Technische Universität Dresden
Faculty of Mechanical Science and Engineering

Study regulations for the Bachelor's degree programme in Mechanical Engineering

From 17 May 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

On the basis of 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 Bachelor's degree course in Mechanical Engineering at Technische Universität Dresden, which can be completed both as a face-to-face course and as a distance learning course.

§ 2
Aims of the study

(1) Students have advanced understanding of the subject of mechanical engineering and are able to meet the growing challenges in practice and science through the holistic research-oriented education. They possess comprehensive basic knowledge of natural sciences and engineering. The students master appropriate methods to recognise, abstract and solve problems in their subject (analysis, modelling, simulation, design, evaluation). They have problem-solving competence and can successfully work on engineering problems taking into account technical, economic, ecological, social and ethical constraints in a specialised field of work or learning. They can organise and take on tasks in teams based on the division of labour, work independently, take on the results of others and communicate their own results in the team and beyond for different target groups. They have insights into methodology and the state of current research. In addition, they have the necessary socialisation skills in the operational environment. Graduates are specialists with interdisciplinary knowledge and the ability to think in a networked manner; they can combine technical, economic and social competence.

(2) Graduates are able to meet the basic requirements in the field of mechanical engineering in professional practice through their basic 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 the areas of development, construction, work preparation and production as well as the technical service sector at home and abroad in various application sectors. Future employers may be capital goods companies, technology companies or manufacturing companies in the commercial industries. Fields of application include, for example, companies and institutions in mechanical and equipment engineering, measurement and automation technology, automotive engineering and its supplier industry, the plastics processing industry, aerospace technology, energy technology and the textile processing industry. Other opportunities open up in scientific institutions, testing and expert bodies, in the public sector and in freelance work. The development and marketing of one's own products, ideas and processes also opens up promising prospects for the future.

(3) Due to a high level of general education, graduates are qualified to fulfil their economic, social and ecological responsibilities. They are able to reach professional and social judgement early in their professional development. The ability to take a holistic view of global contexts in conjunction with an awareness of social responsibility enables graduates in various contexts of professional life.

§ 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 recognized 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 six semesters and includes attendance, self-study and the Bachelor's examination.

§ 5
Teaching and learning methods

(1) The course content is structured in modules. In the individual modules, the course content is taught, consolidated and deepened through lectures, exercises, practicals, work placements, seminars, language courses, self-study and tutorials. In the distance learning programme, the lectures and exercises are replaced by blocked consultations with the same content. In modules that are recognisably subject to several study regulations, synonyms are permissible for teaching and learning forms 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 through his or her cooperation in 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. Language courses impart and train knowledge, skills and abilities in the respective foreign language. They 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 skills. In consultations, the subject areas of the modules are presented and discussed and the students are given the opportunity to discuss the acquired subject matter and solve exercises.

§ 6
Structure and sequence of studies

(1) The degree programme has a modular structure. The courses are spread over six semesters. The fifth semester is designed in such a way that it 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 programme comprises 19 compulsory modules and one profile recommendation, at the student's choice, with the compulsory modules or compulsory elective modules pro-

vided according to the curriculum. For this purpose, the profile recommendations of General and Structural Mechanical Engineering, Power Engineering, Automotive and Railway Vehicle Engineering, Lightweight Engineering, Aerospace Engineering, Production Engineering, Simulation Methods in Mechanical Engineering as well as Processing Machines and Textile Machines Engineering are available for selection. In the distance learning programme, the profile recommendations General and Structural Mechanical Engineering, Energy Technology, Aerospace Engineering and Production Engineering are available for selection. The choice of the profile recommendation and the compulsory elective modules is binding. A one-time change is possible in each case; it is made by a written application of the student to the examination office, in which the profile recommendation to be replaced and the newly selected profile recommendation or the compulsory elective module to be replaced and the newly selected compulsory elective module must be named.

(3) Qualification objectives, contents, teaching and learning forms covered, prerequisites, 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 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 form and deadline of the enrolment option shall be announced to the students in good 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, the methods of physics, the periodic system and the fundamentals of chemical bonds, the manufacture of products in mechanical, plant and vehicle engineering, the fundamentals of dimensioning components, 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, consideration of measurement uncertainties, the measurement of electrical and

non-electrical quantities, sensor technology and 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) Building on these fundamentals, the elective compulsory profile recommendations offer students the opportunity to focus on one of the areas of mechanical engineering described with these profile recommendations.

1. The profile recommendation General and Structural Mechanical Engineering covers the fundamentals of project planning, design, dimensioning and the use of machines and systems in all areas of mechanical engineering. It also includes fundamentals and methods for the development of mechanical engineering products and systems, for the solution of typical machine dynamic problems and for the constructive design, dimensioning and use of essential mechanical, electrical and fluidic drive elements and systems. Further contents of the profile recommendation are intralogistics, tractor technology, fluid engineering systems, modelling and simulation of electrical drive systems, drive technology as well as constructing with CAD and design draft.
2. The profile recommendation Power Engineering covers basic energy-technically relevant contents of fluid mechanics, process thermodynamics, heat and mass transfer, energy machines, refrigeration and air-conditioning technology, non-fossil primary energy use as well as heat exchangers and storage.
3. The profile recommendation Automotive and Railway Vehicle Engineering covers general contents for the development of mobile machines, in particular basics of measurement and automation technology, fluid technology and electrical drive systems, dynamic dimensioning of machines and product development. It includes vehicle components and overall vehicle functions, drive systems and mechatronic systems, the fundamentals of rail vehicles and train conveying mechanics.
4. The Lightweight Engineering profile recommendation covers in particular the design, calculation, production and testing of modern functionally integrative lightweight construction products in multi-material design made of materials with or without reinforcing materials. This includes the complex interactions between the metals, plastics, ceramics, natural materials and composite materials used with the respective direction-independent or direction-dependent property characteristics, the material-specific design concepts, the analytical and numerical calculation methods and the material-specific manufacturing processes with adapted process control and tool design.
5. The Aerospace Engineering profile recommendation covers engineering fundamentals for the development of technical systems in aerospace engineering, in particular fluid mechanics, flight mechanics, flight propulsion, structural mechanics, space systems and propulsion.
6. The profile recommendation Production Engineering includes in particular extended basics of manufacturing processes, production, logistics, production planning and work science as well as machine tools. This includes the selection, application and development of manufacturing processes and tools, the basics of additive manufacturing, machine tool development as well as work organisation and ergonomics.
7. The profile recommendation Simulation Methods in Mechanical Engineering includes in particular simulation methods for the approximate solution of boundary value tasks for elastic bodies and fluids, methods of fatigue and operational strength, static problems of solid bodies with infinitesimal distortions, continuum mechanics, active structures, fluid mechanics and dynamics, the multi-body systems as well as fundamentals and methods for the development of products in the product development process.
8. The profile recommendation Processing Machines and Textile Machines Engineering covers aspects of machine, technology and product development along the entire process chain,

starting with mass consumer goods such as food or pharmaceuticals and extending to textile high-tech products for technical or medical applications, as well as the constructive development of machines and their dynamically appropriate design and layout.

§ 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 180 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 Bachelor's 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 objectives", "Contents", "Forms of teaching and learning", "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 applies to all students newly enrolled in the Bachelor's degree programme in Mechanical 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 Bachelor's degree programme in Mechanical Engineering previously valid for them before the entry into force of these regulations shall continue to apply.

(4) These study regulations from winter semester 2020/2021 for all students enrolled in the Bachelor's degree programme in Mechanical 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 15 August 2018 and the approval of the Rectorate of 15 January 2019.

Dresden, 17 May 2019

The Rector
of the Technical University of Dresden

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