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Technische Universität Dresden
Faculty of Physics

Study Regulations for the consecutive Master's degree program Sustainable Electronics and Photonics

as of April 24, 2026
(translated version)

Pursuant to § 14 para. 4 sentence 1 and § 37 para. 1 of the Saxon Higher Education Act of May 31, 2023 (SächsGVBl. p. 329) last amended by Article 2 of the Act of January 31, 2024 (SächsGVBl. p. 83), the Faculty Board of the Faculty of Physics, after consulting with the Academic Affairs Committee for the Master's degree program in Sustainable Electronics and Photonics adopted the following Study Regulations as a statute, which has been approved by the University Executive Board:

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§ 1

Scope of application

These Study Regulations govern the objectives, content, structure, and organization of the Master's degree program in Sustainable Electronics and Photonics at TU Dresden on the basis of the Saxon Higher Education Act, the General Examination Regulations, and the Specific Examination Regulations for the consecutive Master's degree program in Sustainable Electronics and Photonics.

§ 2

Objectives of the degree program

(1) Upon completion of the degree program, students will have acquired the necessary broad range of subject-specific knowledge, including essential interdisciplinary knowledge, as well as the corresponding practical skills and abilities. They recognize the interrelationships within their field and, drawing on a variety of scientific perspectives, are capable of conducting independent research; they are also able to acquire knowledge independently through research and experimentation, and to critically examine, present, and discuss both their own and others' findings and insights. Students will be able to approach complex problems and solve them using scientific methods, even beyond the current limits of knowledge. Students will possess subject-specific knowledge grounded in current research questions, as well as methodological and analytical skills and an understanding of research methods and strategies. Students will be able to identify scientific connections, communicate across disciplines, and solve scientific problems. Students will be familiar with the methods, techniques, and tools used in the development and manufacture of electronic and photonic components and circuits, as well as their potential applications. They will have foundational knowledge of how to assess the sustainability of the concept, manufacturing processes, and methods required for this. They are able to analyze problems in these subject areas and, based on that analysis, develop effective solutions. They will recognize the connections and interdependencies among these concentration areas and will be able to take them into account when developing solutions. Students are familiar with the latest research and developments in these subject areas and are able to contribute constructively to the process. They will acknowledge the importance of accurate academic documentation and presentation of results and will be committed to good scientific practice. In addition, students will possess key skills relevant to professional life, such as communication skills and team work, presentation skills, critical self-reflection, work organization, time management, and project planning. Moreover, they are able to make responsible judgments and act responsibly, and are able to critically address issues relevant to society such as sustainability.

(2) The professional, methodological, interpersonal, and social competencies, as well as the practical skills and abilities acquired during the degree program qualify graduates to pursue doctoral studies and to take on highly specialized roles, for example in educational and research institutions, industry, quality assurance, consulting, sales, management and government agencies. They will be capable of handling a wide range of tasks in their professional practice in the fields of sustainably produced electronics, photonics, optoelectronics, and nanotechnology, as well as continuing to develop their skills through ongoing, independent professional development.

§ 3

Admission requirements

(1) To be admitted to the degree program, candidates must have completed a first professionally qualifying higher education degree recognized in Germany or a qualification from an officially recognized vocational academy in a scientific or an engineering field.

(2) Furthermore, this degree program also requires English language proficiency at the C1 level of the Common European Framework of Reference for Languages (CEFR). Proof of language skills is provided by means of a relevant examination certificate or language certificate. These may include, in particular, a general or subject-specific university entrance qualification with documented language proficiency at the C1 level, a university entrance qualification completed entirely in English, a certificate of higher education for a degree program completed entirely in English, or an English language certificate such as TOEFL iBT (minimum score of 95) or the IELTS (minimum score of 7.0).

(3) In addition, a special aptitude is required. Proof of this special aptitude is provided through the aptitude assessment process in accordance with the Aptitude Assessment Regulations for the Master's degree program in Sustainable Electronics and Photonics.

§ 4

Start of the degree program

The program can be started in the winter semester.

§ 5

Teaching and learning methods

(1) The curriculum is structured in modules. Throughout the individual modules, the course content shall be taught, reinforced, and explored in greater depth through lectures, exercises, seminars, internships, language courses, and independent study. The scope of teaching methods is usually specified in hours per week (SWS). In modules that are subject to more than one study regulation, synonyms are permitted for teaching and learning methods with the same content.

(2) The individual teaching and learning forms according to para. 1 sentence 2 are defined as follows:

1. Lectures introduce the subject matter of the modules,
2. Exercises allow students to apply the subject matter in exemplary sub-areas,
3. Seminars enable students to familiarize themselves under supervision in a selected subject area on the basis of specialist literature or other material, to report on the results of their work, to discuss them within the group and/or to present them in writing,
4. Practical trainings serve to apply the subject matter taught and to acquire practical skills in potential areas of employment. They provide hands-on demonstrations of concepts already covered in theory and enable students to gain firsthand experience and skills in working with equipment, systems, and measuring instruments,
5. Language courses convey and train language knowledge, skills and abilities in the respective foreign language and enable students to develop communicative and intercultural skills in an academic and professional context as well as in everyday situations and
6. self-study serves to help students prepare for and follow up on course sessions on their own and enables them to independently explore, learn, review, and deepen their understanding of course content, as well as to prepare for examinations.

§ 6

Structure and organization of the degree program

(1) The program is organized into modules. The curriculum is divided into three semesters. The 4th semester is dedicated to the completion of the Master's thesis including the colloquium. The 4th semester is particularly suitable for a temporary stay at another university (mobility window). Part-time study is possible in accordance with the regulations on part-time study.

(2) The degree program comprises nine compulsory modules and a focus area, which allows students to choose their preferred area of specialization. Students can select either the Electronics focus area or the Photonics focus area. Both comprise two required modules each and one elective compulsory module each. The choice is binding. Students can change modules by submitting a written request to the Examination Office, in which they name the focus area they want to replace and the newly chosen focus area, or the module they want to replace and newly choose.

(3) The qualification objectives, content, teaching and learning methods, prerequisites, applicability, frequency, workload, and duration of the individual modules are specified in the module descriptions in Annex 1 of these Study Regulations.

(4) In deviation from § 2 para. 1 of the Specific Examination Regulations for the consecutive Master's degree program in Sustainable Electronics and Photonics, selected courses will be held in German in accordance with module descriptions.

(5) The allocation of modules to the individual semesters, which enables students to complete the degree program within the standard period of study, as well as the type and scope of the respective courses and the number and standard time of the required academic work and examined assessments, are specified in the study schedule for full-time studies, attached in Annex 2 of these Study Regulations, and in an individual study schedule for part-time studies approved by the faculty.

(6) Upon proposal of the Academic Affairs Committee, the Faculty Board may change the range of elective compulsory modules as well as the study schedule, attached in Annex 2 of these Study Regulations. The current selection of elective compulsory modules will be announced in the usual manner at the beginning of the semester. The amended study schedule shall apply to all students who have been informed about this in the usual manner at the beginning of their studies. The Examination Committee shall decide on any exceptions to sentence 3 upon application by the student..

§ 7

Content of the degree program

(1) Sustainable Electronics and Photonics is a research-oriented Master's degree programme.

(2) The degree program covers the fields of semiconductor technology, electronics including nanoelectronics and molecular electronics, photonics and optoelectronics, organic and other "Beyond Moore" semiconductor materials, analytics and measurement technology, as well as processing technology. Interdisciplinarily, the degree program also includes concepts addressing relevant sustainability issues, such as resource extraction and resource use in manufacturing and processing. Depending on the student's choice, it also includes a focus area with topics in the field of electronics, for example, components, applications of organic, perovskite-based, or molecular electronics, and memory technology, as well as topics in photonics and optoelectronics, such as

novel photovoltaics, nano-optics, and modern light sources, nanotechnology and structuring, as well as German as a foreign language and the methodology of scientific work.

§ 8

Credit points

(1) Credit points are awarded in accordance with the European Credit Transfer System. They document the average workload of the students and their individual study progress. One credit point corresponds to a 30-hour workload. Normally, 60 credit points are awarded per academic year, i.e. 30 credit points per semester. The total workload for the degree program corresponds to 120 credit points and comprises the teaching and learning methods according to type and scope stipulated in the module descriptions, the study achievements and examined assessments, the Master's thesis and the colloquium.

(2) The module descriptions indicate the number of credit points that can be earned by each module. Credit points are awarded upon passing the module examination. § 5 of the Specific Examination Regulations for the consecutive Master's degree program in Sustainable Electronics and Photonics shall remain unaffected.

§ 9

Academic Advisory Service

(1) General advice will be provided by the Central Student Information and Counseling Service at TU Dresden. It covers questions regarding study options, enrollment modalities and general student affairs. Subject-specific advice during studies will be provided by the Academic Advisory Service of the Faculty of Physics. This subject-specific advisory service assists students with regard to the design of their studies.

(2) At the beginning of the 3rd semester, each student who has not yet provided proof of academic performance shall make use of the subject-specific advisory services.

§ 10

Changes to module descriptions

(1) In order to amend to changed conditions, the module descriptions may be adapted in a simplified procedure in order to optimize study organization, with the exemption of the field module name, qualification objective, content, teaching and learning methods, requirements for earning credit points, credit points and grades as well as module duration.

(2) In a simplified procedure, the Faculty Board will adopt the amendments to the module descriptions upon proposal of the Academic Affairs Committee. The amendments shall be published in the usual manner.

§ 11

Transitional provisions

(1) This version of the Study Regulations shall apply for the first time to students newly enrolled in the Master's degree program in Sustainable Electronics and Photonics in the 2026/2027 winter semester.

(2) For students who were enrolled in the Master's degree program in Organic and Molecular Electronics prior to the 2026/2027 winter semester, unless otherwise provided in paragraph 3, the version of the Study Regulations for the consecutive Master's degree program in Organic and Molecular Electronics dated April 28, 2019 (Official Announcements of TU Dresden No. 9/2019 of May 23, 2019, p. 515) as amended by the Statute of April 24, 2026 (Official Announcements of TU Dresden No. 4/2026 of May 29, 2026, p. 169), shall continue to apply.

(3) By way of derogation from the first sentence of paragraph 2, § 23 of the General Examination Regulations shall apply with effect from the 2026/2027 winter semester.

§ 12

Entry into force

These Study Regulations enter into force on June 1, 2026.

The foregoing statutes are hereby executed. They shall be published in the Official Announcements of TU Dresden.

Dresden, as of April 24, 2026

The Rector
of Technische Universität Dresden

Prof. Dr. Ursula M. Staudinger

Annex 1
(to § 6 para. 3)
Module descriptions

Module name	Concepts of Molecular Modelling
Module number	Phy-Ma-SEP1
Responsible lecturer	Prof. Gianaurelio Cuniberti gianaurelio.cuniberti@tu-dresden.de
Qualification objectives	Students are familiar with the fundamentals of atomistic classical molecular dynamics for describing material properties at nano and micro scales, as well as with Monte Carlo simulation techniques. They are also familiar with classical mechanics and statistical mechanics, as well as the modelling of interatomic forces using empirical potentials. They can also describe potential energy surfaces and discuss various observables. They can quantitatively characterise the dynamics of molecules and model them using computer programmes. They also have a basic understanding of how machine learning methods can be applied to parameterise interatomic interaction potentials.
Content	The module comprises the topics of simulation methods for molecular dynamics, the use of stochastic methods (Monte Carlo simulations) and a basic introduction to machine learning methods.
Teaching and learning methods	The module comprises 3 hours per week lecture, 2 hours per week exercise, 2 hours per week practical training and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in the fundamentals of mathematics (linear algebra) and physics (classical mechanics). Literature: Riley, K. F., Hobson, M. P., Bence, S. J., Mathematical Methods for Physics and Engineering: A Comprehensive Guide, Cambridge, Cambridge University Press [2006]; Benacquista, M. J., Romano, Joseph D. R., Classical Mechanics (Undergraduate Lecture Notes in Physics), Springer [2018].
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a term paper equating to 160 hours and a written examination lasting 90 minutes, if more than 10 students are registered. If there are 10 or fewer registered students, the written examination is replaced by non-public oral examination lasting 20 minutes as an individual examination. If applicable, it will be announced in writing to the registered students at the end of the registration period. The written test or the oral examination must be graded at least "sufficient" (4.0).

Credit points and grades	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises a total of 300 hours.
Module duration	The module comprises one semester.

Module name	Semiconductor Technology
Module number	Phy-Ma-SEP2
Responsible lecturer	Prof. Stefan Mannsfeld stefan.mannsfeld@tu-dresden.de
Qualification objectives	Students will possess the ability to describe how individual technologies employed in the production of microtechnology and nanotechnology components function, work with the fundamental principles of production and miniaturisation of components and circuits, bring together individual technologies to create complex processes, and explain their interactions.
Content	This module covers the technological foundations of the production of micro and nano components as well as the production concepts of integrated circuits.
Teaching and learning methods	The module comprises 6 hours per week lecture, 1 hour per week practical training and self-study.
Prerequisites for participation	A basic knowledge of physics at the undergraduate level and chemistry at university entrance-level is required. Literature: Halliday, D., Resnick, R., Walke, J., Fundamentals of Physics, John Wiley & Sons Inc. [2011]; Goldberg, D. E., Fundamentals of Chemistry, The McGraw-Hill Companies [2007].
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a written examination lasting 120 minutes, if more than 20 students are registered. If there are 20 or fewer registered students, the written examination is replaced by non-public oral examination lasting 30 minutes as an individual examination. If applicable, it will be announced in writing to the registered students at the end of the registration period.
Credit points and grades	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module will be offered each academic year, beginning in the winter semester.
Workload	The workload comprises a total of 300 hours.
Module duration	The module comprises two semesters.

Module name	Organic Semiconductors
Module number	Phy-Ma-SEP3
Responsible lecturer	Prof. Sebastian Reineke sebastian.reineke@tu-dresden.de
Qualification objectives	Students will possess fundamental and advanced understanding of the relationships between the structure and properties of organic semiconductors and be able to apply this knowledge. They will also gain an overview of current research topics in this and related fields.
Content	The module covers the following topics: fundamental properties of compounds and hybridisation, optical and electronic properties, transport processes, doping, comparison with traditional semiconductors, and component concepts.
Teaching and learning methods	The module comprises 2 hours per week lecture, 2 hours per week seminar and self-study.
Prerequisites for participation	A basic knowledge of solid-state physics at the undergraduate level is required. Literature: Kittel, C., Introduction to Solid State Physics, New York, John Wiley & Sons, Inc [2005].
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an ungraded public oral examination lasting 30 minutes as an individual examination.
Credit points and grades	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 15 para. 1 sentence 6 of the General Examination Regulations.
Module frequency	The module will be offered each academic year, beginning in the winter semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises two semesters.

Module name	Basics – Solid State Science
Module number	Phy-Ma-SEP4
Responsible lecturer	Dean of Studies for the Master's degree program SEP sep@tu-dresden.de
Qualification objectives	Students will gain fundamental knowledge of the fields of solid-state physics, semiconductor physics, optoelectronics and circuit switching technology.
Content	The module covers fundamental topics and key areas in the fields of solid-state and semiconductor physics – including the physics of charge transport in crystalline semiconductors, doping, charge carrier statistics, and interfacial and transport phenomena in electronic components – optoelectronics – including electromagnetic waves in solids, wave propagation in multilayer devices, optical properties of solids, and optoelectronic devices – and circuit engineering – including simple passive RCL circuits and filters, the theory of linear circuits (LTI systems), and applications to circuits consisting of diodes, MOS capacitors, and transistors.
Teaching and learning methods	The module comprises 6 hours per week lecture and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in experimental physics, theoretical physics and the fundamentals of mathematics.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics. Es schafft die Voraussetzung für das Modul Work Experience Project.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a written examination lasting 90 minutes, if more than 25 students are registered. If there are 25 or fewer registered students, the written examination is replaced by non-public oral examination lasting 40 minutes as an individual examination. If applicable, it will be announced in writing to the registered students at the end of the registration period.
Credit points and grades	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment
Module frequency	The module will be offered each academic year, beginning in the winter semester.
Workload	The workload comprises a total of 300 hours.
Module duration	The module comprises two semesters.

Module name	Basics – Aspects of Sustainability in Device Design, Fabrication, and Post-Use
Module number	Phy-Ma-SEP5
Responsible lecturer	Dean of Studies for the Master's degree program SEP sep@tu-dresden.de
Qualification objectives	Students are familiar with the fundamental technical aspects involved in assessing the sustainability of processes and methods for the manufacture of electronic and photonic components, and are able to understand and apply the resulting complex economic, environmental and social interdependencies and interactions between extraction of raw material, manufacturing, the use phase and the re-use phase.
Content	The module covers the fundamentals of sustainability assessment and policy, as well as technical concepts in resource technology.
Teaching and learning methods	The module comprises 6 hours per week lecture and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in experimental physics, theoretical physics and the fundamentals of mathematics.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a complex assessment equating to 20 hours.
Credit points and grades	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises a total of 300 hours.
Module duration	The module comprises one semester.

Module name	Materials for Nanoelectronics
Module number	Phy-Ma-SEP6
Responsible lecturer	Prof. Andreas Richter andreas.richter7@tu-dresden.de
Qualification objectives	Students will possess knowledge about the structure, properties, production and structural formation of materials. They will be able to look at the effects and basic types of small-scale structures to derive the possibilities and challenges associated with nanoelectronic material systems.
Content	This module covers material principles for nanoelectronics.
Teaching and learning methods	The module comprises 2 hours per week lecture, 1 hour per week practical training and self-study.
Prerequisites for participation	Knowledge of the principles of assessing electrical DC networks as well as the physical fundamental principles of electronic components and microtechnologies at Bachelor's degree-level proficiency is required.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a portfolio equating to 15 hours.
Credit points and grades	Participants can earn five credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The grade of the written test is weighted two times, the grade of the portfolio one times.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises one semester.

Module name	Printing Technology
Module number	Phy-Ma-SEP7
Responsible lecturer	Prof. Karl Leo karl.leo@tu-dresden.de
Qualification objectives	Students can use their knowledge of different printing techniques to assess possibilities for functional printing as well as explain why a particular process is suitable for various different purposes.
Content	This module covers the basics of printing technology.
Teaching and learning methods	The module comprises 2 hours per week lecture, 2 hours per week practical training and self-study.
Prerequisites for participation	A basic understanding of the physical properties of liquids – such as general rheological properties, wetting, mixing and ink formulation – as well as the chemistry of solvents, safety considerations when handling them, and mixing behaviour, at Bachelor's degree-level proficiency is required.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a portfolio equating to 20 hours.
Credit points and grades	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.
Module frequency	The module is offered each summer semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises one semester.

Module name	Physical Characterization of Organic and Organic-Inorganic Thin Films
Module number	Phy-Ma-SEP8
Responsible lecturer	Dr. Bernd Rellinghaus bernd.rellinghaus@tu-dresden.de
Qualification objectives	Students are familiar with techniques for characterising the structure and chemical composition of thin organic and organic-inorganic films. They have a solid understanding of both the theoretical principles of physical analysis methods and their application to the characterisation of films, film systems and their interfaces. Students are able to apply selected methods of thin-film and interface analysis in an experimental setting.
Content	The module covers the physical analysis methods used mainly in thin-film electronics for semiconductors, metals, oxides, and organic and hybrid materials. The module also covers the significance of morphology, structure and chemical composition for the function, performance and reliability of organic electronics, as well as the close interconnection between component design, technologies, materials and physical analysis.
Teaching and learning methods	The module comprises 2 hours per week lecture, 2 hours per week practical training and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in physics, particularly classical physics and solid-state physics.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a portfolio equating to 16 hours. The written test must be graded at least "sufficient" (4.0).
Credit points and grades	Participants can earn five credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The grade of the written test is weighted three times, the grade of the portfolio one times.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises one semester.

Module name	Work Experience Project
Module number	Phy-Ma-SEP9
Responsible lecturer	Dean of Studies for the Master's degree program SEP sep@tu-dresden.de
Qualification objectives	Students have the skills to deal with complex problems encountered in professional academic practice and are able to document and present their results. They possess the social skills required for professional communication, as well as for project and product management.
Content	The module covers the areas of research, development, modelling, calculation and project planning within a subfield of electronics and photonics based on organic, inorganic (e.g. metal oxides), hybrid (e.g. organic-inorganic perovskites) or 2D semiconductors.
Teaching and learning methods	The module comprises 8 hours per week practical training and self-study.
Prerequisites for participation	Participants require skills acquired in the module Basics – Solid State Science.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a term paper equating to 25 hours.
Credit points and grades	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises one semester.

Module name	Major Electronics
Module number	Phy-Ma-M1
Responsible lecturer	Dean of Studies for the Master's degree program SEP sep@tu-dresden.de
Qualification objectives	Students are able to navigate the fields of thin-film electronics, micro- and nanoelectronics, and molecular electronics – Electronics –, and are familiar with the latest developments in these areas. They possess advanced knowledge of current issues and the latest techniques in the respective sub-fields of thin-film electronics, micro- and nanoelectronics, and molecular electronics based on organic semiconductors and selected inorganic semiconductors, such as metal oxides, hybrid organic-inorganic perovskites, or 2D semiconductors.
Content	The module covers modern semiconductor technologies, sustainable electronic materials and the development of energy-efficient components. It also includes topics such as nanoelectronics, organic electronics, thin-film processes, electrical characterisation methods, manufacturing techniques, circuit fundamentals and materials science aspects of electronic systems.
Teaching and learning methods	The module comprises 6 hours per week lecture and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in experimental physics, theoretical physics and the fundamentals of mathematics.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics in the focus area Electronics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a complex assessment equating to 40 hours.
Credit points and grades	Participants can earn twelve credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module will be offered each academic year, beginning in the summer semester.
Workload	The workload comprises a total of 360 hours.
Module duration	The module comprises two semesters.

Module name	Major Photonics
Module number	Phy-Ma-M2
Responsible lecturer	Dean of Studies for the Master's degree program SEP sep@tu-dresden.de
Qualification objectives	Students are able to navigate the fields of photophysics, photonics and optoelectronics – Photonics – with confidence and are familiar with the latest developments in these areas. They possess advanced knowledge of current issues and the latest techniques in the respective sub-fields of photophysics, photonics and optoelectronics based on organic semiconductors and selected inorganic semiconductors, such as metal oxides, hybrid organic-inorganic perovskites, or 2D semiconductors.
Content	The module covers light-matter interactions, optical technologies and the development of photonic devices. It also covers topics such as laser physics, optoelectronic components, photonic materials and spectroscopy, sustainable and organic photonic systems, and their applications in sensor technology, communications and energy.
Teaching and learning methods	The module comprises 6 hours per week lecture and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in experimental physics, theoretical physics and the fundamentals of mathematics.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics in the focus area Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a complex assessment equating to 40 hours.
Credit points and grades	Participants can earn twelve credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module will be offered each academic year, beginning in the summer semester.
Workload	The workload comprises a total of 360 hours.
Module duration	The module comprises two semesters.

Module name	Minor Photonics and Nanotechnology
Module number	Phy-Ma-M3
Responsible lecturer	Dean of Studies for the Master's degree program SEP sep@tu-dresden.de
Qualification objectives	Students are able to navigate the fields of photophysics, photonics and optoelectronics – Photonics – as well as nanotechnology and complex nanomaterials – Nanotechnology – with confidence, and are familiar with the latest developments and techniques. They also possess knowledge of current issues within their respective sub-fields.
Content	The module covers topics from the fields of photophysics, photonics, optoelectronics, nanotechnology and complex nanomaterials that are relevant to the development and characterisation of photonic and optoelectronic components and systems. The module also covers the fundamentals of nanoscale materials and structures, including their physical, chemical and electro-optical properties, fabrication and analysis methods, and their application in photonic and electro-optical systems.
Teaching and learning methods	The module comprises 4 hours per week lecture and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in experimental physics, theoretical physics and the fundamentals of mathematics.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics in the focus area Electronics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a complex assessment equating to 20 hours.
Credit points and grades	Participants can earn eight credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each summer semester.
Workload	The workload comprises a total of 240 hours.
Module duration	The module comprises one semester.

Module name	Minor Electronics and Nanotechnology
Module number	Phy-Ma-M4
Responsible lecturer	Dean of Studies for the Master's degree program SEP sep@tu-dresden.de
Qualification objectives	Students are able to navigate the fields of thin-film electronics, micro- and nanoelectronics, molecular electronics – Electronics –, as well as nanotechnology and complex nanomaterials – Nanotechnology – with confidence, and are familiar with the latest developments and techniques. They also possess knowledge of current issues within their respective sub-fields.
Content	The module covers topics in the fields of thin-film electronics, micro- and nanoelectronics, molecular electronics, nanotechnology and complex nanomaterials, which are relevant to the development and characterisation of electronic and optoelectronic components and systems. The module covers the physical and technological fundamentals of electronic components at the nanometre scale, as well as relevant nanoscale materials, structures, physical, chemical and electro-optical properties, electronic transport phenomena, characterisation methods and fabrication processes.
Teaching and learning methods	The module comprises 4 hours per week lecture and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in experimental physics, theoretical physics and the fundamentals of mathematics.
Applicability	This module is a compulsory module in the Master's degree program Sustainable Electronics and Photonics in the focus area Photonics.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a complex assessment equating to 20 hours.
Credit points and grades	Participants can earn eight credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each summer semester.
Workload	The workload comprises a total of 240 hours.
Module duration	The module comprises one semester.

Module name	German as a foreign language – Beginners
Module number	Phy-Ma-E1
Responsible lecturer	Ute Meyer ute.meyer@tu-dresden.de
Qualification objectives	Students will have elementary language proficiency in German at level A1.1. Students can understand slow, clearly articulated, concrete information on familiar everyday topics; comprehend short, syntactically, semantically, lexically and morphologically simple texts by focusing on key words; deduce the meanings of unfamiliar concrete terms from the context; and use simple phrases to talk about their surroundings and respond appropriately to simple questions on the subject.
Content	The module covers very simple texts and audio recordings relating to everyday situations, particularly within a university setting, basic oral and written expression and interaction on these topics, the development of relevant reading and listening strategies, the acquisition of simple grammatical structures and appropriate vocabulary, as well as exercises designed to build fluency through various teaching methods and using different media.
Teaching and learning methods	The module comprises 4 hours per week language course and self-study. The courses will be held in German.
Prerequisites for participation	There are no specific prerequisites for participation.
Applicability	This module is one of four elective compulsory modules of the Master's degree program Sustainable Electronics and Photonics, one of which must be selected.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of ungraded language examination lasting 60 minutes.
Credit points and grades	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises one semester.

Module name	Current Topics in Materials Science
Module number	Phy-Ma-E2
Responsible lecturer	Prof. Gianaurelio Cuniberti gianaurelio.cuniberti@tu-dresden.de
Qualification objectives	Students will learn about the various aspects of current research in materials science. Students will also possess relevant key competencies such as presentation techniques, patent law, technology transfer and leadership skills.
Content	The module covers modern experimental and theoretical methods for discovering, characterizing and applying new materials with a focus on topic areas such as the use of artificial intelligence and Big Data in materials science, modern materials for electronics and sensors, the use of novel materials in medical and health technology, materials for energy management, technology transfer.
Teaching and learning methods	The module comprises 1 hour per week lecture, 1 hour per week exercise, 1 hour per week seminar and self-study.
Prerequisites for participation	Participants require Bachelor's degree-level proficiency in experimental physics, theoretical physics and the fundamentals of mathematics.
Applicability	This module is one of four elective compulsory modules of the Master's degree program Sustainable Electronics and Photonics, one of which must be selected.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of a complex assessment equating to 20 hours.
Credit points and grades	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises one semester.

Module name	Career Paths
Module number	Phy-Ma-E3
Responsible lecturer	Dr. Francesca Moresco francesca.moresco@tu-dresden.de
Qualification objectives	Students will know how to qualify for a doctoral degree and how to pursue careers in industry and research. They know the rules of good scientific practice and scientific techniques and methods. Students will have project and knowledge management skills, as well as soft skills such as teamwork and conflict resolution.
Content	The module includes an introduction to scientific work and aspects of good scientific practice as well as practical insights from external representatives from various fields of activity and practice as well as research. Furthermore, the module includes qualification paths for a doctorate at the TU Dresden
Teaching and learning methods	The module comprises 2 hours per week lecture and self-study.
Prerequisites for participation	There are no specific prerequisites for participation.
Applicability	This module is one of four elective compulsory modules of the Master's degree program Sustainable Electronics and Photonics, one of which must be selected.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of an ungraded public oral examination lasting 20 minutes as an individual examination.
Credit points and grades	Participants can earn five credit points for this module. The module examination will be graded as either "pass" or "fail".
Module frequency	The module is offered each winter semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises one semester.

Module name	General Studies
Module number	Phy-Ma-E4
Responsible lecturer	Dean of Studies for the Master's degree program SEP sep@tu-dresden.de
Qualification objectives	Students develop their skills in the area of social issues and learn to engage critically with these fields. Depending on the student's choice, they will have knowledge in general education topics such as sustainability, democracy, globalization, digitalization, science communication, diversity, internationalization, or social and personal skills such as communication skills, project and time management, cooperation and teamwork skills. Based on the knowledge and skills they have acquired, they are particularly well equipped to engage in intercultural and interdisciplinary discourse, as well as to make socially responsible judgements and take appropriate action.
Content	Depending on the student's choice, the module covers interdisciplinary content from the Studium Generale catalogue on topics relating to life in a diverse and pluralistic society. Depending on the choice, it also covers the development and application of academic knowledge and methods in international and intercultural fields of work.
Teaching and learning methods	The module comprises lecture or seminar totaling 4 hours per week and self-study. The courses are to be chosen from the General Studies catalogue of the Institute Studium Generale. This catalog including the information on the required examinations will be announced at the beginning of each semester in the usual manner.
Prerequisites for participation	There are no specific prerequisites for participation.
Applicability	This module is one of four elective compulsory modules of the Master's degree program Sustainable Electronics and Photonics, one of which must be selected.
Requirements for earning credit points	Credit points are earned after passing the module examination. The module examination consists of an ungraded examination assessment specified in the General Studies catalogue of the Institute Studium Generale.
Credit points and grades	Participants can earn five credit points for this module. The module examination will be graded as either "pass" or "fail".
Module frequency	The module is offered each semester.
Workload	The workload comprises a total of 150 hours.
Module duration	The module comprises one semester.

Annex 2

(to § 6 para. 5)

Study schedule für full-time study

with type and scope of courses given in hours/week (SWS) as well as required work, the type, scope and format of which can be found in the module description

Key:

¹ Students must choose one focus area (1 out of 2) with a total of 25 credit points, comprising two compulsory modules and one elective compulsory module.

² The module comprises lecture or seminar totaling 4 hours per week.

* alternatively, depending on choice made by the student

CP Credit Points

Ex Examination

E Exercise

L Lecture

LC Language course

M Mobility window

P Practical training

S Seminar

Module number	Module name	1 st Semester	2 nd Semester	3 rd Semester	4 th Semester (M)	CP
		L/E/S/P/LC	L/E/S/P/LC	L/E/S/P/LC		
Compulsory Field						
Phy-Ma-SEP1	Concepts of Molecular Modelling			2/2/0/2/0 2xEx		10
Phy-Ma-SEP2	Semiconductor Technology	4/0/0/0/0	2/0/0/1/0 1xEx			10
Phy-Ma-SEP3	Organic Semiconductors	0/0/2/0/0 1xEx	2/0/0/0/0 1xEx			5
Phy-Ma-SEP4	Basics – Solid State Science	4/0/0/0/0	2/0/0/0/0 1xEx			10
Phy-Ma-SEP5	Basics – Aspects of Sustainability in Device Design, Fabrication, and Post-Use			6/0/0/0/0 1xEx		10
Phy-Ma-SEP6	Materials for Nanoelectronics	2/0/0/1/0 2xEx				5
Phy-Ma-SEP7	Printing Technology		2/0/0/2/0 2xEx			5
Phy-Ma-SEP8	Physical Characterization of Organic and Organic-Inorganic Thin Films	2/0/0/2/0 2xEx				5
Phy-Ma-SEP9	Work Experience Project			0/0/0/8/0 1xEx		5
					Master thesis Colloquium	25 5

Module number		Module name	1 st Semester	2 nd Semester	3 rd Semester	4 th Semester (M)	CP
			L/E/S/P/LC	L/E/S/P/LC	L/E/S/P/LC		
Elective Compulsory Field ¹							
Focus area Electronics							
Compulsory	Phy-Ma-M1	Major Electronics		4/0/0/0/0	2/0/0/0/0 1xEx		12
	Phy-Ma-M3	Minor Photonics and Nanotechnology		4/0/0/0/0 1xEx			8
Elective	Phy-Ma-E1	German as a foreign language – Beginners	0/0/0/0/4 1xEx				5
	Phy-Ma-E2	Current Topics in Materials Science	1/1/1/0/0 1xEx				5
	Phy-Ma-E3	Career Paths	2/2/0/0/0 1xEx				5
	Phy-Ma-E4	General Studies ²	*0/*0/0 1xEx				5
Focus area Photonics							
Compulsory	Phy-Ma-M2	Major Photonics		4/0/0/0/0	2/0/0/0/0 1xEx		12
	Phy-Ma-M4	Minor Electronics and Nanotechnology		4/0/0/0/0 1xEx			8
Elective	Phy-Ma-E1	German as a foreign language - Beginners	0/0/0/0/4 1xEx				5
	Phy-Ma-E2	Current Topics in Materials Science	1/1/1/0/0 1xEx				5
	Phy-Ma-E3	Career Paths	2/0/0/0/0 1xEx				5
	Phy-Ma-E4	General Studies ²	*0/*0/0 1xEx				5
CP			28	31	31	30	120