Technische Universität Dresden
Faculty of Physics

Study Regulations for the Organic and Molecular Electronics consecutive Master's degree programme

28 April 2019

The Technische Universität Dresden issues the following study regulations based upon Sec. 36 (1) of the Higher Education Freedom Act of Saxony as published on 15 January 2013 (SächsGVBl, p. 3).

Contents

§ 1
Scope

These study regulations are based upon the Higher Education Autonomy Act of Saxony and the examination regulations, and regulate the objectives, content, structure and organisation of the degree programme for the consecutive Master's degree programme Organic and Molecular Electronics at Technische Universität Dresden.

§ 2
Objectives of the degree programme

(1) Students of the Organic and Molecular Electronics Master's degree programme will be able to use different scientific approaches for conducting independent research. Students will be able to take on complex problems and use scientific methods to find solutions even beyond the current limits of knowledge. Students will have specialist knowledge focussed around current research topics, about methodical and analytical expertise, and research methods and strategies. Students will be able to find scientific correlations, practice multidisciplinary communication and solve scientific problems.

(2) Students will become familiar with the methods, techniques and tools for producing organic and molecular electronics as well as their possibilities and their applications. They will be able to analyse problems in this field and use everything they have learned to develop effective solutions. They will be able to recognise the relationships and dependencies between these key areas and them to find solutions. Students will be familiar with current research and developments in these fields and be able to constructively contribute to the problem-solving process.

(3) Graduates will possess broad specialist knowledge and familiarity with the global research community in the areas of conceptual design, production, application and integration of organic electronics. This will further enable them, after sufficient orientation and based upon their chosen specialisation, to tackle a wide range of complex problems in the conceptual design, production, application and integration of organic electronics in their chosen occupation.

§ 3
Admission requirements

(1) To be admitted to the degree programme, candidates must have completed a first vocational university degree recognised in Germany or obtained a qualification from a state or state-approved vocational academy in the natural sciences or engineering. Also required is fundamental knowledge of classical physics, including mechanics, electrodynamics, optics, thermodynamics and quantum theory, as well as a good understanding of the structure of matter. Suitability determination processes according to the suitability determination regulations are used to demonstrate that these requirements are met.

(2) Furthermore, this degree programme requires English language proficiency at a minimum level of C1 according to the Common European Framework of Reference for Languages. Paragraph 1(3) applies accordingly.

§ 4
Commencement and duration of studies

(1) The degree programme may be started in the winter semester.

(2) The normal period of study is four semesters and includes contact hours with teaching staff, self-study, practical work and the Master's examination.

§ 5
Teaching and learning formats

(1) The programme content has a modular structure. Each modules delivers, consolidates and deepens learning content through lectures, practical sessions, seminars, practical work, language courses and self-study.

(2) The teaching and learning formats according to Paragraph 1(2) are defined as follows:

1. Lectures introduce the material covered by the module.
2. Practical sessions enable students to put the material acquired in lectures into practice in exemplary sub-areas.
3. Seminars provide a guided environment which allows students to make use of specialist literature and other materials to independently learn about a chosen topic, present their results, discuss the topic with the group and/or present the topic in written form.
4. Practical work is intended to allow students to put into practice what they have learned and gain practical skills in potential career areas. These use experiments to illustrate the theoretical content that has been taught, giving students their own experiences and skills working with devices, equipment and measurement tools.
5. Language courses provide training and develop students' knowledge and skills in a foreign language. Students develop communicative and intercultural competencies within an academic and professional context as well as for everyday situations.
6. Self-study is where students work on, consolidate and deepen their knowledge of the taught content as they see fit.

§ 6
Structure and organisation of the degree programme

(1) The degree programme has a modular structure. The courses offered are spread over three semesters. The fourth semester is reserved for completing the Master's dissertation and holding the colloquium. The cooperation agreement also provides, as part of the Erasmus Mundus Nanoscience and Nanotechnology programme, the option to undertake studies at the Katholieke Universiteit Leuven (Belgium) for the first year, and then continue and complete studies at Technische Universität Dresden.

(2) The degree programme consists of eleven core modules and an elective that allows the student to focus on a particular area of interest. The selection is binding. It is possible to change the selected modules just once; this requires the student to submit a written application to the Examinations Office stating the module they wish to drop and the new module they wish to join.

(3) Qualification objectives, content, teaching and learning formats used, requirements, applicability, frequency, amount of work and duration of individual modules are indicated in the module descriptions (Annex 1).

(4) Lectures are held in English. If a module leads to a qualification in the use of the foreign language, such as the Deutsch als Fremdsprache module, then lectures may also be held in the target language depending on the content and aims to be achieved.

(5) The optimum distribution of modules across individual semesters such as to allow the degree programme to be completed within the standard period of study, along with the type and scope of lectures contained therein and the number and standard progression of the required study and examination activities, can be found in the included study plan (Annex 2).

§ 7
Content of the degree programme

(1) The Organic and Molecular Electronics Master's degree programme is research-oriented.

(2) This degree programme covers topics in semi-conductor technology, molecular electronics, organic semi-conductors, analytics and measurement technology as well as

processing technology. It further comprises, depending on the focus area chosen by the student, fundamental chemistry and physics, topics in materials and materials processing (e.g. production, structuring, characterisation and surface chemistry), topics on photophysics, optical electronics, application of organic and molecular electronics (e.g. as components in circuit integration, memory technology and microsystem technology), topics in business administration and economics as well as German as a foreign language and methods in scientific work.

§ 8
Credit points

(1) ECTS credit points document the average workload on students and their individual progress through their studies. One credit point equates to a workload of 30 hours. In general, 60 credit points are awarded per academic year, i.e. 30 points per semester. The total workload for the degree programme is 120 credit points and comprises teaching and learning formats of the type and scope indicated in the module description, study activities and examinations, as well as the Master's dissertation and colloquium.

(2) The number of credit points earned by completing a module are indicated in the module description. Credit points are earned upon successful completion of the module. Sec. 26 of the examination regulations remains unaffected.

§ 9
Student counselling services

(1) General student counselling services are provided via the Central Student Information and Counselling Service of TU Dresden. They offer advice on issues relating to study options, ways of enrolment and other general matters affecting students. Academic advice regarding studies is the responsibility of the student counselling service in the Faculty of Physics. In particular, academic advisers provide support to students with issues relating to the organisation of their studies.

(2) At the start of the third semester, any student who has not yet completed any part of their studies is required to attend an academic advice session.

§ 10
Changes to module descriptions

(1) A simplified procedure exists for making changes to module descriptions in order to optimise the organisation of studies where conditions have changed. Fields that are excluded from this procedure are "Module name", "Objectives", "Content", "Teaching and learning formats", "Requirements for the award of credit points" as well as "Credit points and grades".

(2) According to this simplified procedure, the Faculty Board enacts the change to the module description at the request of the Academic Affairs Committee. Changes are to be announced via the normal channels within the faculty.

§ 11
Effective date, publication and transitional provisions

(1) These study regulations come into force on the day after the day of publication in the official announcements of Technische Universität Dresden.

(2) They apply for all new students enrolling in the Organic and Molecular Electronics consecutive Master's degree programme for the winter semester 2019/2020 or later.

(3) The respective previous study regulations for the Organic and Molecular Electronics consecutive Master's degree programme continue to apply for students who enrolled before the winter semester 2019/2020.

(4) These study regulations apply from the winter semester 2020/2021 for all students enrolled in the Organic and Molecular Electronics Master's degree programme.

Issued following the decision of the Faculty Board of the Faculty of Physics dated 17 October 2018 and the approval by the Central University Administration dated 27 November 2018.

Dresden, 28 April 2019

The Dean
of TU Dresden

Prof. Dr.-Ing. habil. DEng/Auckland Elans Müller-Steinhagen

Annex 1:
Module descriptions

Module number	**Module name**	**Lecturer responsible**
OME-1.1	Concepts of Molecular Modelling	Prof. Cuniberti
Objectives	Students will learn the fundamentals of molecular dynamics simulations for theoretically describing material properties at nano and micro scales. They will have knowledge of classical mechanics using numerical methods and modelling interatomic forces (classical and quantum mechanical). They will be familiar with describing potential energy surfaces, stable and metastable points as well as discussions on different observables. Students will learn mathematical approaches and will be able to quantitatively characterise molecule dynamics as well as model these using computer programs.	
Content	The module comprises the topics of simulation methods for molecular dynamics and the use of stochastic methods (Monte Carlo simulations).	
Teaching and learning formats	Lectures (2 hrs/wk), practical sessions (2 hrs/wk), practical work (2hrs/wk) and self-study.	
Participation requirements	Knowledge of fundamental mathematics (analysis and linear algebra) and physics (classical mechanics) is required. Literature: Mathematical Methods for Physics and Engineering: A Comprehensive Guide, K. F. Riley, M. P. Hobson, S.J. Bence (2006); Classical Mechanics (Undergraduate Lecture Notes in Physics), Matthew J.J. Benacquista, Joseph D. Romano (2018).	
Applicability	This module is a core module for the Organic and Molecular Electronics Master's degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined via a project assignment lasting 4 weeks and, if there are more than 10 students registered for the module, a written test lasting 90 minutes. If there are no more than 10 students registered for the written test, this will be replaced by an oral examination lasting 20 minutes; the exact type of examination will be announced to the registered students at the end of the registration period via normal channels within the faculty. Passing the module requires that the written test or oral examination is awarded a minimum grade of "sufficient" (4.0).	
Credit points and grades	10 credit points are awarded for this module. The module grade is calculated from the unweighted average of grades from the two examinations.	
Frequency of the module	This module runs once per year in the winter semester.	
Workload	The total workload for this module is 300 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-1.2	Semiconductor Technology	Prof. Bartha
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 formats	Lectures (6 hrs/wk), practical work (1 hr/wk) and self-study.	
Participation requirements	Knowledge of physics and chemistry at Bachelor's level is required. Literature: Fundamentals of Physics ISBN-13: 978-0470469088; Fundamentals of Chemistry ISBN-10: 0536418829.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master's degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. If more than 20 students are registered, this module is examined with one end-of-semester exam lasting 120 minutes. If there are no more than 20 students registered, this will be replaced by an oral examination lasting 30 minutes; the exact type of examination will be announced to the registered students at the end of the registration period via normal channels within the faculty.	
Credit points and grades	10 credit points are awarded for this module. The module grade is the grade achieved in the examination.	
Frequency of the module	This module runs once per year, beginning in the winter semester.	
Workload	The total workload for this module is 300 hours.	
Module duration	This module lasts for two semesters.	

Module number	Module name	Lecturer responsible
OME-1.3	Organic Semiconductors	Dean of Studies
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	This module covers: a) Fundamental properties: Compounds and hybridisation b) Optical properties c) Electronic properties d) Transport processes e) Doping f) Comparison with traditional semiconductors g) Component concepts	
Teaching and learning formats	Seminars (2 hrs/wk), lectures (2 hrs/wk) and self-study.	
Participation requirements	Basic knowledge of solid-state physics is required. Literature: Kittel, Charles, Introduction to solid state physics, New York: Wiley, 2005.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master's degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with one end-of-semester exam lasting 90 minutes and an ungraded presentation lasting 30 minutes.	
Credit points and grades	5 credit points are awarded for this module. The module grade is calculated from the unweighted average of grades from the assessed work according to Sec. 11(1)(5) of the examination regulations.	
Frequency of the module	This module runs once per year, beginning in the winter semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	This module lasts for two semesters.	

Module number	Module name	Lecturer responsible
OME-1.4	Basics - Solid State Science	Dean of Studies
Objectives	Students will gain fundamental knowledge of the fields of quantum physics, solid state physics and semiconductor physics or general and preparative organic chemistry or the fundamentals of circuit switching technology.	
Content	This modules focusses on topics chosen by the student from the following: a) Quantum, solid state and semiconductor physics b) General and preparative organic chemistry c) Fundamentals of switching technology.	
Teaching and learning formats	Lectures (6 hrs/wk), practical sessions (2 hrs/wk), practical work (2hrs/wk) and self-study. Courses are chosen from the “Basics” module catalogue for the Organic and Molecular Electronics Master’s degree programme; these will be announced along with coursework requirements for each module at the start of the semester through the normal faculty channels.	
Participation requirements	None.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master’s degree programme. This module is a prerequisite for modules: Optoelectronics, Work Experience Project, Major and Minor.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with one oral examination lasting 45 minutes. Additionally, the coursework specified in the “Basics” catalogue must be completed for this module.	
Credit points and grades	15 credit points are awarded for this module. The module grade is the grade achieved in the examination.	
Frequency of the module	This module runs once per year in the winter semester.	
Workload	The total workload for this module is 450 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-2.2	Optoelectronics	Dean of Studies
Objectives	Students will gain and understanding of the fundamental principles of optoelectronics and be able to apply these to the designing of components.	
Content	The module covers the principles of optoelectronics; this includes: a) interactions between electromagnetic waves and solid bodies b) the propagation of EM waves in layered structures c) the optical properties of solid bodies d) waveguides e) the creation of charge carriers.	
Teaching and learning formats	Lectures (4 hrs/wk) and self-study.	
Participation requirements	The knowledge and skills from module “Basics - Solid State Science” are required for this module.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master’s degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with one oral examination lasting 30 minutes.	
Credit points and grades	5 credit points are awarded for this module. The module grade is the grade achieved in the examination.	
Frequency of the module	This module runs once per year in the summer semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-3.1	Molecular Electronics	Prof. Cuniberti
Objectives	Students will learn the principles of molecular electronics, focussing on: experimental methods, physical effects and theoretical tools, e.g. single molecule electronics, raster testing and break-junction techniques, nanoscale transport mechanisms, molecular components (diodes, transistors, sensors) and molecular architectures. Students will learn about the most important experimental and theoretical methods for investigating the transportation of charge at the molecular scale.	
Content	This module covers the application of molecular electronics as well as the theoretical principles of charge transportation in nanostructures. The module also covers the experimental characterisation of single molecules and development of these into electrical circuits.	
Teaching and learning formats	Lectures (2 hrs/wk), practical sessions (2 hrs/wk) and self-study.	
Participation requirements	None.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master's degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. If more than 10 students are registered, this module is examined with one end-of-semester exam lasting 90 minutes. If there are no more than 10 students registered, this will be replaced by an oral examination lasting 20 minutes; the exact type of examination will be announced to the registered students at the end of the registration period via normal channels within the faculty.	
Credit points and grades	5 credit points are awarded for this module. The module grade is the grade achieved in the examination.	
Frequency of the module	This module runs once per year in the winter semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-3.2	Materials for Nanoelectronics and Printing Technology	Prof. Richter
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. 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 material principles for nanoelectronics as well as the principles of printing technology.	
Teaching and learning formats	Lectures (4 hrs/wk), practical work (2 hrs/wk) and self-study.	
Participation requirements	Knowledge of the principles of assessing electrical DC networks as well as the physical fundamental principles of electronic components and microtechnologies is required. Literature: K. Lunze, Einführung in die Elektrotechnik, Verlag Technik Berlin. B. Hoppe, Mikroelektronik, 2 Bände [2 volumes], Vogel Fachbuch, 1997.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master's degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with two written exams lasting 90 minutes.	
Credit points and grades	10 credit points are awarded for this module. The module grade is calculated from the unweighted average of grades from the two examinations.	
Frequency of the module	This module runs once per year starting in the winter semester.	
Workload	The total workload for this module is 300 hours.	
Module duration	This module lasts for two semesters.	

Module number	Module name	Lecturer responsible
OME-3.3	Physical Characterization of Organic and Organic-Inorganic Thin Films	Prof. Dr. Ehrenfried Zschech
Objectives	Students will become familiar with different techniques for characterizing organic and organic-inorganic thin films. They will learn both the theoretical principles of methods of physical analysis and their application in characterizing organic and inorganic thin films and layered systems as well as their boundaries. Students will be able to experimentally apply selected methods of thin film and boundary analytics.	
Content	This module looks at current and future methods of physical analysis of semiconductors, metals and glasses as well as organic and hybrid materials, with a focus on organic electronics. It includes the importance of material and process characterization for the functionality, performance and reliability of organic electronics. The close relationships between component design, technology, materials and physical analytics are also studied.	
Teaching and learning formats	Lectures (2 hrs/wk), practical work (2 hrs/wk, as a block during the lecture-free period) and self-study.	
Participation requirements	Knowledge of physics, particularly classical and solid state physics. Literature: Giovanni, Organic Semiconductor Materials and Device Characterization, Scholar's Press 2015.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master’s degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with one exam lasting 90 minutes and a practical report requiring 16 hours of work.	
Credit points and grades	5 credit points are awarded for this module. The module grade is calculated from the weighted average of grades from the assessed work and examination. The examination is triple-weighted and the practical report single-weighted. Passing the module requires that the written test is passed with a minimum grade of “sufficient” (4.0).	
Frequency of the module	This module runs once per year in the winter semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-E1	Work Experience Project	Dean of Studies
Objectives	Students will possess expertise in working on complex practical scientific problems and will be able to document and present their results. They will possess social competencies for professional communication as well as project and product management skills.	
Content	This module covers the topics of research, development, modelling, assessing and project planning in the field of organic electronics and related fields.	
Teaching and learning formats	Practical work (8 hrs/wk) including self-study.	
Participation requirements	The knowledge and skills from module “Basics - Solid State Science” are required for this module.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master’s degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with a project lasting one week (30 hours).	
Credit points and grades	5 credit points are awarded for this module. The module grade is the grade achieved in the examination.	
Frequency of the module	This module runs once per year in the winter semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-M1	Major	Dean of Studies
Objectives	Students will be able orient themselves within a relatively large chosen specialist field and be familiar with the latest developments within that field. The fields of choice are Photophysics of Organics or Electronic Systems. They will possess in-depth knowledge of current issues and the latest developments in the chosen area of organic and molecular electronics.	
Content	This content of this module is chosen by the student from one of the two following specialist areas: a) Physics b) Electronics.	
Teaching and learning formats	This module includes lectures, practical work and potentially also practical sessions totalling 8 hrs/wk as well as self-study. The required courses are chosen from the “Major/Minor” module catalogue for the Organic and Molecular Electronics Master’s degree programme; these will be announced along with coursework/examination requirements for each module at the start of the semester through the normal faculty channels.	
Participation requirements	Knowledge and skills in chemistry, physics and circuit technology from module “Basics - Solid State Science” are required for this module.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master’s degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined as specified in the Major/Minor catalogue for the Organic and Molecular Electronics Master’s degree programme.	
Credit points and grades	10 credit points are awarded for this module. The module grade is calculated from the unweighted average of grades from the assessed work according to Sec. 11(1)(5) of the examination regulations.	
Frequency of the module	This module runs once per year starting in the summer semester.	
Workload	The total workload for this module is 300 hours.	
Module duration	This module lasts for two semesters.	

Module number	Module name	Lecturer responsible
OME-M2	Minor	Dean of Studies
Objectives	Students will be able to reliably orient themselves within an additional chosen specialist field and be familiar with the latest developments within that field. The fields of choice are Organic Materials or Complex Nanomaterials. Students will possess in-depth knowledge of current issues and the latest developments in the chosen area of organic and molecular electronics.	
Content	This content of this module is chosen by the student from one of the two following specialist areas: a) Chemistry b) Nanotechnology.	
Teaching and learning formats	This module includes lectures, practical sessions totalling 4 hrs/wk as well as self-study. The required courses are chosen from the "Major/Minor" module catalogue for the Organic and Molecular Electronics Master's degree programme; these will be announced along with coursework/examination requirements for each module at the start of the semester through the normal faculty channels.	
Participation requirements	Knowledge and skills in chemistry, physics and circuit technology from module "Basics - Solid State Science" are required for this module.	
Applicability	This module is a core module for the Organic and Molecular Electronics Master's degree programme.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined as specified in the Major/Minor catalogue for the Organic and Molecular Electronics Master's degree programme.	
Credit points and grades	5 credit points are awarded for this module. Depending on the chosen field, the module grade is calculated from the grade awarded for assessed work or as an unweighted average of individual grades from the assessed work.	
Frequency of the module	This module runs once per year in the summer semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-E3	Deutsch als Fremdsprache	Dr. Antonella Wermke
Objectives	Students will gain written and spoken skills in everyday use of the German language at level A1, A2 or B1 according to the Common European Framework of Reference for Languages (CEFR)	
Content	The module covers language useful for use on campus as well as reading and listening strategies with geographical and cultural relevance. The foreign language skills acquired in the module depend on the level the student studies - A1, A2 or B1 of the CEFR.	
Teaching and learning formats	Language courses (4 hrs/wk) and self-study.	
Participation requirements	Basic general language skills at the Abitur (beginner's course) level are required to take levels A2 and B1. Students whose language skills do not meet the participation requirements can opt to take a “reactivation course” and undertake (media-supported) self-study - with guidance provided if necessary.	
Applicability	This module is one of 5 electives in the Organic and Molecular Electronics Master’s degree programme, from which one module must be chosen.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with one end-of-semester exam lasting 90 minutes and an oral examination lasting 15 minutes.	
Credit points and grades	5 credit points are awarded for this module. The module grade is calculated from the unweighted average of grades from the two examinations.	
Frequency of the module	This module runs once per year in the winter semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
M_ESS 2.4 (OME-E4)	Investing in a Sustainable Future	Frau Prof. Günther edeltraud.guenther@tu-dresden.de
Objectives	Students will understand sustainability assessment and policy as a scientific and societal area of research. Students will be able to independently research and make use of relevant academic literature. Students will be able to use the theoretical framework to classify information about case studies and analyse this information on five different levels (strategic, financial, ecological, social and accessibility analyses). They will be familiar with the use of English in science.	
Content	This module looks at sustainability assessments and policy as a scientific and societal area of research.	
Teaching and learning formats	Lectures (2 hrs/wk) and self-study.	
Participation requirements	None.	
Applicability	This module is one of 29 electives from which students in the Ecosystem Services Master's degree programme must select according to Sec. 27(3) of the examination regulations. This module is also one of 5 electives in the Organic and Molecular Electronics Master's degree programme, from which one module must be chosen.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with one end-of-semester exam lasting 90 minutes.	
Credit points and grades	5 credit points are awarded for this module. The module grade is the grade achieved in the examination.	
Frequency of the module	This module runs once per year in the summer semester.	
Workload	The total workload for this module is 150 hours. Of these, 30 hours are allocated for lectures and teaching activities and 120 hours for self-study, including exam preparation and the examination itself.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-E5	Current Topics in Materials Science	Prof. G. Cuniberti
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: a) Statistical and data-intensive approaches; use of Big Data in materials science b) Modern materials for electronics and sensors c) The use of novel materials in medical and health technology d) Materials for energy management e) Scalable integration of novel materials f) Technology transfer	
Teaching and learning formats	Lectures (1 hr/wk), practical sessions (1 hr/wk), seminars (1 hr/wk) and self-study.	
Participation requirements	None.	
Applicability	This module is one of 5 electives in the Organic and Molecular Electronics Master's degree programme, from which one module must be chosen.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined with one written task requiring 20 hours' work and a presentation lasting 90 minutes.	
Credit points and grades	5 credit points are awarded for this module. The module grade is calculated from the unweighted average of grades from the two examinations.	
Frequency of the module	This module runs once per year in the winter semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-E6	Academic and Scientific Work	Dean of Studies
Objectives	Upon completion of this module, students will possess key competencies required for academic and scientific work. They will be able to make critical use of scientific texts, pass knowledge on to others as well as support the learning process for other people.	
Content	This module covers understanding the key content of scientific texts, placing these texts within the current research context, critical reflection of societal, economic and cultural effects as well as the presentation of this information.	
Teaching and learning formats	This module includes lectures, practical sessions, practical work and seminars totalling 3 hrs/wk as well as self-study. The required number of courses is to be selected from the Academic and Scientific Work catalogue. This catalogue will be announced along with coursework/examination requirements for each module at the start of the semester through the normal faculty channels.	
Participation requirements	None.	
Applicability	This module is one of 5 electives in the Organic and Molecular Electronics Master's degree programme, from which one module must be chosen.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined as specified in the Academic and Scientific Work catalogue.	
Credit points and grades	5 credit points are awarded for this module. Depending on the chosen courses, the module grade is calculated from the grade awarded for assessed work or as an unweighted average of individual grades from the assessed work.	
Frequency of the module	This module runs every semester.	
Workload	The total workload for this module is 150 hours.	
Module duration	The module lasts for one semester.	

Module number	Module name	Lecturer responsible
OME-E7	Semiconductor Industry Challenges: Market Dynamics, Technology Innovations, Yield and Reliability Engineering	Prof. Dr. Ehrenfried Zschech
Objectives	Students will understand key aspects of the semiconductor industry with regard to market and its changing conditions for development and production as well as in conjunction with technological advancement. They will be able to illustrate the relationships between component design, technology, materials and analytics for products and assess the importance of the reliability of components in quality management for products and the series consistency of micro and nano electronics.	
Content	This module covers the physical and engineering methods used in micro and nano electronics for increasing yield in volume production and for securing the required degree of product liability, as well as the associated theoretical principles. The importance of business concepts when introducing new products is also covered.	
Teaching and learning formats	Lectures (3 hrs/wk) and self-study.	
Participation requirements	Knowledge of electrical engineering, materials science, physics and business administration for engineers and scientists is required. Literature: G.S. May, C.J. Spanos, Fundamentals of Semiconductor Manufacturing and Process Control, John Wiley & Sons, Hoboken, New Jersey 2006. J.W. McPherson, Reliability Physics and Engineering, Springer Cham 2013.	
Applicability	This module is one of 5 electives in the Organic and Molecular Electronics Master's degree programme, from which one module must be chosen.	
Requirements for the award of credit points	Credit points are earned upon successful completion of the module. This module is examined via a report requiring 16 hours of work and, if there are more than 20 students registered for the module, a written test of 90 minutes. If there are no more than 20 students registered for the written test, this will be replaced by a group oral examination lasting 45 minutes; the exact type of examination will be announced to the registered students at the end of the registration period via normal channels within the faculty.	
Credit points and grades	5 credit points are awarded for this module. The module grade is calculated from the weighted average of grades from the assessed work and examination. The report is single-weighted and the written examination/oral examination is double-weighted.	
Frequency of the module	This module runs once per year starting in the summer semester.	

Workload	The total workload for this module is 150 hours.
Module duration	This module lasts for two semesters.

Annex 2:
Study plan
with type and scope of courses given in hrs/week
as well as required work, the type, scope and format of which can be found in the module descriptions

Module types	Module number	Module name	1st Semester	2nd Semester	3rd Semester	4th Semester	CP
			L/E/S/P/LC	L/E/S/P/LC	L/E/S/P/LC	L/E/S/P/LC	
Core modules	OME-1.1	Concepts of Molecular Modelling			2/2/0/2/0 2 Ex		10
	OME-1.2	Semiconductor Technology	4/0/0/0/0	2/0/0/1/0 1 Ex			10
	OME-1.3	Organic Semiconductors	0/0/2/0/0 1 Ex	2/0/0/0/0 1 Ex			5
	OME-1.4	Basics - Solid State Science	6*/2*/0/2*/0 CW*1 Ex				15
	OME-2.2	Optoelectronics		4/0/0/0/0 1 Ex			5
	OME-3.1	Molecular Electronics			2/2/0/0/0 1 Ex		5
	OME-3.2	Materials for Nanoelectronics and Printing Technology	2/0/0/0/0 1 Ex	2/0/0/2/0 1 Ex			10
	OME-3.3	Physical Characterization of Organic and Organic-Inorganic Thin Films			2/0/0/2/0 2 Ex		5
	OME-E1	Work Experience Project			0/0/0/8/0 1 Ex		5
	OME-M1[1]	Major		*/*/0/*/0 Ex*	*/*/0/*/0 Ex*		10
	OME-M2[2]	Minor		*/*/0/0/0 Ex*			5

Electives[3]	OME-E3	Deutsch als Fremdsprache	0/0/0/0/4 2 Ex				5
	M_ESS 2.4 (OME-E4)	Investing in a Sustainable Future		2/0/0/0/0 1 Ex			5
	OME-E5	Current Topics in Materials Science	1/1/1/0/0 2 Ex				5
	OME-E6[4]	Academic and Scientific Work		*/*/*/*/0 Ex*			5
	OME-E7	Semiconductor Industry Challenges: Market Dynamics, Technology Innovations, Yield and Reliability Engineering		1/0/0/0/0	2/0/0/0/0 2 Ex		5
						Master's Dissertation	29
						Colloquium	1
CP			**32**	**28**	**30**	**30**	**120**

[1] This module includes lectures, practical work and potentially also practical sessions totalling 8 hrs/wk.
[2] This module includes lectures and practical sessions totalling 4 hrs/wk.
[3] Alternative (1 out of 5).
[4] This module includes lectures, practical sessions, seminars and practical work totalling 3 hrs/wk.

CP	Credit points	E	Practical sessions
Ex	Examination(s)	S	Seminars
CW	Coursework	P	Practical work
L	Lectures	LC	Language course
		*	Alternative depending on choices made by the students