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TECHNISCHE UNIVERSITÄT ILMENAU

Examination and Study Regulations - Special Provisions - for the degree program Micro- and Nanotechnologies with the degree "Master of Science"

According to § 3 para. 1 in conjunction with § 38 para. 3 of the Thuringian Higher Education Act (ThürHG) of 10 May 2018 (GVBl. p. 149), last amended by Article 7 of the Act of 23 March 2021 (GVBl. p.115 / 118), the Technische University Ilmenau (hereinafter referred to as "University") issues the following Examination and Study Regulations - Special Provisions - for the degree program Micro- and Nanotechnologies with the degree "Master of Science", based on the Examination and Study Regulations - General Provisions - for degree programs with the degree "Bachelor", "Master" and "Diploma" of the University, published in the University Gazette No. 174 / 2019, last amended by the Second Amendment Statutes (University Gazette No. 184 / 2020), as published in the University Gazette No. 211 / 2021.

The Council of the Department of Electrical Engineering and Information Technology adopted these regulations on 2 March 2021. The Academic Committee issued a positive opinion on them in a resolution dated 30 March 2021. The President approved them on 5 May 2021.

Table of contents

A. General regulations	3
§ 1 Scope of application	3
B. Studies and degree program	3
§ 2 Academic degree	3
§ 3 Study requirements and prior knowledge	3
§ 4 Objectives of the program, occupational field, profile type	4
§ 5 Standard length of study	4
§ 6 Content, structure, and scope of the degree program; curriculum	4
§ 7 Admission to program segments, admission to modules	5
§ 8 Student advisory service	5
§ 9 Language of instruction and examination	5
C. Examinations	6
§ 10 Admission to examinations	6
§ 11 Type, form, and duration of examinations; deadlines	6

§ 12 Second resit of examinations	6
§ 13 Grade improvement and free attempt (Freiversuch)	6
§ 14 Master's thesis	7
§ 15 Determination of the overall grade	8
D. Final regulations	8
§ 16 Validity and termination of validity	8
Annex Special admission requirements	9
Annex Curriculum	11
Annex Profile description	12
Annex Competence goals and regulatory area elective course catalogues	18

A. General regulations

§ 1 Scope of application

(1) The Examination and Study Regulations - Special Provisions - for the degree program Micro- and Nanotechnologies with the degree "Master of Science" determine the contents, objective, structure and organization of the degree program as well as details of the examination procedure in the mentioned degree program on the basis of the Examination and Study Regulations - General Provisions - for degree programs with the degree "Bachelor", "Master" and "Diploma" of the University (PStO-AB), published in the University Gazette No. 174 / 2019 in the respective valid version. The annexes are part of these regulations.

(2) All references to persons and positions shall apply in the same way irrespective of gender.

B. Studies and degree program

§ 2 Academic degree

The university, on the proposal of the Department of Electrical Engineering and Information Technology, awards students who successfully complete this Master's program the academic degree

"Master of Science"

as further professionally qualifying academic degree.

§ 3 Study requirements and prior knowledge

(1) In addition to the general admission requirements to a Master's degree program according to the Thuringian Higher Education Act, the further admission requirements for this degree program shall apply as specified in the annex "Special Admission Requirements".

(2) For modules in a language of instruction and examination other than English (§ paragraph 1) as well as for double degree programs (§ 9 paragraph 2), it is recommended to be proficient in the language of instruction and examination at C1 level according to the Common European Framework of Reference for Languages (CEFR) to successfully complete the program.

§ 4 Objectives of the program, occupational field, profile type

(3) The degree program aims at a research-oriented deepening of the technical and methodological competence in micro- and nanotechnology in general, which has already been acquired in a university degree program and, if applicable, in professional practice, as well as gaining special systems engineering knowledge in the fields of electronics, electrical engineering, microsystems engineering, physics and materials engineering. In addition, the ability to work in a team, social competence and communication skills are to be developed to a high degree during the degree program. In the annex "Profile description", the qualification goals, content-related aspects of the degree program and the demand for graduates in the industry are described in detail.

(4) The degree program is consecutive with a profile of "research-oriented" according to § 4 Thüringer Studienakkreditierungsverordnung (ThürStAkkVVO, ordinance on accreditation of degree programs).

§ 5 Standard length of study

According to § 52 ThürHG, the standard length of study is four semesters. The degree program begins in the winter semester.

§ 6 Content, structure, and scope of the degree program; curriculum

(1) The curriculum (annex) outlines the content as well as the structure of the studies in such a way that the degree program can be completed with all final examinations and the Master's thesis (§ 14) within the standard length of study according to § 5.

(2) The program covers a total of 120 credit points (LP/ECTS).

(3) In addition to the subject-specific modules, students are also recommended to attend the optional classes offered by the university exceeding the curriculum's requirements.

(4) Self-study is essential for gaining specialized knowledge and for the deepening and broadening of the subjects' contents presented in the lectures and classes.

(5) Students aiming for the academic degree in a double degree program based on a cooperation agreement with a partner university shall, unlike the curriculum described in the annex, complete classes at the partner university in accordance with the provisions of the respective cooperation agreement and its amendments.

(6) According to § 3 para. 7 PStO-AB, the corresponding regulations are defined in the annex "Competence goals and regulatory area elective course catalogues".

(7) The third semester is particularly suitable for a stay abroad during the program, and the fourth semester for writing the Master's thesis. An individual study agreement must be signed for this purpose. For the recognition of the achievements abroad, § 26 PStO- AB applies.

(8) Students shall be invited to participate in the university's self-governing bodies, including the student body.

§ 7 Admission to program segments, admission to modules

There are no special professional (qualitative and quantitative) requirements for admission to program segments and modules.

§ 8 Student advisory service

As recommended by the Academic Program Committee, the Department of Electrical Engineering and Information Technology appoints a study advisor. Individual study counselling on organizational and examination-related issues is provided by the study advisor and the Education Office / Examination Office of the Department of the Department of Electrical Engineering and Information Technology.

§ 9 Language of instruction and examination

(1) English is the language of instruction and examinations in the degree program Micro- and Nanotechnologies. Individual elective modules can also be offered in German. The language of the examination corresponds to the language of the class. The module officer determines the specific language of instruction and examination for the respective module in the module description in accordance with PStO-AB sentences 1 and 2 as well as § 3 paragraph 9 sentences 1 to 3.

(2) For students who are interested in an academic degree in a double degree program (Double Degree) based on a cooperation agreement with a partner university (§ 9 PStO-AB), classes and exams are held in the partner university's usual language of instruction and examination. The provisions of the cooperation agreement and its supplementary agreements apply to the Master's thesis.

C. Examinations

§ 10 Admission to examinations

There are no program-specific requirements for admission to examinations.

§ 11 Type, form, and duration of examinations; deadlines

(1) The type of examination to be taken (§ 10, para. 1 PStO-AB) is specified in the curriculum. The form and duration of the examination (graded and non-graded examinations) shall be determined by the module officer in the module description (§ 11 paragraphs 1 to 7 PStO- AB).

(2) Alternative academic achievements, which must be provided in writing, can be supplemented by a colloquium (§ 11 para. 5 PStO-AB).

(3) If the examinations to be taken in the first two semesters according to the curriculum (annex) are not taken by the end of the second semester after the semester provided for in the curriculum (annex), the examinations not yet taken shall be deemed to have been taken for the first time and not passed, unless the student is not responsible for the failure; § 21 paragraph 4 PStO-AB shall apply accordingly.

§ 12 Second resit of examinations (2nd repeat exam)

According to § 19 para. 1 PStO-AB, three graded examinations can be repeated a second time.

§ 13 Grade improvement and free attempt (Freiversuch)

In accordance with § 21 para. 1 PStO- AB, an examination that has not been passed for the first time is deemed not to have been taken upon application if it was taken for the first time before or in the semester recommended in the curriculum (annex) (Freiversuch/free attempt). Section 21 para. 2 PStO-AB applies to the improvement of grades. According to § 21 para. 3 PStO-AB four free attempts and grade improvements (total number of attempts) can be claimed.

§ 14 Master's thesis

(1) According to § 24 PStO-AB, the Master's thesis is an examination in the fourth semester. It consists of the written scientific assignment and a colloquium (§ 24 paragraph 1 PStO-AB). The grade of the Master's thesis is determined by 4 / 5 from the arithmetic mean of the grades of the expert opinions and 1 / 5 from the grade of the colloquium.

(2) Admission to the Master's thesis requires the successful completion of academic achievements and examinations listed in the curriculum (annex) amounting to at least 85 credit points. The topic is usually issued at the end of the third semester.

(3) In accordance with § 9 in conjunction with Annex 1 PStO-AB, the cooperation agreements and their supplementary agreements for double degree programs may contain provisions that differ from the provisions outlined here.

(4) The thesis covers a workload of 750 hours / 25 credit points and must be completed within five months. The processing period begins at the time determined by the examination board according to § 24 paragraph 7 PStO-AB.

(5) Students are only admitted to the colloquium when they have proven that they have completed all the coursework and examinations listed in the curriculum (annex), with the exception of the Master's thesis, and the Master's thesis has been submitted to the Examinations Office of the Department of Electrical Engineering and Information Technology in due time. The colloquium consists of a talk of usually 20 minutes (maximum 30 minutes) in which the student presents the results of his/her thesis and a subsequent discussion of maximum 30 minutes. Five credit points are awarded for the colloquium. It usually takes place no later than four weeks after the submission of the thesis, but only after the admission requirements have been met. The colloquium is assessed/graded by two examiners. One of the examiners should be the supervising professor.

(6) The topic and supervision for the Master's thesis are always the responsibility of the respective supervising university teacher, who must be a professor, a junior professor or a habilitated staff member of a group of the university involved in the degree program.

(7) Should a student intend to write the Master's thesis externally or in a group of the university not involved in the degree program, he/she shall add the following to the application for admission:

1. the approval of the desired institution/company or the desired group, indicating a specialist supervisor with details and proof of his/her qualifications,
2. a brief description of the task and content,
3. a declaration by the supervising university professor.

(8) The supervising university professor is the first assessor/examiner of the thesis. According to § 33 para. 1 PStO-AB, the supervising professor is entitled to suggest the second assessor/examiner.

§ 15 Determination of the overall grade

The determination of the overall grade follows § 17 para. 5 sentence 1 PStO-AB.

D. Final regulations

§ 16 Validity and termination of validity

(1) These Examination and Study Regulations - Special Provisions - for the Micro- and Nanotechnologies program leading to the degree of "Master of Science" shall be valid as of the day following their publication in the university's Official Gazette. They apply to all students enrolled as of the winter semester 2021 / 2022.

(2) As of the end of the summer semester 2024, all other examination regulations - special provisions - and study regulations for the Micro- and Nanotechnologies degree program with the degree of "Master of Science" in force at the time of the validity of these regulations shall cease to apply. For students who have not completed their studies by the time these regulations expire, the current version of the Examination and Study Regulations - Special Provisions - for the Micro- and Nanotechnologies program leading to the degree of "Master of Science" shall apply from the time these regulations expire.

Ilmenau, 5 May 2021

signed by

Univ.-Prof. Dr.-Ing. habil. Kai-Uwe Sattler

President

Annex: Special admission requirements

1. The admission to the degree program Micro- and Nanotechnologies with the degree "Master of Science" requires - despite the general and other admission requirements - the presence of the following professional qualifications, which is to be verified in the aptitude test according to § 4 of the Regulations on the Admission to Master's Degree Programs at the Technische Universität Ilmenau (MAZugO). Therefore, the aptitude test determines whether the applicant meets the special subject-specific requirements for the degree program Micro- and Nanotechnologies with the degree "Master of Science".

2. Aptitude testing shall be based on a combination of the professional qualifications listed in the following sections 3 to 6 and weighted based on scores.

3. The Master's program is based on a first professional qualification with knowledge in the following fields:

- Principles of Electronic Engineering
- Principles of Materials Engineering
- Higher Mathematics
- Experimental Physics/Theoretical Physics/Solid-state Physics
- Principles of Electrical Engineering
- Principles of Mechanical Science/Engineering Mechanics/Mechatronics

4. the first professionally qualifying degree within the meaning of § 67 para. 1 sentence 1 number 4 ThürHG is assessed:

- a) with 40 points in the following programs:
Electrical Engineering and Information Technology / Engineering degree programs with an in-depth specialization in content / Focus on micro- and nanotechnology or microsystems technology
- b) with 30 points in the following programs:
Engineering degree programs with a considerable focus on electrical engineering or semiconductor physics or microelectronics
- c) with 20 points in the following programs:
Other engineering or science degree programs

5. In addition, the level of qualification is assessed according to the final grade of the degree program:

- a) Final grade 1.0 – 1.5 = 30 points,
- b) Final grade 1.6 – 2.0 = 20 points,
- c) Final grade 2.1 – 2.5 = 10 points.

6. Furthermore, there are considered:

a) Achievement of a final grade of "good" or "very good" in the three subjects or subject groups relevant to the degree program:

- Principles of electrical engineering,
- Experimental Physics/Theoretical Physics/Solid-state Physics,
- Principles of materials engineering / Materials science and engineering,

and

b) the completion of a closely related and equivalent bachelor's thesis or a thesis with a grade of at least "good"

and

c) proven, qualified and closely related professional experience of at least one year.

The assessment consists of five points

each.

A maximum of 20 points can be earned.

7. Should the applicant achieve the following according to the assessments in sections 3 to 6:

a) The aptitude test is to be assessed as "Special access requirements met" when the total score is 60 points or more according to the presented documents.

b) The aptitude test is to be assessed as "Special admission requirements not fulfilled" if, based on the presented documents, the total score is less than 60 points (§ 4 Para. 4 Sentence 4, Para. 6 Sentence 1 MA-ZugO).

8. The responsibility for the decision according to number 1 results from § 4 para. 1 MA-ZugO. In case of doubt, the Examination Board shall decide.

Examination and Study Regulations - Special Provisions - for the degree program
Micro- and Nanotechnologies with the degree "Master of Science"

Annex: Curriculum

Study segments / Modules	Module type (compulsory/ elective)	Final Module Score/Exam (Form, duration and details are defined in the module catalogues)	Semester				Total LP	Weig htin g	Module description
			1.	2.	3.	4.			
			WS LP	SS LP	WS LP	SS LP			
Compulsory segment									
Electronics Technology 1	P	MPL	5				5	5	200573
Semiconductor Devices 1	P	MPL	5				5	5	200502
Materials of Micro- and Nanotechnologies	P	MPL	5				5	5	200601
Nanodiagnostics	P	MPL	5				5	5	200386
Nanotechnology	P	MPL	5				5	5	200547
Microsystems Technology	P	MPL		5			5	5	200333
Laboratory for Materials & Micro/Nanofabrication	P	MPL		5			5	5	200543
Introduction to Research	P	MSL		5			5	0	200752
Forschungsprojekt / Research Project	P	MPL			10		10	10	200749
Advanced studies	P								
Choice of six modules (30 credit points) according to the current catalogue	W	4 MPL			30		30	30	
Technical elective modules	P								
Choice of one technical module (minimum five credit points) from engineering master programs of the university	W	MPL			5		5	5	
Key competencies	P								
*Choice of non-technical course(s) from the department of Economy and Media (e. g. economy, law...) or ZIB. International students choose a course from the language catalogue for "Allgemeinsprache DaF" for 4 credit points	W	MSL	5				5	0	
Master's Thesis with colloquium	P	MPL				30	30	30	Link
Total LP			30	30	30	30	120		
	MPL	Module examination (graded)	LP	Leistungspunkte / credit points					
	MSL	Module academic achievement (graded or non-graded)	P	Pflichtmodul / compulsory modules					
			W	Wahlmodul / elective module					

Annex: Profile description

1. Objective of the Master's degree program Micro- and Nanotechnologies

Studying Micro- and Nanotechnologies at the TU Ilmenau offers a combination of classical micro-technologies and modern nanotechnologies, covering and providing methods, tools, and theoretical considerations for dealing with the world of micro- and nano-scale structures. The micro-technological aspect with structural dimensions ranging from 0.1 to 1000 μm is extended by the nano-scale world with structural dimensions of less than 100 nm. The necessity of this major arises from the fact that traditional micro-technologies have reached the limit of their classical approach to the production, testing and application of structural components with progressing miniaturization at nano levels. Thus, entirely new properties and functions are achieved at a nano scale, which offer a wide range of applications. Due to decreasing structural dimensions in the "nano world", the traditional disciplines of electrical engineering, natural sciences, materials sciences, and mechanics are combined ever more in an integrated use of physical and chemical properties and principles.

This engineering degree program aims to teach natural scientific fundamentals and basic technical knowledge for micro- and nanostructures, as well as their systematic integration. During this degree program, students are prepared to contribute to and forward the development of micro- and nanotechnologies and their applications in the future. Particular attention is devoted to teaching equally the relevant methodical range for lithographic nano-structuring (top-down strategy); the molecular structuring through self-assembling (bottom-up approach); the opportunity of combining both concepts and the required characterization techniques also. Additional to the general basic knowledge in engineering and natural sciences, knowledge in thin-film technology, micro-structure technology and solid-state physics is provided.

This Master of Science in Micro- and Nanotechnologies as a consecutive, research-oriented university program is based on the Bachelor of Science degree programs of Electrical Engineering, Micro-systems Engineering, Mechatronics, Technical Physics, Materials Science and similar (international) degree programs, as well as optional appropriate professional experience. It is jointly provided by the Departments of Electrical Engineering and Information Technology, Mechanical Engineering, and Mathematics and Natural Sciences, and enables students to enter the program after a six- or seven-semester bachelor's degree program. Due to a strong commitment to research, and with the aim of preparing students for research work in companies or at universities and attracting suitable candidates from Germany and abroad, this major is set to be designed internationally, and English is the language of instruction.

2. Qualification objectives of the Master's program in Micro- and Nanotechnologies

The consecutive Master's program in Micro- and Nanotechnologies is designed as an in-depth, broadening, cross-disciplinary, research-oriented degree program.

The degree Master of Science in Micro- and Nanotechnologies represents a professionally qualifying university degree, which provides graduates with extended competences and skills required for the labour market. Graduates of the Master's degree program can start their career in industry or immediately enter a doctoral program in Ilmenau or abroad.

Successful graduates of the Master's program Micro- and Nanotechnologies acquire the following competences:

Knowledge, understanding, and comprehension

Graduates have already met the qualification objectives of the previous bachelor program and have now improved their skills in this Master's program, achieving a higher level of confidence in applying and implementing their competencies when creating micro- and nano-structures, using these structures in components and devices and enlarging natural-scientific requirements for their preparation and functions.

Graduates have gained in-depth expertise in the field of Micro- and Nanotechnologies including the specialist knowledge based on the fields of Mechanics, Electrical Engineering, Physics, Materials Science and Systems Technology. They can define and interpret questions and problems in engineering science.

The specialist expertise of the graduates is of considerable breadth and depth and, therefore, they can easily and independently acquaint themselves with both new developments in Micro- and Nanotechnologies and the related fields like Technical Physics, Micro- and Nano-electronic Systems and Sensor Technology. Their knowledge and understanding provides the basis for the research-oriented development and/or application of independent ideas.

Graduates weigh up the epistemologically based correctness of technical and practice-relevant statements against each other, including scientific and methodological considerations. With the help of these considerations, they solve scientific research questions and practical problems.

Use, application, and generation of knowledge

Graduates can apply their knowledge, understanding, and problem-solving skills to new and unfamiliar situations related to micro- and nanotechnologies in a broader or multidisciplinary context. Graduates apply methods used in engineering, mathematics and natural sciences to define and solve complex problems in research and development, in the manufacture, use and operation of miniaturized components, in R&D work in industrial companies in the fields of electronics, microsystems technology, sensor and device technology or in research centres, to critically scrutinize them and to develop them further as required.

Graduates

- integrate existing and new knowledge in complex contexts even based on limited information,
- make scientifically sound decisions and critically assess possible consequences,
- acquire new knowledge and skills independently,
- carry out application-oriented projects mainly independently,
- can develop innovative concepts and solutions to fundamental issues in micro- and nanotechnologies with the consideration of other disciplines.

Graduates

- outline and design research questions,
- choose specific ways of operationalizing research and justify them,
- select research methods and justify this selection,
- explain research results and interpret them critically.

Communication and cooperation

Graduates

- work on development tasks in teams, plan, and work on subtasks independently and combine them into a comprehensive solution which is implemented and documented appropriately for the task,
- define and express technical and subject related solutions to problems and can justify them with theoretical and methodical arguments in a discourse with representatives of the field as well as with external experts,
- communicate and cooperate with experts and non-specialists to solve a problem responsibly,
- reflect and consider different points of view and interests of other participants,
- have social skills that prepare them particularly well for management tasks

(team and communication skills, international and intercultural experience, social, ecological, and ethical awareness.

Scientific self-image / professionalism

Graduates:

- develop a professional self-perception based on goals and standards of in professional fields within and outside academia,
- justify their own professional activities according to theoretical, practical, and methodological knowledge,
- can assess their own abilities, autonomously reflect on relevant design and decision-making independence, and use these under supervision,
- can evaluate fundamental interactions between technology and society as well as ethical aspects and take them into account when developing technology products,
- can manage and set up projects in the engineering technology fields, as well as related and multidisciplinary fields,
- critically think about their professional activities in terms of social expectations and consequences.

3. Content-related main focus / course of studies / curriculum of the Master's program in Micro- and Nanotechnologies

The focus of the Micro- and Nanotechnologies degree program is, on the one hand, an interdisciplinary orientation ranging from natural scientific basics to engineering science-oriented application and, on the other hand, the systematic integration of methods, procedures, and technologies. Micro- or nano-integration, as well as methods for a targeted generation and functionalization of firmly established nanostructures in a technical micro-system cover one key area of research at the inter-departmental Institute for Micro- and Nanotechnologies, MacroNano[®], and together with the scientific infrastructure at the Centre for Micro- and Nanotechnologies, represents a unique selling point that determines the essential content of the Master's program in Micro- and Nanotechnologies.

The degree program provides for an interdisciplinary oriented, practical education through a coordinated offer of compulsory key modules, a complementary spectrum of elective modules - some of which include seminars as well as short-term internships - and a challenging research project. On the one hand, this range of classes is intended to introduce students to modern theories and techniques of nanoscience, representing the basis for micro- and nanotechnologies, and, on the other hand, due to the proximity to current research at the university, to train the ability to directly implement scientific work into findings, knowledge, and development achievements.

The compulsory modules to be completed deepen scientific fundamentals and provide a further and more in-depth introduction to the respective fields of

Micro- and Nanotechnologies (Nanotechnology, Semiconductor Technology, Electronics Technology, Materials of Micro- and Nanotechnologies, Microsystems Technology).

An extensive range of electives one can choose from meets the Master's program and the possibility of specialization:

- Nanoelectronics
- Neuromorphic Electronics
- Advanced Packaging
- Micro- and Nanosensor Technology
- Nanostructure Physics
- Materials Analytics

Interdisciplinary, including non-technical, subjects complete the degree program. Corresponding internships or independent learning elements are embedded in many modules.

As a special feature, the program features a complex project as individual or group work. Through many industrial contacts and projects, education and program are always close to application.

The completion of a Master's thesis within six months concludes the program.

There is a possible mobility window in the third semester, which provides many options, in the context of the Master's thesis in the fourth semester, or through individual study agreements.

4. Demand for graduates in industry

Micro- and Nanotechnologies are key technologies at present and will continue to be in the future. The development of nanoscale materials and components, as well as their integration in micro-systems, has caused a significant demand for professionals who are able to work at the interface between the well-honed lithographic micro-technology and molecular techniques. These professionals need a solid university education containing parts of the mainstream engineering sciences and modern expertise in the fields of all natural sciences. This demand is sure to increase considerably in the years to come. The program offered here helps to close the gap between the requirements of the labor market and the offer of qualified experts.

In Thuringia, the micro-nano integration is regarded as a key technology for the qualitative leap in the field of sensor technology. Due to the enormous potential for miniaturization, cost reduction and entirely new functionality, the micro-nano integration is considered an "Enabling Technology" worldwide, which offers sophisticated solutions for tasks in many aspects of life, e.g. in ultra-efficient energy storage and conversion; in medical diagnostics; in environmental sensor systems; in communications or in production monitoring

and control. The nation-wide demand is also clear to see in Thuringia since employers and company representatives lament the lack of qualified micro-engineers. In Thuringia, there is an urgent need of engineers, especially in the fields of microelectronics and sensor technology.

There are very interesting employment opportunities in research centers and institutes and, above all, in the electronics industry; the sector for micro-systems technology; in the equipment industry and in material development. Due to their interdisciplinary education, graduates will find a wide range of employment opportunities in areas with close links to micro-systems technology and nanotechnology, as well as in traditional fields of research and development. Thus, graduates can choose from a wide range of fields and thus benefit from a high degree of flexibility on the labour market.

The professional career prospects for graduates of the Master's program in Micro- and Nanotechnologies at the TU Ilmenau can be described as outstanding nationally and internationally in the mid and long term. The main areas of employment for graduates are, among others:

- Microelectronics and semiconductor industry
- Microsystems technology (MEMS/NEMS-industry)
- Smart measuring and sensor technology
- Industrial automation and control technology/process engineering
- Power engineering (esp. renewable energy generation)
- Medical engineering
- Information and communications electronics

Annex: Competence goals and regulatory area elective course catalogues

The Micro- and Nanotechnologies program leading to the degree of "Master of Science" includes three electives:

1. Elective field of "Advanced Studies"

(1) The " Advanced Studies " allow students to deepen and broaden their knowledge in various fields of application and related areas of micro- and nanotechnology. This provides them with the opportunity to set and deepen their own focal points that correspond to their preferences and interests, also serving as preparation for the final thesis and a possible professional specialization.

(2) According to the curriculum (appendix), students must earn 30 credit points (ECTS) in this elective area.

(3) The current elective catalogue provides a selection of modules based on the courses offered by the relevant groups at the university.

(4) According to § 3 para. 7 PStO-AB, the elective catalogue can be updated.

2. Elective field "Technical Electives"

(1) Selecting a module from an (ideally other) engineering Master's program at the university broadens the students' profile beyond micro- and nanotechnology.

(2) According to the curriculum (appendix), students must earn five credit points in this elective area.

3. Elective field "Key Competencies"

(1) The elective area "Key Competencies" serves the purpose of gaining additional knowledge, skills, and competencies, especially in the linguistic, societal, and social fields. Students choose a module or classes from the range of classes offered in economics, law, labour, and media studies, the Studium generale, European studies and the languages offered by the university. For international students, the completion of at least one class from the language program "General Language - German as a Foreign Language" with a total of four credit points is compulsory.

② According to the curriculum (appendix), students must earn at least five credits in the "Key Competencies" by completing graded assignments/exams.