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Technische Universität Dresden
Biotechnologisches Zentrum

**Study regulations
for the consecutive master's program
Nanobiophysics**

of 20.07.2015

Pursuant to Article 36 par.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 11 of the law of April 29, 2015 (Saxon law gazette pp. 349, 354), 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 Nanobiophysics 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 on a multidisciplinary level and solve economic problems.
- (2) Through a sound training in physics, biology and polymer and material science from a nanoscopic view i.e. by using the wide variety of modern nanotechnological approaches and single-molecule based methods the students are able to understand molecular machines quantitatively, to use and manipulate them, to adapt and develop them for technical processes. The students know the basics of biophysics and bionanotechnology and are able to characterise and understand complex molecular machines as e.g. biomolecules with the help of nanotechnological approaches as well as harness these modules in technological systems and use them as templates or model systems for a bottom-up nanotechnology. They have acquired an analytical-technical profile.
- (3) A graduate in Nanobiophysics has extensive knowledge of modern experimental and theoretical biophysics and a sound background and experimental experience with biological systems from biochemistry to molecular cell biology. He knows the most important concepts and methods in nanotechnology as well as different modern single-molecule methods in theory and practice and has a basic background in material sciences. Graduates are qualified to work in R&D labs/departments in an interdisciplinary context and are able to assess the economic aspects and relevance of their work.

§ 3 **Admission requirements**

- (1) Providing proof of the eligibility (qualification) for the master program Nanobiophysics is mandatory for the admission to the program.
- (2) To be qualified and, thus, eligible for admission to the Master's program Nanobiophysics according 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 science (typically physics or biophysics) or engineering (typically Nanotechnology) or a subject with a similar inclination towards higher mathematics.

- 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 Nanobiophysics. 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, seminars, tutorials, exercises 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 master program is subdivided into the track Molecular Biophysics and the track Nanoscience and Nanotechnology. Students need to choose one track when they apply for the program. The choice of the track Nanoscience and Nanotechnology is only possible if students have also been admitted for the Erasmus Mundus program Nanoscience and Nanotechnology. The track Molecular Biophysics comprises of 13 obligatory modules. In the track Nanoscience and Nanotechnology students need to spend their first year at KU Leuven in Belgium in the framework of a joint program. The details are specified in an agreement between the cooperating universities. The course and exam requirements are equivalent to the ones in the local master program Nanoscience and Nanotechnology at KU Leuven. In the

second year students choose between the two specializations Biophysics and Nanoelectronics. The course comprises in both specializations four obligatory modules.

(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 modified study schedule is valid for all students whom have been informed as is customary at the Biotechnology Center at the start of the study program. The examination committee decides on exceptions to sentence 2.

§ 7 Contents of the program

(1) The master program Nanobiophysics is research-oriented.

(2) The program offers an interdisciplinary training in the field of molecular and cellular biophysics from a molecular or nanotechnological perspective.

(3) The track Molecular Biophysics covers topics from the fields of biology, biophysics and polymer physics. Nanotechnology is firstly approached from the angle of nanobiotechnology to pinpoint basic interdisciplinary concepts. The focus is on bio- and nanophysics. The students gain a broad overview over molecular and cellular biophysics and molecular nanostructures and –machines in theory and experiments. To stress the molecular approach, the program also covers modern single molecule techniques (single molecule optics, scanning probe techniques) that are fundamental in both bio- and nanophysics.

(4) The track Nanoscience and Nanotechnology covers basic concepts of molecular biology and biochemistry. The specialization Nanoelectronics covers molecular electronics, nano optics, concepts of molecular modeling and molecular magnetism. The specialization Biophysics covers applied biophysics, biophysical methods and cellular machines.

§ 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 study 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) The 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 Nanobiophysics from winter semester 2010/11.

(3) The students who have been enrolled before winter semester 2010/11 shall complete the program on the basis of the study regulations for the master's program Nanobiophysics applicable for them.

Enacted on the basis of the resolution of the Scientific Board of BIOTEC on 19.08.2010 and the approval of the Rectorate of TU Dresden on 21.01.2014.

Dresden, 20.07.2015

The Rector of the Technische Universität Dresden

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