

**Course of Study-Specific Examination Regulations
for the Master's Course of Study
in Software Systems Engineering
at RWTH Aachen University**

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in the Third Revised Version

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Please note: This publication is an English translation. Only the German original of these regulations as published in the Official Announcements of RWTH Aachen University (“Amtliche Bekanntmachungen”) is legally binding.

Based on §§ 2 (4) (64) of the Higher Education Act of the State of North Rhine-Westphalia (Higher Education Act; or Hochschulgesetz - HG) in the version of the act dated September 16, 2014 (Law and Official Gazette of the State of North Rhine-Westphalia; GV. NRW p. 547), most recently amended by Article 1 of the Act to Amend the Higher Education Act dated July 12, 2019 (GV. NRW, p. 425, corr. p. 593), RWTH Aachen University has issued the following regulations:

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I. General

§ 1

Scope of Application and Academic Degree

- (1) These regulations apply to the Master's course of study in Software Systems Engineering at RWTH. They only apply in conjunction with the currently valid version of the General Examination Regulations (GER), supplementing it with an additional set of study-specific regulations. In cases of doubt, the provisions of the General Examination Regulations take priority.
- (2) Students who successfully complete the Master's course of study are awarded the academic degree of Master of Science RWTH Aachen University (M. Sc. RWTH).

§ 2

Objectives of the Course of Study and Language Provisions

- (1) This Master's degree program builds upon the Bachelor's degree program in Computer Science in accordance with § 2 (3) GER.
- (2) The overall educational objectives are set out in § 2 (1, 3, 4) GER.
- (3) The degree program is predominantly taught in English.

§ 3

Admission Requirements

- (1) One requirement for admission is a recognized first university degree according to § 3 (4) GER.
- (2) To meet the subject-specific requirements that are necessary to be able to successfully complete the Master's course in Software Systems Engineering, the applicant must have the necessary knowledge evidenced by credit points (CP) in the following areas:
 - A total of 28 CP from the field of practical computer science (programming, data structures and algorithms, databases and information systems, software engineering)
 - A total of 18 CP from the field of computer engineering (technical computer science, operating systems and system software, data communication, and security)
 - A total of 18 CP from the field of theoretical computer science (formal systems, automata and processes, computability and complexity, mathematical logic)
 - A total of 26 CP from the field of mathematics (discrete structures, analysis for computer scientists, linear algebra, applied stochastics)

The credit points must have been gained for assessments comparable to those required by the Bachelor of Computer Science degree program taught at RWTH.

- (3) In addition, proof of having completed the Graduate Record Examination (GRE) General Test is required at the time of application. In the *Quantitative Reasoning* (GRE-QR) measure, applicants must be among the top 25% (in the 75th percentile); in the *Verbal Reasoning* (GRE-VR) measure, they must be among the top 85% (in the 15th percentile) of a test cohort. A minimum score of 3.5 must be achieved in the *Analytical Writing* (GRE-AW) measure. Applicants who are citizens of a member state of the European Union or

of the European Economic Area (EEA) as well as “Bildungsinländerinnen” or “Bildungsinländer”, i.e. non-German citizens who have a German school leaving certificate or university degree, are exempt from this rule.

- (4) For admission conditional on the completion of additional requirements, § 3 (6) GER applies. If additional requirements corresponding to more than 22 credit points are imposed, admission to the Master’s course of study will be denied.
- (5) For this Master’s course of study, English proficiency must be proven according to § 3 (9) GER.
- (6) When determining whether the admission requirements are met, § 3 (12) GER applies.
- (7) General regulations for the recognition of prior learning and credit are provided in § 13 GER.

§ 4

Standard Period of Study, Curriculum, Credit Points, and Scope of Study

- (1) The standard period of study is four semesters (two years) full-time, including preparation of the Master’s thesis. Students can only start their studies in the winter semester.
- (2) The content of the degree program is divided into the following five areas:
 1. Theoretical foundations of software systems engineering
 2. Communication
 3. Data and information management
 4. Applied computer science
 5. Software engineering
- (3) For successful completion of the degree program, a total of 120 credit points must be acquired. The Master’s examination is constituted as follows:
 1. Modules from computer science (72 CP)
 2. A seminar (4 CP)
 3. A lab course (7 CP)
 4. An oral focus colloquium (3 CP)
 5. A German language course or substitute course (4 CP)
 6. Master’s thesis (30 CP)

For computer science modules, the assignment to the above areas is based on the module catalog; for seminars and lab courses, the assignment is based on the course description. The assignment of the focus colloquium – i.e. an oral exam on a chosen specialization – is determined by the examiner according to content criteria. The scope of the modules examined in one of the five areas may not exceed 35 CP each. This does not take into account the lab course, the seminar, and the focus colloquium. In the computer science modules (in addition to the compulsory seminar under 2.) a maximum of one course of the type "seminar" may be chosen.

In the area Theoretical Foundations of Software Systems Engineering, examinations must be taken for modules worth at least 12 CP, with at least two computer science modules from the Core Subjects sub-catalog. The Core Subjects are indicated in the module catalog.

In the area of Software Engineering, exams amounting to at least 16 CP must be completed, of which 4 CP are accounted for by the compulsory lecture Software Project Management and a further 12 CP are accounted for by Computer Science modules from the Core Subjects sub-catalog, which are indicated in the module catalog.

- (4) Students whose native language is not German must attend the German course for English-language Master's degree programs offered by the RWTH Language Center and take the German Language Examination for Students in English-Language Master's Degree Programs. Students who have German proficiency evidenced by Zertifikat Deutsch (ZD)/telc Deutsch with a minimum grade of "good", level 3 in all examination areas of the Test Deutsch als Fremdsprache (TestDaF), or a Goethe-Zertifikat B2 are exempt from taking the German course and the associated exam. They shall freely select a module in a non-technical area and take the exam worth at least 4 CP instead. The same applies to students whose native language is German.
- (5) The course of study comprises between 14 and 24 modules, including the Master's thesis module. All modules are defined in the module catalog (appendix 1). The weighting of the assessments to be taken in the individual modules is carried out according to § 4 (4) GER.

§ 5

Obligatory Attendance in Classes

- (1) According to § 5 (2) GER, obligatory attendance can only be stipulated in courses of the following type:
 1. Tutorials
 2. Seminars and introductory seminars ("Proseminare")
 3. Colloquia
 4. Lab courses
 5. Excursions
- (2) Classes with obligatory attendance in accordance with paragraph 1 shall be indicated as such in the module catalog.

§ 6

Exams and Exam Deadlines

- (1) General regulations on exams and exam periods are stipulated in § 6 GER.
- (2) If successful completion of modules, exams, or module components according to § 5 (4) GER is stipulated as a precondition for participation in other exams, this is indicated in the module catalog.

§ 7

Types of Exams

- (1) General regulations on types of exams are included in § 7 GER.
- (2) The following other form of exam is stipulated according to § 7 (1) GER:

- In the **focus colloquium**, the combined material from at least three modules totaling 12 to 18 CP is examined orally. With regard to the implementation of the exam, the provisions for oral exams according to § 7 (6) GER apply. The duration of the exam is set at a minimum of 20 minutes and a maximum of 45 minutes. The modules should be closely related. In the focus colloquium, the student should demonstrate that they can grasp a larger subject area as a whole, identify connections between topics/subjects, and link results from different areas with one another. Independent of the superordinate focus colloquium, the courses chosen can also be examined separately and the subject grades counted towards the Master's examination.
- (3) Written exams shall last a minimum of 60 minutes and a maximum of 120 minutes.
 - (4) Oral exams shall last at least 15 minutes and at most 45 minutes per candidate. An oral exam may be carried out as a group exam with up to four candidates.
 - (5) The following applies to term papers and coursework: Depending on the topic, the paper shall be between 5 and 20 pages long. As a rule, the paper is to be completed over the semester and involves giving a final oral presentation.
 - (6) Research papers range from 5 to 40 pages. Students are typically given from one week to three months to complete a term paper.
 - (7) The written version of the oral presentation shall be a maximum of 40 pages. The presentation shall last for a minimum of 10 minutes and up to a maximum of 60 minutes.
 - (8) The following applies to colloquia in particular: They shall last for a minimum of 15 and a maximum of 45 minutes.
 - (9) The following applies to lab courses in particular: Students are expected to independently apply subject-specific knowledge and methods to design, implement, and test software and hardware systems and to carry out experiments and measurements. Usually, an assignment is completed in small groups in order to train the students' ability to work in a team.
 - (10) The examiner specifies the duration of the exam and, if applicable, other modalities of the exam at the start of the course.
 - (11) Admission to module exams may be conditional on the successful completion of module components in accordance with § 7 (15) GER. This is outlined for the relevant modules in the module catalog. At the start of the semester, or by the first session of the course, the instructor shall provide the students with precise criteria online in the CMS regarding opportunities to improve their grades by completing module components, specifically indicating the number and type of tutorials that can be taken for extra credit and the methods of correction and assessment.

§ 8

Assessment and Grading

- (1) General regulations for assessing exams and the formation of grades are stipulated in § 10 GER.
- (2) If an exam consists of several partial exams, each partial exam must be passed, i.e. be completed with the grade of at least "sufficient" (4.0).

- (3) A module has been passed if all associated exams have been passed with a grade of at least "sufficient" (4.0), and all other credit points or module components have been achieved according to the relevant course of study-specific examination regulations.
- (4) The overall grade is formed from the grades of the modules and the grade of the Master's thesis in accordance with § 10 (10) GER, with the exception of the focus colloquium (§ 7 (2)), which is included with four times the value of its credit points. The grade of the German course or the substitute course is not taken into account in the calculation of the overall grade.
- (5) If all module exams of the Master's course of study have been completed within the standard period of study, **one** weighted module grade corresponding to **max. 15 credit** points can be deleted according to § 10 (13) GER.

§ 9 Examination Board

The responsible examination board according to § 11 GER is the Examination Board for Computer Science at the Faculty of Mathematics, Computer Science and Natural Sciences.

§ 10 Repeating Exams or the Master's Thesis Loss of the Right to Take an Exam

- (1) General regulations governing retaking exams or rewriting the Master's thesis as well as the loss of the right to take exams are stipulated in § 14 GER.
- (2) Modules that can be freely selected within an elective area of this Master's course can be substituted, provided this is permitted according to the module catalog. It is not possible to substitute mandatory modules.

§ 11 Deregistration, Non-Attendance, Withdrawal Deception, Non-Compliance

- (1) General provisions on deregistration, non-attendance, withdrawal, deception, or non-compliance are stipulated in § 15 GER.
- (2) The following applies to deregistering from lab courses and seminars: Deregistration is possible until three weeks after the topic assignment or preliminary meeting. In the case of block courses, deregistering is possible up to one day before the first day of the course.

II. Master's Examination and Master's Thesis

§ 12

Type and Scope of the Master's Examination

- (1) The Master's examination consists of
 1. the exams that are to be completed based on the structure of the course of study according to § 4 (2 to 4) and detailed in the module catalog according to Appendix 1, as well as
 2. the Master's thesis and the Master's final colloquium.
- (2) The order in which the students shall take the courses is based on the curriculum (Appendix). The Master's thesis can only be registered once the student has attained 60 credit points.

§ 13

Master's Thesis

- (1) General provisions for the Master's thesis are stipulated in § 17 GER.
- (2) Further details regarding the supervision of the Master's thesis are outlined in § 17 (2) GER.
- (3) The thesis can usually be written in German or English, in agreement with the examiner in question.
- (4) The Master's thesis writing time is usually six months alongside studies. In justified exceptional cases, the writing time can be extended by a maximum of up to six weeks upon application to the relevant examination board in accordance with § 17 (7) GER. The written work should not exceed 80 pages (excluding appendices).
- (5) The candidate presents the results of their Master's thesis in a Master's final colloquium – § 7 (12) GER in connection with § 7 (8) apply accordingly. The Master's final colloquium may be held before the Master's thesis is submitted.
- (6) The work required for preparing and writing the Master's thesis as well as for the colloquium shall correspond to 30 credit points. The Master's thesis can only be graded after the Master's final colloquium has taken place.

§ 14

Acceptance and Assessment of the Master's Thesis

- (1) General provisions on the acceptance and assessment of the Master's thesis are stipulated in § 18 GER.
- (2) Three printed and bound copies of the Master's thesis are to be submitted to the Central Examination Office by the set deadline.

III. Final Provisions

§ 15 Viewing of Examination Records

The reviewing of exam documents is carried out in accordance with § 22 GER.

§ 16 Entry into Force, Publication, and Transitional Provisions

- (1) These regulations shall be published in the official announcements of RWTH Aachen University (“Amtliche Bekanntmachungen”) and enter into force as of the 2020/2021 winter semester.
- (2) These regulations apply to all students who are enrolled in the Software Systems Engineering Master’s course of study at RWTH.
- (3) If a student has started this Master's degree program before the 2016/17 winter semester and passed all module exams within the standard period of study, they may apply to the responsible examination board to have the worst of the weighted module grades from each of the five computer science module areas – with the exception of the focus colloquium – canceled.
- (4) Module components passed before the 2015/2016 winter semester are accepted for all exam attempts offered for a course.

Issued based on the resolutions of the Faculty Council of the Faculty of Mathematics, Computer Science and Natural Sciences dated July 16, 2015, December 14, 2016, July 5, 2017, January 31, 2018, July 4, 2018, and December 18, 2019.

It is pointed out that, in accordance with § 12 (5) NRW HG, any claims regarding a violation of procedural or formal requirements of the regulatory or other autonomous rights of the University may no longer be asserted after one year has elapsed since the official publication of this announcement unless:

- 1) the announcement has not been properly published,
- 2) the Rectorate has objected, prior to publication, to the decision of the committee adopting the regulations,
- 3) the University has been previously notified about the defect of form or of procedure in a complaint, specifying the infringed legal provision and the fact which gives rise to the defect, or
- 4) the legal consequence of the exclusion of complaints was not pointed out in the public announcement.

The Rector
of RWTH
Aachen University

sgd. Rüdiger

Aachen,
dated

January 9, 2020

Univ.-Prof. Dr. rer. nat. Dr. h. c. mult. Rüdiger

Appendix: Curriculum

Curriculum	SWS	CP
1st Semester (WiSe)		
Core elective lecture (Core Subject from the area of Theoretical Foundations of Software Systems Engineering)	V3 Ü2	6
Core elective lecture in computer science ⁽¹⁾	V3 Ü2	6
Core elective lecture in computer science ⁽¹⁾	V3 Ü1	6
Core elective lecture in computer science (Core Subject from the area of Software Engineering)	V3 Ü2	6
German course or Examination in a non-technical area	Ü2	4
		4
		28
2nd Semester (SuSe)		
Seminar ⁽²⁾	S2	4
Core elective lecture (Core Subject from the area of Theoretical Foundations of Software Systems Engineering)	V3 Ü2	6
Core elective lecture in computer science ⁽¹⁾	V3 Ü2	6
Core elective lecture in computer science ⁽¹⁾	V3 Ü2	6
Core elective lecture in computer science ⁽¹⁾	V2 Ü1	4
Compulsory lecture: Software Project Management	V2 Ü1	4
		30
3rd Semester (WiSe)		
Lab course	P4	7
Seminar or core elective lecture in computer science	S2 / V2Ü1	4
Core elective lecture in computer science ⁽¹⁾	V3 Ü2	6
Core elective lecture in computer science ⁽¹⁾	V3 Ü1	6
Core elective lecture in computer science (Core Subject from the area of Software Engineering)	V3 Ü2	6
Focus colloquium		3
		32
4th Semester (SuSe)		
Master's thesis		27
Master's final colloquium		3
		30
Total:		120

Annotations

- (1) The scope of all modules may not exceed 35 CP per subject area.
- (2) V (Vorlesung) = Lecture, Ü (Übung) = Tutorial, S (Seminar), P (Praktikum) Lab course.