

**Program Regulations for Master's Students
of the Faculty of Physics and Astronomy
in the Master of Sciences (M.S.) Degree Program in Photonics
18th May, 2009**

According to § 3 paragraph 1 § 34 and paragraph 3 sentence 1 of the Thuringian Higher Education Act (*Thüringer Hochschulgesetzes, ThürHG*) from 21st Dezember 2006 (GVBl. S. 601), last changed via Art. 15 of the Act from 20th March 2009 (GVBl. S. 238), the Friedrich Schiller University Jena issues the following Program Regulations. These regulations were decided by the Council of the Faculty of Physics and Astronomy (*Fakultätsrat*) on 10th July 2008 and agreed to by the Senate of the Friedrich Schiller University Jena on 16th December 2008.

The Rector approved these regulations on 18th May 2009.

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§ 1 Scope

This course of study regulates the goals, contents and structure of the consecutive, research-oriented master's program in photonics at the Faculty of Physics and Astronomy of the Friedrich Schiller University Jena. Following a successfully completed master's examination in this program, the examinee earns the degree of Master of Sciences (M.Sc.). The companion documents are the corresponding current course of examination and the study plan and module catalogue which have been approved by the faculty council.

§ 2 Prerequisites for Admission

- (1) The admission requirements for the master of science program in photonics are as follows:
- (a) A bachelors of science (B. Sc.) or equivalent degree in an area of physics or another appropriate subject;
 - (b) proof of English skills at the level of B 1 according to the European Frame of Reference, generally via an internationally recognized certificate;
 - (c) a typed application letter (max. 500 words) in which the applicant displays motivation and eligibility as well as skills relevant to the course of study (letter of motivation);
 - (d) for applicants who are participants in the international Erasmus-Mundus master program "Optics in Science and Technology", the admission letter from the international selection commission;
 - (e) an overview table of practical and work experience relevant to the course of study in optics;

- (f) copies of any references from former employers or supervisors;
- (g) submission of all required application documents by the deadline set by the Friedrich Schiller University Jena for that semester.

(2) The examination committee decides which applicants to accept. The criteria used by the committee are:

1. admission by the international selection committee for the Erasmus-Mundus master program "Optics in Science and Technology",
2. final and/or average grade in the previously completed course of study,
3. arguments presented in the application letter,
4. work experience relevant to the course of study in optics.

§ 3 Period of Study

(1) The regular period of study is two years, including the time allowed for the master's examination. The university ensures that the course of study can be completed within this period.

(2) Periods of time which will not be counted towards the total study period if a justified application has been approved are given in § 3 paragraph 3 of the examination rules for the master's program in optics.

(3) The regular period of study for part-time students is four years as given in § 3 paragraph 4 of the examination rules for the master's program in optics.

(4) A master's thesis will be submitted at the end of the study period.

§ 4 Beginning Study

The master's program begins in the winter semester.

§ 5 Goals of the Program

(1) The goal of the master's program in photonics is to prepare students for a research-oriented scientific occupation in the area of optics and optic technologies, as well as to provide them with practical training as a basis for further training programs at a postsecondary or other institution.

(2) Students earn a deepened understanding in experimental and theoretical optics and specialized training in multiple areas of optics.

(3) Following the successful completion of the program, students will have a command of professional and interdisciplinary key qualifications (including social competence and teamworking skills) necessary for a career in research-oriented and scientific fields. They are able to elaborate upon and implement research concepts within their subject. They have shown that they are able to critically analyze scientific discoveries, to think interdisciplinarily, to work responsibly, and to break complex questions in optics down into their individual parts and develop solutions.

§ 6 Structure of the Program

(1) The program is composed of modules. Individual modules comprise different forms of instruction and work requirements including lectures, seminars, practical exercises, independent study and examinations. Each module is an instructional and evaluative unit and is listed on the student's transcript along with the grade earned. Modules generally last for one semester, but may include contents from multiple semesters.

(2) The program of study is divided into required modules (*Adjustment* [16 credit points/"Leistungspunkte", LP] and *Fundamentals* [16 LP]) and required elective modules within optics (*Specialization*) [24 LP], as well as three practical modules (*Labworks*, *Internship* and *Research Labworks*) [34 LP]. The program ends with the master's thesis [30 LP].

(3) Within the module *Adjustment*, the various initial requirements of students in the masters program should be discussed in order to prepare students for the successful completion of the program. This module should especially convey the international orientation of the master's program. At the same time, there may be large differences in student's experiences depending on whether they have completed a bachelor's program in the natural sciences or in engineering. Thus each student should receive his or her own specialized orientation program from the leader of the *Adjustment* module.

(4) In the required elective module *Specialization*, students choose among lectures for a total of 24 LP.

(5) Throughout the study program, students earn several qualifications and competencies:

- (a) In the first year of study, students learn and demonstrate the following skills under the main themes of "fundamentals", "adjustment", and "specialization":
- fundamentals of modern knowledge in the areas of optics, photonics, solid-state and laser physics;
 - the current state of research in chosen focus areas;
 - advanced methodological competence;
 - integrative thinking;
 - fundamental methods of experimentation in optics;
 - practical career-related skills;
 - conceptual competence to understand the structure of fields of research, apply theories to individual cases, and present results.
- (b) In the second year of study, students learn and demonstrate the following skills under the main themes of "specialization" and "research":
- deepened knowledge of elective topics in optics;
 - application of theoretical, experimental and methodical fundamentals in a thematically focused research project;
 - planning and implementation of a research project;
 - conducting systematic research as part of a group;
 - writing up a scientific project;
 - presentation of results.

(6) In addition to the information conveyed in the program of study, students can take advantage of voluntary language courses offered by the language centre (*Sprachenzentrum*) at the university. The language course comprises weekly courses over at least three semesters. Students may choose among different languages depending on their knowledge and goals.

§ 7

Scope and Contents of the Program

(1) The program of study consists of 120 credit points (*Leistungspunkte*, LP) according to the European Credit Transfer and Accumulation System (ECTS). 60 LP are to be earned per year. One LP as determined by ECTS standards corresponds to 30 hours spent attending a course and in independent study outside of the course.

(2) The modules in the first year of study convey the current state of research in the fields of optics, photonics, solid state and laser physics. Students additionally become familiar with the most modern skills and the use of research methods in chosen topics.

(3) The first year of the program is divided into the following modules:

- 16 LP in the individualized module *Adjustment*
- 16 LP in the required modules *Fundamentals 1* und *Fundamentals 2*
- 12 LP in the required optics elective module *Spezialization 1*

- 16 LP in two practical modules *Labworks* and *Internship*
- (4) In the second year of study, students apply and expand their skills in additional required elective modules and in research projects.
- (5) The second year of the program is divided into the following modules:
- 12 LP in the required optics elective course *Spezialisierung 2*
 - 18 LP in the practical module *Research Labworks*
 - 30 LP for the master's thesis.
- (6) Descriptions of the modules can be found in the module catalogue. The module descriptions include the name of the module coordinator, prerequisites for participation, applications, status of the module, methods of instruction and work, workload and number of credits the module is worth, contents and goals of the module, as well as the type of examination and how the different parts are weighted. The module description also includes how often the module is offered, and how many semesters it spans.
- (7) Modules are usually given in English.

§ 8

International Mobility of Students

- (1) The faculty has made it a duty to support the international mobility of students. To this end, concrete course offerings at partner universities should be developed which enhance the program of study.
- (2) The completion of an ECTS Learning Agreement prior to the beginning of an academic exchange in a foreign country outside of the Framework Act for Higher Education (Hochschulrahmengesetzes) guarantees that the academic work completed during the exchange will be recognized.

§ 9

Academic Workload and Examinations

The types and scope of the academic workload and examinations included in the master's examination are regulated in the Examination Regulations (*Prüfungsordnung*). The methods of examination for individual module examinations and the weighting of different parts of the examinations are given in the module descriptions in the module catalogue. The module coordinator sets the times and dates for examination. Additionally, he or she can determine the scope of examinations according to § 9 of the Examination Regulations. All important appointments and deadlines will be given at the beginning of the module.

§ 10

Admission to Segments of the Program and to Individual Modules

- (1) The study plan and module descriptions contain recommendations about the order in which the modules should be taken. There are no particular prerequisites for admission to individual modules.
- (2) The number of participants may be limited for particular modules if this can be justified, in particular based on space and technical limitations.

§ 11

Academic Advising

- (1) Academic advisors from the Faculty of Physics and Astronomy in the area of optics are available for individual advising. They can answer students' questions specific to the area of study in order to help them focus their study and finish in time.

(2) Advising is also part of the job description for all instructors. Each student may choose an instructor whom he or she particularly trusts as a mentor. The choice of a mentor is independent of whether the student is currently participating in any courses offered by that instructor.

(3) Questions regarding the Examination and Program Regulations for the M. Sc. Photonics should be addressed to the chairperson of the examination committee, his or her substitute, or a person named by the examination committee.

(4) The Student Services of the Friedrich Schiller University Jena are available to answer questions which are not specific to the program in photonics.

§ 12

Evaluation of Courses Offered and Quality Control

(1) The faculty feels it has the duty to continually update and improve course offerings. At regular intervals, the examination committee evaluates the development of the faculty and the ability of the study program and module offerings to prepare students for their future careers.

(2) Additionally, teaching evaluations are conducted every semester in cooperation with the faculty council in physics. The evaluations are shared with the instructors and evaluated in the faculty council. The goal of the evaluations is to individually optimize each course and to improve the effectiveness and efficiency of the master's program and the course contents in ways acceptable to the students.

§ 13

Equal Opportunity Clause

Status and functional operators in this document apply equally to women and to men.

§ 14

Coming Into Effect, Interim Regulations

(1) This document comes into effect with its announcement in the official record of the Friedrich Schiller University Jena on April 1st 2009.

(2) With coming into effect this document also applies to all students who began their study in the winter semester 2007/2008. Work which they have done prior to the coming into effect of this document will still be recognized.

Jena, 18th May 2009

Prof. Dr. Klaus Dicke
Rector
of the Friedrich Schiller University Jena