Technische Universität Dresden
Faculty of Mechanical Science and Engineering

Study Regulations for the Diploma degree programme Process Engineering and Natural Materials Technology

From 29 April 2019

On the basis of § 36 paragraph 1 of the Saxon Higher Education Freedom Act (Sächsisches Hochschulfreiheitsgesetz) in the version published on 15 January 2013 (SächsGVBl. p. 3), Technische Universität Dresden enacts the following study regulations as statutes.

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§ 1
Scope

Based on the Saxon Higher Education Freedom Act and the examination regulations, these study regulations govern the objectives, content, structure and procedure of the study programme for the Diploma degree course in Process Engineering and Natural Materials Technology at Technische Universität Dresden.

§ 2
Aims of the study

(1) Graduates are high-performance engineering personalities with leadership skills who meet the growing challenges in practice and science through a holistic research-oriented education. They possess comprehensive basic knowledge of natural sciences and engineering and master methods to recognise, abstract and solve problems in their field. They can analyse, model and simulate problems and challenges in the fields of process engineering and natural materials engineering and scale, implement and evaluate corresponding solution approaches. Through the holistic problem-solving competence, graduates are able to organise and successfully work on process engineering tasks from the most diverse areas of material conversion, taking into account technical and social as well as economic and ecological boundary conditions in teams based on the division of labour. They can take up the results of others and communicate them together with their own results in the team and beyond for different target groups. Due to the increasing research orientation, graduates are familiar with current research questions from all special fields of process engineering and natural materials engineering such as general process engineering, bioprocess engineering, chemical engineering, wood technology and fibre materials technology as well as food technology and have insights into the state of research and the application of contemporary methodology.

(2) Graduates are able to meet the requirements of professional practice in the field of process engineering and natural materials engineering through their scientific and technical knowledge, their mastery of specialist knowledge and scientific methods and are able to apply their knowledge. Possible occupational fields can be found in process development and design as well as in product development and design-, in plant construction, layout and design, in quality management and in technical service sectors as well as in teaching and training at home and abroad in various application sectors. Technology companies, manufacturing companies and plant constructors of all sizes can be future employers. Fields of employment include, for example, companies and institutions that are active in mechanical, thermal and chemical process engineering, wood technology and fibre processing, food production and bioprocess engineering. Other opportunities open up in scientific institutions, testing and expert bodies, in the public sector and in freelance activities. The development and marketing of one's own products, ideas and processes also opens up promising prospects for the future.

(3) Graduates are also qualified to fulfil their economic, social and ecological responsibilities due to a high level of general education. They are able to reach professional and social judgement early in their professional development. Graduates are universally employable specialists with interdisciplinary knowledge and the ability to think in a networked manner; they can combine technical, economic and social competence.

§ 3
Access requirements

The prerequisite for admission to the degree programme is a general higher education entrance qualification, a subject-specific higher education entrance qualification in the relevant subject area or a higher education entrance qualification recognised as equivalent by the higher education institution.

§ 4
Start and duration of studies

(1) The degree programme can be commenced in the winter semester.

(2) The standard period of study is ten semesters and includes attendance, self-study, supervised practical periods and the Diploma examination.

§ 5
Teaching and learning methods

(1) The course content is structured in modules. In the individual modules, the teaching content is conveyed, consolidated and deepened through lectures, exercises, practicals, work placements, seminars, excursions, language courses, self-study, tutorials and projects. In modules that are recognisably subject to several study regulations, synonyms are permissible for teaching and learning methods with the same content.

(2) Lectures introduce the subject matter of the modules. Exercises enable the application of the subject matter in exemplary sub-areas. Internships serve the application of the taught material as well as the acquisition of practical skills in potential professional fields. In work placements, the student is introduced to the practical occupational activity by working on technical-planning and operational-organisational tasks. Seminars enable students to inform themselves about a selected problem area on the basis of specialist literature or other materials under guidance, to present what they have worked out, to discuss it in the group and/or to present it in writing. Excursions enable students to experience the acquired knowledge in practical application and to get to know potential professional fields. Language courses impart and train knowledge, skills and abilities in the respective foreign language. Students develop communicative and intercultural competence in an academic and professional context as well as in everyday situations. Self-study enables students to acquire basic as well as in-depth subject knowledge independently with the help of various media (teaching materials, literature, internet, etc.) in individual work or in small groups. In tutorials, students, especially first-year students, are supported in acquiring practical and theoretical skills. In projects, the connection between theory and practice is supported and special topics are developed with the inclusion of interdisciplinary questions. In particular, projects enable the application and deepening of methodological and social skills.

§ 6
Structure and sequence of studies

(1) The degree programme has a modular structure. The courses are spread over nine semesters. The tenth semester is used to write the Diploma thesis. The eighth and ninth semesters are designed in such a way that they are 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 study programme comprises 22 compulsory modules and one field of study, at the student's choice, with the compulsory or compulsory elective modules provided according to the study schedule (Annex 2). The fields of study Process Engineering, Bioprocess Engineering, Chemical Engineering, Wood and Fibre Material Technology as well as Food Engineering are available for selection. The choice of the field of study and the compulsory elective modules is binding. A one-time change of choice is possible in each case; it is made by a written application of the student to the examination office, in which the field of study to be replaced and the newly chosen field of study or the compulsory elective module to be replaced and the newly chosen compulsory elective module must be named in each case.

(3) Qualification goals, contents, teaching and learning methods, requirements for participation, usability including any combination restrictions, frequency, workload and duration of the individual modules can be found in the module descriptions (Annex 1).

(4) The courses are held in German or in English according to the module descriptions.

(5) The appropriate allocation of the modules to the individual semesters, the observance of which enables the completion of the degree programme in the standard period of study, as well as the type and scope of the courses included in each case and the number and standard time of the required study and examination achievements are to be taken from the attached study schedule (Annex 2) or an individual study schedule confirmed by the faculty for the part-time degree programme.

(6) The range of compulsory elective modules as well as the study schedule can be changed by the Faculty Council on the proposal of the Study Commission. The current range of compulsory elective modules shall be announced at the beginning of the semester in the usual manner of the faculty. The amended study schedule shall apply to the students to whom it is announced in the customary manner at the beginning of the semester. The examination board shall decide on exceptions to sentence 3 upon application by the student.

(7) If participation in an elective or in a non-elective course of a compulsory elective module is limited by the number of available places according to the module description, the selection of participants shall be made according to the order of enrolment for the corresponding course. The number of available places as well as the form and deadline of the enrolment option shall be announced to the students in due time in the usual manner of the faculty.

§ 7
Content of the study programme

(1) The essential contents include, in particular, differential and integral calculus, linear algebra and stochastics, equilibrium of plane and spatial load-bearing structures, moments of area, tensile, compressive and shear stress, stress and distortion states as well as the calculation of

translational movements, atomic structure and structure of the periodic table, mechanisms of chemical bonds and reactions, ways of representing important organic compounds, chemical potential and equilibrium, colligative properties and phase diagrams, basic principles of electrochemistry and reaction kinetics, basic biochemical metabolic pathways and transport processes, structure, occurrence, reactions and properties of carbohydrates, lipids, proteins, enzymes and nucleotides, working concepts and working strategies of the subject areas mechanical process engineering, thermal process engineering, chemical process engineering, bioprocess engineering, chemical engineering, food technology, wood technology and fibre materials technology as well as processing technology, calculation methods for electrical direct, alternating and three-phase circuits, the use of complex computer systems and methods of software technology, properties of thermodynamic systems, application of the conservation laws of mass, energy and momentum, manufacturing and production engineering basics for the manufacture of products and the process chains required for this, Consideration of measurement uncertainties, the measurement of electrical and non-electrical quantities, sensor technology as well as the description of dynamic behaviour, basic features of cost accounting with cost types, cost centres and cost unit accounting as well as the structure of company accounting, study and occupation-related, written and oral communication of professional and scientific language, social science, environmental protection, work science and organisation, business and patent law.

(2) Natural science and engineering fundamentals with a strong emphasis on process engineering processes, methods and applications create the prerequisites for studying in one of the five elective compulsory fields of study, which allow students to focus on one area of process engineering and natural materials engineering. Each field of study is characterised by a compulsory area and a compulsory elective area. The compulsory elective area of each field of study is divided into the area of fundamentals-oriented specialisation and the area of specialisation.

1. The compulsory area of the Process Engineering field of study includes basic contents of mechanical, thermal and chemical process engineering, plant engineering and safety engineering, heat and mass transfer, systems process engineering, multiphase reactions and chemical thermodynamics and multiphase thermodynamics. In the elective compulsory area, the area of basic-oriented specialisation includes the focal points of particle technology, process automation, reactor technology and energy process engineering. The area of specialisation includes the focal points recycling, interfacial engineering, process analysis, food and bioprocess engineering, cryogenics, pure technologies, process engineering plants, environmental process engineering and process control systems.
2. The compulsory area of the Bioprocess Engineering field of study includes basic contents of mechanical and thermal process engineering, microbiology, biophysics, biochemistry and bioanalytics. In the compulsory elective area, the area of basic-oriented specialisation includes the focal points of bioprocess technology and bioreaction technology, enzyme and biosensor technology, white biotechnology and applied biotechnology. The area of specialisation includes the focal points of process analysis, process engineering plants, environmental process engineering, biotechnical plants and processes, bioprocessing and food technology, chemometrics and systems biotechnology.
3. The compulsory area of the Chemical Engineering technology field of study includes basic contents of mechanical, thermal and chemical process engineering, multiphase reactions, analytical and technical chemistry as well as methods of chemical analysis. In the elective compulsory area, the area of basic-oriented specialisation includes the focal points of plant engineering and safety engineering, high-performance materials, macromolecular chemistry and regenerative energy production. The area of specialisation includes the focal points heat transfer and mass transfer, system and energy process engineering, food and bioprocess engineering, chemometrics, particle and water technology, food chemistry and materials syn-

thesis.

4. The compulsory area of the Wood and Fibre Material Technology field of study includes basic contents of mechanical and thermal process engineering, wood and fibre materials chemistry, wood anatomy, the production and processing of wood materials and paper and wood and paper chemistry. In the elective compulsory area, the area of basic-oriented specialisation includes the focal points of furniture and construction element development, wood protection, machines and processes of paper production and paper processing, wood drying and wood analysis as well as fibre and paper physics. The area of specialisation includes the focal points of process analysis, wood construction, product design, natural fibre-based products and fibre composites, food and bioprocess engineering, product manufacturing and separation technology as well as paper recycling.
5. The compulsory area of the Food Engineering field of study includes basic contents of mechanical and thermal process engineering, food science, food chemistry, basic food technology processes, food technology and food microbiology and hygiene. In the compulsory elective area, the area of basic-oriented specialisation includes the focal points of food rheology, quality assurance and special chapters of food technology and bioprocess engineering. The area of special specialisation includes the focal points of machine and plant technology, process analysis, environmental process technology, chemometrics, packaging and refrigeration technology as well as nutritional physiology.

§ 8
Credit points

(1) ECTS credit points document the average workload of students as well as their individual study progress. One credit point corresponds to a workload of 30 hours. As a rule, 60 credit points are awarded per academic year, i.e. 30 credit points per semester. The total workload for the degree programme corresponds to 300 credit points and includes the forms of teaching and learning described in the module descriptions in terms of type and scope, the course and examination achievements as well as the Diploma thesis and the colloquium.

(2) The module descriptions indicate how many credit points can be acquired through a module in each case. Credit points are acquired if the module examination has been passed. Section 27 of the examination regulations remains unaffected.

§ 9
Student advisory service

(1) General student counselling is provided by the Central Student Counselling Office of the Technische Universität Dresden and covers questions regarding study opportunities, enrolment modalities and general student matters. The student counselling of the Faculty of Mechanical Science and Engineering is responsible for the academic counselling during the studies. This academic counselling supports the students in particular in questions of study organisation.

(2) At the beginning of the third semester, every student who has not yet completed a course of study shall take part in a course guidance session.

§ 10
Adaptation of module descriptions

(1) In order to adapt to changed conditions, the module descriptions can be changed in a simplified procedure within the framework of an optimal study organisation with the exception of the fields "Module name", "Qualification goals", "Contents", "Teaching and learning methods", "Requirements for the award of credit points" as well as "Credit points and grades".

(2) In a simplified procedure, the Faculty Council of the Faculty of Mechanical Science and Engineering decides on the amendment of the module description on the proposal of the Study Commission. The changes are to be published in the customary manner of the faculty.

§ 11
Entry into force, publication and transitional provisions

(1) These study regulations shall enter into force on 1 June 2019 and shall be published in the Official Announcements of the Technische Universität Dresden.

(2) It shall apply to all students newly enrolled in the Diploma degree programme in Process and Natural Materials Engineering in the winter semester 2019/2020 or later.

(3) For students enrolled earlier than the winter semester 2019/2020, the study regulations for the Diploma degree programme in Process Engineering and Natural Materials Technology previously valid for them before the entry into force of these regulations shall continue to apply.

(4) These study regulations shall apply from the winter semester 2020/2021 for all students enrolled in the Diploma degree programme in Process and Natural Materials Engineering.

(5) In the case of transfer according to Paragraph 3 or Paragraph 4, the module examinations already completed, including the grades, shall be transferred ex officio, and individual examination performances shall also be transferred ex officio on the basis of equivalence tables which are determined by the Examination Committee and announced in the customary manner of the faculty. With the exception of § 15 Paragraph 5 of the Examination Regulations, module examinations and examinations not graded with at least "sufficient" (4.0) or "passed" shall not be transferred. In principle, the module grade is not recalculated on the basis of the grades of exclusively transferred examinations; exceptions can be found in the equivalency tables.

Issued on the basis of the resolution of the Faculty Council of the Faculty of Mechanical Science and Engineering of 16 November 2018 and the approval of the Rectorate of 12 February 2019.

Dresden, 29 April 2019

The Rector
of the Technical University of Dresden

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