on exceptions.

(3) [1]The candidate may suggest a topic for the Master's thesis. [2]The Master's thesis is written in English. [3]In exceptional cases, it may be written in German at the written request of the student with the consent of the supervisor. [4]The Examination Board shall decide on the application.

§ 9 Further Supplementary Regulations

There are no additional regulations.

§ 10 Entry into Force, Abrogation Regulations

(1) These regulations come into effect from the Winter semester 2024/25.

(2) These Examination and Study Regulations are no longer relevant after the established regular four semester of study duration of the programme and the final enrolment.

Issued on the basis of the decisions made by the Faculty Council of Faculty 1 – MINT – Mathematics, Computer Science, Physics, Electrical Engineering and Information Technology held on 18 October 2023, the opinion provided by the Senate on 23 November 2023 and the approval of the President of Brandenburg University of Technology Cottbus-Senftenberg given on 30 January 2024.

Annex 1: Overview of the Modules, Status, Credit Points (CP) of the Master's degree in Micro- and Nanoelectronics

Modul Nr.	Complexes and Modules	Status	Evaluation	CP
	Foundation Module			**6**
14032	Introduction to Microwave Electronics[1]	WP	Exam	6
14031	Physics of Modern Devices[2]	WP	Exam	6
	Thematic Subjects			**66**
	Technology and Devices			**min. 12**
13009	Semiconductor Technology	WP	Exam	6
14033	Advanced Micro- and Nanoelectronic Devices	WP	Exam	6
13024	Light and Matter: Introduction	WP	Exam	6
13025	Light and Matter: Interaction in Nanostructures	WP	Exam	6
13963	Neuromorphic Computing and Engineering	WP	Exam	6
11221	Fundamental in Power Electronics	WP	Exam	6
13019	Micro Systems	WP	Exam	6
13752	Advanced Micro Systems, Focus on Microsensors	WP	Exam	6
13016	Characterization of Micro- and Nanomaterials	WP	Exam	6
13021	Surface Physics and 2D Materials	WP	Exam	6
	Circuit Design			**min. 12**
14047	Selected Chapters in Microwave Electronics	WP	Exam	6
14074	Radio Frequency Measurement Techniques	WP	Exam	6
14086	Microwave CAD	WP	Exam	6
13006	Data Converters	WP	Exam	6
14030	Radio Frequency Application-Specific Integrated Circuit Design	WP	Exam	6
14029	Application-Specific Integrated Circuit Design and Characterization Lab	WP	Exam	12

14028	Antennas	WP	Exam	6
13374	Antenna Design Laboratory	WP	Exam	6
14027	Fundamentals of Signal and Power Integrity	WP	Exam	6
	Applications			**min. 12**
13254	Image Based Measurement Techniques for Aerodynamics	WP	Exam	6
11847	Neural Networks and Learning Theory	WP	Exam	8
13942	Foundations of Psychophysiology	WP	Exam	6
11864	Wireless Sensor Networks: Concepts, Protocols and Applications	WP	Exam	6
	General Interdisciplinary Studies			**6**
	General Interdisciplinary Studies (FÜS)	WP	Exam	6
	Research Project			**12**
14026	Research Module	P	Exam	12
	Master Thesis			**30**
14025	Master Thesis	P	Exam	30
	Total			**120**

[1]Compulsory for students without a Bachelor's degree in Electrical Engineering/Information Technology

[2]Compulsory for students without a Bachelor's degree in Physics

[*]to be selected from the BTU's FÜS catalogue

P = Compulsory, WP = Compulsory Elective

Annex 2: Regular Study Plan (Example)

Complexes and Modules	**Credit points in the semester**				**CP Total**
Semester	1	2	3	4	
Foundation Module					**6**
Introduction to Microwave Electronics or Physics of Modern Devices	6				6
Thematic Subjects					**66**
Subjects from the compulsory elective catalogue	24	24	18		66
General Interdisciplinary Studies					**6**
Module from FÜS		6			6
Research Project					**12**
Research Module			12		12
Master Thesis					**30**
Master Thesis				30	30
Total	**30**	**30**	**30**	**30**	**120**