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**Study Regulations  
of the Faculty of Physics and Astronomy  
for the Study Programme 'Physics' Seeking the Degree 'Master of Science'**

of 18 May 2009

**([Verkündungsblatt der Friedrich-Schiller-Universität Jena N°13/2009, S. 1228](#))**

including the

first modification of 17 November 2010

**([Verkündungsblatt der Friedrich-Schiller-Universität Jena N°1/2011, S. 10](#))**

and

second modification of 19 June 2013

**([Verkündungsblatt der Friedrich-Schiller-Universität Jena N°7/2013, S. 13](#))**

and

third modification of 20 November 2015

**([Verkündungsblatt der Friedrich-Schiller-Universität Jena N°9/2015, S. 269](#))**

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### § 1 Scope and Application

These Study Regulations establish objectives, content, and structure of the research-oriented, consecutive study programme 'Physics' leading to a Master of Science degree (abbreviation: M.Sc.) at the Faculty of Physics and Astronomy of the Friedrich Schiller University Jena. It is applicable in connection with the corresponding Examination Regulations (in the following: MPO) in their applicable version and the study plan and module catalogue adopted by the Faculty Council.

### § 2 Admission Requirements

(1) Prerequisite for the admission to the Masters programme 'Physics' is proof of the successful completion of a first university study programme in physics at a German university leading to a Bachelor of Science degree (at least 180 ECTS).

(2) Applicants with a university degree in another relevant subject or a university degree acquired abroad are admitted if equivalence of the degree is ascertained. Equivalence is to be ascertained in particular if successful completion of the following assessed course work and/or examinations can be proven:

1. assessed course work and/or examinations in the fundamentals of mathematics earning a total of at least 32 credit points (ECTS);
2. assessed course work and/or examinations in experimental physics earning a total of at least 32 ECTS;
3. assessed course work and/or examinations in theoretical physics earning a total of at least 32 ECTS;
4. assessed course work and/or examinations in practical courses in physics earning a total of at least 24 ECTS.

Equivalence is ascertained by the Examinations Committee on a case-by-case basis. Admission is granted if past performances and achievements show particular aptitude for the Masters programme, i.e. if there is no significant difference between the competencies or

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knowledge and skills acquired and the qualifications required for this study programme according to (1) above. Admission may be linked to certain conditions. For degrees earned outside the area of application of the German Basic Law, equivalence will be assessed taking into account equivalence agreements (*Äquivalenzvereinbarungen*) and cooperation agreements.

(3) Proficiency in English is essential and is expected from all applicants. Applicants from abroad must sit and pass the German Language Test for Admission to Higher Education (*Deutsche Sprachprüfung für den Hochschulzugang ausländischer Studienbewerber—DSH 2*) prior to their matriculation. Without proof of having passed the DSH 2 test as stipulated in sentence 2, an applicant from abroad may be admitted if he/she provides proof of very good English language skills at the level C1 of the Common European Framework of Reference for Languages or proof of a university degree in an English-taught study programme.

(4) The application for admission this study programme must be filed by the respective deadlines set by the University and must be accompanied by the following documents:

- a) proof of a first university degree qualifying the applicant to work in his/her profession;
- b) proof of language skills as stipulated in (3) above;
- c) a letter of application and, where applicable, duplicates or copies of work certificates.

### **§ 3 Duration of Study**

(1) The standard duration of study is two years, including the time required for the Master examinations. The University ensures that it is possible to complete the study programme in this standard duration of study.

(2) Times that are not counted as part of the standard duration of study according to (1) above if a duly justified request for leave of absence has been submitted and granted, are defined in § 3 (3) MPO.

(3) Pursuant to § 3 (4) MPO, the standard duration of study for part-time students is four years.

(4) To complete the study programme, each student writes a Master thesis.

### **§ 4 Beginning of Study Programme**

This Masters programme begins in the winter or summer semester.

### **§ 5 Objectives of the Study Programme**

(1) The objective of this consecutive Masters programme in physics is to prepare students for science-based and research-oriented careers, and to provide the foundation for further training programmes within and outside of academia through specialized academic training.

(2) Students will gain profound knowledge of experimental and theoretical physics as well as specialized training in various subfields of physics.

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(3) Upon successful completion of the study programme, graduates have acquired the specialist and interdisciplinary key skills and qualifications (e.g. social skills, ability to work in a team) required for research-oriented and science-based careers. They will have learned to develop and implement subject-specific research concepts. And in doing so, they prove to be able to critically evaluate scientific data, to think and act interdisciplinarily, and to analyse complex physical questions also across disciplines, to interpret findings correctly, and to find solutions.

## § 6

### Structure of the Study Programme

(1) The study programme is composed of modules. Each module may comprise different forms of instruction and learning, including but not limited to lectures, seminars, practical exercises, independent study periods, as well as examinations. Each module is a learning and examination unit, the results (grades) of which will be documented on the Grade Certificate. Generally, a module takes on semester; in some cases, in may, however, also comprise courses during several semesters.

(2) The study programme is subdivided into compulsory and required elective modules in the field of physics (total of 40 to 48 ECTS), in modules of an individually chosen elective subject (total of 12 to 20 ECTS), and two project modules (30 ECTS). The Master thesis (30 ECTS) completes the study programme.

(3) For their area of specialization in the field of physics, students select modules from among the focus areas of the Faculty of Physics and Astronomy: astronomy/astrophysics, solid-state physics/materials sciences, gravitational and quantum theory, or optics. In this area, they will attend modules earning a total of at least 24 ECTS and will write their Master thesis. In the individually chosen elective subject, students complete modules earning a total of at least 12 ECTS. These modules help to accumulate the required credit points. This part of the study programme is designed to allow students to attend additional courses to gain more thorough and profound knowledge or extend and broaden existing knowledge in the field of study at their own discretion, and to allow them acquire additional key qualifications. Students may choose modules offered by any of the faculties of the Friedrich Schiller University Jena, including modules offered by the Faculty of Physics and Astronomy except those offered in their chosen area of specialization in physics.

(4) Throughout the two-year duration of the study programme, students acquire various advanced qualifications and competencies.

- a) The first year of study will be the 'specialization phase' and will teach
- the current state of knowledge in the field of quantum physics and state-of-the-art physical experimenting;
  - the current state of research in selected subjects in the chosen area of specialization;
  - advanced methodological and methodical skills and competencies in the elective subject;
  - interactive thinking;
  - knowledge outside the chosen area of specialization.
- b) The second year of study will be the 'research phase' and will teach
- the planning and implementation of research projects;

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- the practical implementation of theoretical, experimental, and methodological foundations in a physical research project focused on one particular topic;
- the writing of a scientific project report;
- the presentation of research results as well as chairing a discussion.

## § 7

### Scope and Content of the Study Programme

(1) To successfully complete the study programme, students must acquire a total of 120 credit points according to the European Credit Transfer and Accumulation System (ECTS). Per year of study, a total of 60 ECTS has to be earned. Pursuant to the stipulations of the European Credit Transfer System (ECTS), a workload of a total of 30 hours of in-class and independent studying is assumed for every one credit point.

(2) The modules in the first year of study are designed to teach students the current state of research in selected subject areas as well as research-oriented methodological approaches in their chosen elective subject. In addition, students are made familiar with the most recent developments and findings in the field of quantum physics and in physical experimenting. In their elective subjects individually chosen from among the complete range of modules offered by all faculties of the Friedrich Schiller University Jena, students acquire skills and competencies from outside the field of physics that correspond to their individual inclinations and preferences and may be of use to them later on in their professional life. Generally, the modules to be chosen as elective subjects should be modules in a Masters programme. However, if a student has no existing knowledge in the field of study chosen as elective subject, he/she may also select modules from a Bachelors programme. Some modules recommended as elective subjects have been included in the module catalogue.

(3) The first year of study comprises the following:

- 16 ECTS in Advanced Quantum Theory and Physical Experimenting
- 20 to 28 ECTS in the areas of specialization astronomy/astrophysics, solid-state physics/materials sciences, gravitational and quantum theory, or optics. Each student must, however, complete modules in at least two of these areas. The modules are offered in German or English.
- 4 ECTS in an advanced seminar where students have to produce presentations on selected topics from the area of specialization.
- 12 to 20 ECTS in their elective subjects.

(4) In the second year of study, acquired knowledge and skills are practically applied in research-oriented projects. The modules Project Planning and Introduction to Writing the Master Thesis prepare students to successfully implement a scientific research project as their Master thesis.

(5) The second year of study comprises the following:

- 15 ECTS Introduction to Scientific Working Methods
- 15 ECTS Project Planning for the Master Thesis, each of which has to be completed with an individual presentation.
- 30 ECTS Master thesis.

These three modules form a thematic unit and must therefore be completed in one working group.

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(6) A description of the modules can be found in the module catalogue, an annex to the study plan. The module descriptions provide information about the person responsible for the module, the prerequisites for participation, what earned credits may be counted towards, the status of the module, the different forms of learning and working, the work load and the credit points to be earned, the content and qualification objectives of the module, as well as the types of performance assessment and their respective weight for the final grade of the module. In addition, the module descriptions provide information on how often the module is offered and its duration.

## **§ 8**

### **International Mobility of Students**

(1) The Faculty of Physics and Astronomy is committed to promoting international mobility of students. To this end, it seeks to develop special courses jointly with selected partner universities that will complement the physics courses in Jena.

(2) If students wish to spend some time abroad during the course of their studies, an ECTS Learning Agreement signed with their home university prior to the stay abroad will guarantee recognition of times of study and academic achievements produced outside the scope of application of the German Higher Education Framework Act (*Hochschulrahmengesetz*).

## **§ 9**

### **Assessed and Non-Assessed Coursework and Examinations**

The type and scope of assessed and non-assessed coursework as well as examinations are defined in the Examination Regulations. The types of examination in the individual modules and the weighting of partial examinations are specified in the module descriptions in the module catalogue. The person responsible for a particular module will set the dates for examinations. In addition, he/she may, within the limitations set in the Examination Regulations (§ 9 MPO), also decide on the scope of assessed course work and examinations. Examination dates and other specifications for each module are announced at the beginning of each module.

## **§ 10**

### **Admission to the Different Stages of Study and to Individual Modules**

(1) Information on the recommended order or sequence of modules can be found in the study plan and module descriptions. There are no special prerequisites for the admission to individual modules.

(2) For individual modules of the elective subjects, the number of participants may be limited for factual reasons, particularly for reasons of available space or equipment.

## **§ 11**

### **Subject-Specific Academic Advisory Service**

(1) An individual subject-specific academic advisory service is offered by experts in the various ranges of elective subjects (astronomy/astrophysics, solid-state physics/materials sciences, gravitational and quantum theory, optics) at the Faculty of Physics and Astronomy.

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They offer advice on subject-related questions so that students can organise their studies in a target-oriented way geared towards finishing the study programme with the desired degree and within the standard time of study.

(2) Advising students in subject-specific questions and concerns is, however, also the responsibility of all teaching staff. Students may choose a person of trust from among all teaching staff as their mentor and may consult them in case of questions during the course of their studies regardless of whether or not they attend their courses.

(3) Questions related to the Study or Examination Regulations will be responded to by the chairperson of the Examinations Committee, his/her deputy, or another person appointed by the Examinations Committee. He/she also offers the academic advisory service required by § 10 (1) of the Thuringian Higher Education Act (*Thüringer Hochschulgesetz, ThürHG*)

(4) Non subject-specific questions and concerns can be discussed with staff at the Central Academic Advisory Service of the Friedrich Schiller University Jena.

## **§ 12**

### **Evaluation of Courses Offered and Quality Control**

(1) The Faculty of Physics and Astronomy is committed to constantly modernizing and improving the courses offered. Pursuant to § 7 (4) MPO, the Examinations Committee regularly evaluates the study plan and the range of modules offered in due consideration of the developments in the specific field and of professional requirements.

(2) In addition, regular course evaluations are conducted in cooperation with the physics student representative committee (*Fachschaft Physik*) every semester. The results are discussed with concerned academic staff and evaluated by the Faculty Council. The goal of these evaluations is to optimize each course and to improve the study conditions in the Masters programme, particularly with regard to acceptance by the students, the content of the study programme, and the shortening of study times.

## **§ 13**

### **Equal Opportunity Clause**

All titles and functions in (the German version of) these Regulations equally refer to men and women.

## **§ 14**

### **Coming into Effect**

(1) The third modification of these Study Regulations come into effect on the day following their announcement in the journal of legal notices of the Friedrich Schiller University (*Verkündungsblatt der Friedrich-Schiller-Universität*).

[(2) In principle, each and any student finishes his or her studies pursuant to the regulations applicable at the moment he/she began his/her studies.]

Jena, 20 November 2015

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