

**Study regulations  
of the Faculty of Chemistry and Earth Sciences  
for the study programme 'Chemistry of Materials' seeking the degree 'Master of Science'  
of 19 February 2018**

Pursuant to the section 3 subsection 1 in conjunction with the section 34 subsection 3 sentence 1 of the Thuringian Higher Education Act (*Thüringer Hochschulgesetz, ThürHG*) of 21 December 2006 (published in the journal of legal notices of the Free State of Thuringia, GVBl p. 601, in German), in the version from 13 September 2016 (GVBl, p. 437), the Friedrich Schiller University Jena issues the following Study Regulations for the study programme Master of Science Chemistry of Materials. The Council of the Faculty of Chemistry and Earth Sciences adopted the Regulations on 15 November 2017. The Senate of the Friedrich Schiller University Jena approved the respective examination regulations on 13 February 2018. The President of the Friedrich Schiller University authorized the Regulations on 19 February 2018.

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**§ 1 Scope and application**

These Study Regulations establish objectives, content, and structure of the consecutive research-oriented study programme 'Chemistry of Materials' leading to a degree 'Master of Science' (abbreviation: MSc) offered by the Faculty of Chemistry and Earth Sciences at the Friedrich Schiller University Jena. It is applicable in conjunction with the corresponding examination regulations (in the following 'Examination Regulations') in their applicable version, with the study plan, and module catalogue adopted by the Council.

**§ 2 Admission requirements**

- (1) Prerequisite for admission to the Master of Science in Chemistry of Materials is a first university degree (Bachelor, Diplom) in one of the study programmes in chemistry, chemical engineering or physics with an overall final grade 'good' ('gut') or better.
- (2) Principally, graduates of related study programmes, in particular in materials science, are granted admission if their degree is equivalent to the above. Generally, a degree is equivalent if the applicant acquired at least 60 ECTS (European Credit Transfer System) in physics and chemistry within the previous study programme, excluding a final thesis, and the overall final grade was 'good' ('gut') or better.

(3) If a final grade is not yet available for the first university degree qualifying the applicant to work in his/her profession, the applicant may be provisionally admitted to the study programme on the basis of his/her performance and achievements documented at the time of application.

(4) Applicants who do not meet the requirements as defined in the subclause of the subsection 1 and in the subsection 2 may be admitted to the study programme if their application illustrates particular aptitude for the Master of Science in Chemistry of Materials and therefore an equivalence. The equivalence shall be ascertained on a case-by-case basis where also relevant professional experience shall be taken into consideration. The decision upon admission is performed by the Examinations Committee. In cases of doubt, selection interviews may be held. Provisional admission under certain conditions is possible.

(5) Because all courses of this study programme are exclusively offered in English, proficiency in English (level B2) is essential to the study programme. Proficiency in German (level 1 of the German Language Test for Admission to Higher Education 'DSH') is strongly recommended.

(6) The application for admission together with the following application documents—if requested in authenticated copy—has to be submitted by the stipulated deadline:

(a) proof of completion of the first university degree or documentation of the academic work (at least 150 ECTS) completed until the date of application

(b) a letter of application in English in which the study-related knowledge, skills, and scientific interests are outlined

(c) a tabular overview of the activities and experiences relevant to the study programme, and proof of academic achievements, e.g. academic or scientific papers, publications, research work, research periods, and study periods spent abroad

(d) where applicable, proof of any relevant work experience, e.g. occupation in the industry

(e) proof of proficiency in English at the level B2 according to the Common European Framework of Reference for Languages.

### **§ 3 Duration of studies, beginning of the study programme**

(1) The standard duration of study is two academic years, including the time required for the master's examination. The University ensures that it is possible to complete the study programme in the standard duration of study. Part-time studies are possible. Particulars are stated in the Matriculation Regulations (*Immatrikulationsordnung*) of the Friedrich Schiller University Jena.

(2) The study programme Chemistry of Materials leading to a degree 'Master of Science' begins in the winter semester.

### **§ 4 Objectives of the study programme**

(1) The objective of the master's programme leading to a second degree qualifying graduates to work in the field of chemistry of materials is to prepare students for science-based careers in chemistry of materials, and to provide the foundation for further training programmes within and outside of academia through specialized academic training.

(2) Students broaden and improve their knowledge in the theories, methodologies, and systematics in chemistry, physics, and materials sciences; they acquire the necessary experimental and theoretical competencies required for scientific work in chemistry of materials, and they undergo special training in selected areas of microscopy, spectroscopy, of multi-scale simulation, and computer-assisted materials sciences.

(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,

German skills) required for research-oriented, and science-based careers. They learn to develop and implement subject-specific research concepts. They prove to be able to critically evaluate scientific data, to think and act based on an interdisciplinary approach, and to analyse complex questions also across disciplines, to interpret findings correctly, and to find solutions.

## § 5 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 one semester; in some cases it may, however, also comprise courses during several semesters.

(2) The study programme consists of the following module areas: *Entrance and Consolidation*, *Soft Skills*, *Specialization*, *Open Specialization*, *Elective Module*, and *Mobility*.

(3) In the module area *Entrance and Consolidation*, courses concentrate on the various subject-specific admission requirements of the students so that in the modules that follow them they can build on a joint basic knowledge in molecule physics and solid-state physics, molecule and solid-state chemistry, and materials sciences. It is designed to ensure that all students have the same level of knowledge and skills, and to gain basic knowledge and skills in chemistry of materials.

(4) In the module area *Soft Skills*—if not already at least at the level 1 of the German Language Test for Admission to Higher Education ‘DSH’—basic German skills are conveyed. Alternatively, the students shall complete a module on the application of advanced English skills in tools required in organization management, report management, and in project management.

(5) In the module area *Specialization*, all students of the master's programme acquire basics of the chemical materials synthesis, structural aspects of functional materials, and nanomaterials.

(6) In the module area *Open Specialization*, students shall select one analytical focus about spectroscopic and spectrometric methods for the characterization of the chemical and electronic structure of materials or a focus of the computer-assisted chemistry of materials in which they can learn about scale-independent modelling of the chemical material development.

(7) These module areas are complemented by *elective modules* having an application-oriented focus.

(8) All modules in the master's programme do not only teach specialist knowledge in the field of study, but also scientific and academic key qualifications, and working techniques. All modules teach the skills of scientific research, the critical analysis of one's own data as well as data from third parties, and train the presentation of scientific findings. Social skills and the ability to work in a team are also enhanced.

(9) The study programme concludes with a master's thesis. By writing and defending their master's thesis, students prove to be able to work on a problem or question of one of the subfields in chemistry of materials using scientific methods, and within a given time frame independently.

(10) Assessed and non-assessed coursework, including examinations, that was completed or achieved during a study-related stay abroad, shall be recognized if there are no essential differences in terms of the competences which are to be acquired at the Friedrich Schiller University Jena. Students are recommended to conclude a Learning Agreement with the

Chairperson of the Examinations Office in which it shall be documented which academic achievements can be recognized.

## § 6 Scope and content of the study programme

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

(2) Qualification objectives are divided into:

- in the first semester:
  - completing two modules from the basic and adjustment module area *Entrance and Consolidation* (10 ECTS each) which provide the basics required for the scientific work in chemistry of materials. Depending on the bachelor's degree and previous knowledge of materials sciences, chemistry, and physics, both modules of the missing disciplines shall be completed.
  - completing a module of 5 ECTS from the module area *Soft Skills* where basic German skills and basic principles of the scientific work can be acquired, Students who do not possess German skills at the level 1 of the 'DSH' are recommended to complete this module in order to acquire German skills. Otherwise, the English-speaking module has to be attended.
  - Completing a required elective module (5 ECTS) in the module area *Open Specialization*. This module lays foundations for the successful completion of all following modules, particularly the required elective modules, and the master's thesis. This comprises basic knowledge in the computer-assisted characterization of materials or in the methods for the evaluation of the chemical and electronic structure of materials. Students can choose a specialization on which they focus in the second semester.
- in the second semester:
  - completing two required elective modules (10 ECTS) from the module area *Specialization*. These modules introduce students into the materials synthesis and into structural aspects of functional materials, and nanomaterials.
  - completing a required elective module (5 ECTS) in the module area *Open Specialization*. The modules in computer-assisted characterization of materials, in spectroscopic and spectrometric methods for evaluating the chemical and electronic structure of materials expand the acquired knowledge, and complement the study offer of the second semester.
  - completing another required elective module (5 ECTS) in the module area *Elective Modules*. The skills acquired are complemented by advanced courses in the following topics: simulation, nanobiotechnology, advanced polymer synthesis, and electrochemistry or photonics.
- In the third semester, students have to perform practical training in research (15 ECTS) to acquire knowledge and practical skills needed to write their master's thesis. In addition, students have to earn 15 ECTS from research internship. Both, internship and practical training, can be conducted by involved university professors in Germany or abroad. The module coordinators advise the students on these options before and during the internship/practical training. In case of completing them abroad, the students may choose from among various research groups of international partner institutions. International students shall be able to do an internship in Germany or an industrial placement, respectively.

- The study programme concludes with writing and defending a master's thesis in the fourth semester (30 ECTS).

(3) Description of the module areas and the individual modules can be found in the current version of the module catalogue. Module specifications provide information about the module coordinators, the prerequisites for participation, where 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 type of performance assessment and their respective weight for the final grade of the module. In addition, the module specifications provide information on how often the module is offered and its duration.

## **§ 7 Assessed and non-assessed coursework and examinations**

(1) The type and scope of assessed and non-assessed coursework, and that of 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 specifications in the module catalogue.

(2) The module coordinator sets the date of the examinations. In addition, he can determine the scope of assessed course examinations within the frame of the Examination Regulations. Examination dates and other specifications for each module are announced at the beginning of each module.

## **§ 8 Admission to individual modules**

(1) Attention has to be paid to the admission requirements of the following modules:

<b>Module code</b>	<b>Requirements include</b>
<b>MMC P004</b>	at least 50 ECTS in the study programme Chemistry of Materials
<b>MMC P003</b>	at least 50 ECTS in the study programme Chemistry of Materials
<b>MMC P005</b>	60 ECTS in the study programme Chemistry of Materials and either the scientific practical training or practical training in research.

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

## **§ 9 Scientific practical training and research internship**

(1) The research internship scheduled to be completed in the third semester may be done at an institute or working group of the Friedrich Schiller University Jena, at another university, at a non-academic scientific institute, or in a research-intensive business in the field of chemistry of materials. Content and programme of the internship must be agreed upon with the supervising professor at the Faculty of Chemistry and Earth Sciences before the beginning of the internship. Academic supervision of the research internship by a university graduate with a university degree qualifying the graduate to supervise an internship in the respective field must be ensured also and particularly if the internship is completed at an institution or enterprise outside the university.

(2) A written report of the internship must be produced by the student and must be submitted to the supervising professor. In the report, the student proves that he/she is able to understandably present and critically reflect on his/her own research work applying academic and scientific standards of the respective field. Factual accuracy of the report is to be confirmed by the supervising professor who will also assess and grade the report pursuant to the section 14 of the

Examinations Regulations. If the internship report is graded as 'failed' (*nicht bestanden*), the student is to be given—within one month of the announcement of his/her grade—the opportunity to revise his/her work.

(3) If the internship has been completed within the allocated time, the factual accuracy of the report has been confirmed, and the additional assessed coursework or examinations connected to the module has been completed, the candidate is awarded the credit points as indicated in the module catalogue.

### **§ 10 Subject-specific academic advisory service**

(1) The module coordinators consult about the modules, respectively. Subject-specific study problems are covered by the professional academic advisory services which lies within the field of duties of all lecturers. The Erasmus subject-specific coordinator advises students on studying abroad.

(2) The Examinations Office of the Faculty of Chemistry and Earth Sciences of the Friedrich Schiller University Jena advises on examination terms.

(3) Non-subject specific study problems are mediated by the Central Academic Advisory Service of the Friedrich Schiller University Jena.

### **§ 11 Evaluation of courses offered and quality control**

(1) The Faculty of Chemistry and Earth Sciences is committed to constantly modernizing and improving the courses offered. The module coordinators, including the programme directors of related programmes, shall evaluate the range of courses offered at regular intervals. Subject-related surveys are evaluated in due consideration of the developments in the specific field and of professional requirements.

The Examinations Committee documents and analyses teaching performance and success in the various courses offered regarding performance developments, and the organizational set-up of the programme.

(3) In addition, it evaluates the experiences with the master's programme, particularly with regard to its approval by the students and professionals in the field, to study conditions, and the range of specialist and interdisciplinary qualification options, and discusses them with the teaching staff concerned. The evaluation in question shall be submitted to the Joint Conference on the study programme on a yearly basis.

### **§ 12 Equal opportunity clause**

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

### **§ 13 Coming into effect**

These Study Regulations come into effect on 1 October 2018 following their announcement in the journal of legal notices of the Friedrich Schiller University (*Verkündungsblatt der Friedrich-Schiller-Universität*).

Jena, 19 February 2018

Prof. Dr Walter Rosenthal  
President of the Friedrich Schiller University Jena