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Technische Universität Dresden
Biotechnologisches Zentrum

**Study regulations
for the consecutive master's program
Molecular Bioengineering**

of 10.12.2014

Pursuant to Article 34 par. 1 sent. 1 of the Law on Institutions of Higher Education in the Free State of Saxony (Sächsisches Hochschulfreiheitsgesetz - SächsHSFG) of January 15, 2013 (Saxon law gazette p. 3), amended by article 24 of the law of December 18, 2013 (Saxon law gazette pp. 970, 1086), the Technische Universität Dresden enacts the study regulations below as statutes.

(In these regulations masculine designations of persons apply to female persons too.)

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§ 1

Scope

Based on the Saxon Law on Institutions of Higher Education and the examination regulations, these study regulations govern the aims, content, structure and organisation of the consecutive Master's program Molecular Bioengineering at the Technische Universität Dresden.

§ 2

Aims of the program

1) On the basis of the discussed methods and different scientific approaches the students are able to conduct independent scientific research. The students can work on complex problems and solve them with scientific methods that may even lie beyond their current state of knowledge. The students have gained a subject-related expertise that is based on current research questions, methodological and analytical skills enabling them to independently broaden their scientific knowledge. In this, research methods and strategies play a central role. The students are able to think across scientific boundaries, communicate scientifically in a multidisciplinary field and solve economic problems.

(2) Students have in-depth knowledge in biomedical or technological aspects of bioscience. They know the main concepts in technology and biomedical areas. They are able to interrelate contents from technology and biomedicine and focus on specific fields of interest that combine these two.

(3) The students broaden their basic knowledge and their methodological skills. Thus, the students acquire an interdisciplinary research and development competence that qualify them for scientific purposes (PhD) as well as the professional field in R&D departments of biotech companies.

(4) A graduate in Molecular Bioengineering has a sound knowledge in molecular and cell biology, biomaterial science and tissue engineering as well as bionanotechnology and bioinformatics. He is able to combine his knowledge of biomedical contents with an engineering approach to current research questions and can such contribute to an efficient technology transfer.

§ 3

Admission requirements

(1) Providing proof of the eligibility (qualification) for the master program Molecular Bioengineering is mandatory for the admission to the program.

(2) To be qualified and, thus, eligible for admission to the Master's program Molecular Bioengineering pursuant to par. 1, a candidate shall

1) furnish evidence of a first university degree or degree of a state or state-approved university of cooperative education in engineering (preferably in Materials Science, Nanotechnology or Computer Science), in medical or in natural science.

- 2) prove his proficiency in English, in case English is not his mother tongue. Evidence may be furnished through common international language tests (preferably IELTS: min. Level 6.5 or TOEFL: 600 points paper-based test).
- 3) furnish evidence of his qualification for the Master's program Molecular Bioengineering. Evidence shall be furnished as specified by the separate admission regulations (Eignungsfeststellungsordnung).

§ 4

Start and duration of the program

- (1) The program generally starts in the winter semester.
- (2) The standard period of study is four semesters and includes attendance of the courses as well as self-study, practicals under supervision and the master examination.

§ 5

Types of courses

- (1) The structure of the program is modular. The content of the individual modules is conveyed, consolidated and treated in-depth in lectures, exercises, tutorials, seminars and practicals.
- (2) In lectures the students are introduced to the topics specified in the module descriptions. In the exercises students apply the theory that they learned in the lectures in exemplary sub-topics. Tutorials refer to the lectures and are intended for a thorough repetition of the lecture content and, if applicable, its in-depth treatment. Seminars are intended for developing the student's ability to deal with a problem mainly on the basis of literature, documentation or other papers, to present the results of his work in written or oral form. Practicals are intended for the practical application and in-depth treatment of the content conveyed in the lectures.

§ 6

Structure and organisation of the program

- (1) The structure of the program is modular. Semester 1-3 are dedicated to coursework. The fourth semester is reserved for the writing of the Master's thesis and the defense.
- (2) The program consists of 11 compulsory modules and 1 compulsory optional module allowing a focus either on the biomedical or technological area.
- (3) The contents and qualification aims, the types of courses, the necessary requirements, workload and duration of the modules are specified in the module descriptions (appendix 1).
- (4) The courses are taught in English.
- (5) The appropriate distribution of the modules over semester 1-3 ensuring the timely completion of the program in the standard period of study, as well as type and scope of the

courses and number and suggested standard date of the course requirements and exams are specified in the study schedule (appendix 2).

(6) Upon proposal by the study committee the Scientific Board of the BIOTEC may update the list of electives and the study schedule. The up-to-date list of electives is published at the beginning of the semester. The modified study schedule is valid for all students whom have been informed at the start of the study program. The examination committee decides on exceptions to sentence 3.

§ 7

Contents of the program

(1) The master program Molecular Bioengineering is research-oriented.

(2) The program focuses on the scientific basics and potential applications of molecular bioengineering in medicine and technology.

(3) In the biomedical area, the study program focuses on the architecture of the genome and mechanisms of its mutation as well as its application in model systems through Genome Engineering. It also comprises the function of proteins in the cell, in tissue and organisms and the interaction with other proteins is also discussed. Essential aspects to be discussed are the structure of proteins and their dynamic characteristics in cellular functions like cellular signaling processes, cell adhesion, cell movement and cell division. These processes are based on biochemical reactions and metabolic pathways whose systematic manipulation is studied in detail. In the technological area, the study program contains the basics of biophysics and biophysical methods. Dynamics, interactions and structure of biological systems are described with the help of physical principles. Furthermore, the methods in bioinformatics enabling to process biological data and investigate their sequence and structure are part of the study program.

§ 8

Credit Points

(1) The successful progression of the studies as well as the workload for the students is documented by the award of ECTS credit points. One credit point is equivalent to a workload of 30 hours. The workload per academic year is typically 60 credit points, i.e. 30 per semester. The total workload for the whole program is 120 credit points and includes the types of courses, course requirements and exams as well as the master thesis and the defence as specified by the module descriptions.

(2) The module descriptions (appendix 1) specify how many credit points are awarded for each module. The credits are obtained when the module examination is passed. § 26 of the examination regulations remains unaffected.

§ 9

Study counselling

(1) The general study counselling on study opportunities, enrolment procedures and general student affairs is provided by the Student Advisory Service of the Technische Universität Dresden and the BIOTEC student office. Continuous study counselling is provided by the

university teachers who are active in the program and the BIOTEC student and examination office. This is to support students especially in matters of study planning.

(2) Students who have not taken any examinations until the 3rd semester must take part in a study counselling session.

§ 10

Modification of module descriptions

(1) In order to ensure an optimal adaptation to changed conditions, the module descriptions can be modified in a simplified procedure except for the points "module name", "contents and qualification aims", "type of course", "requirements for the award of credits" as well as "credits and grades".

(2) Upon proposal of the study committee the Scientific Board of BIOTEC thus formally resolves upon changes in the module descriptions. The changes shall be published in accordance with the relevant provisions for publications.

§ 11

Entry into force, publication and transitional rules

(1) These study regulations shall enter into force on October 1, 2010 and be published in the Official Publications (Amtliche Bekanntmachungen) of the Technische Universität Dresden.

(2) They are applicable to the students enrolled in the master's program Molecular Bioengineering from winter semester 2010/2011.

(3) The students who have been enrolled before winter semester 2010/2011 shall complete the program on the basis of the study regulations for the master program Molecular Bioengineering applicable for them.

Enacted on the basis of the resolution of the Scientific Board of the Biotechnology Center of Technische Universität Dresden on 30.06.2010 and the approval of the Rectorate of TU Dresden on 17.12.2013.

Dresden, 10.12.2014

The Rector of the Technische Universität Dresden

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