Course of Study-Specific Examination Regulations

for the Master’s Course of Study

Software Systems Engineering

of RWTH Aachen University

Dated January 27, 2017

in the third revised version to modify the examination regulations

Dated January 09, 2020

Published as a Complete Version

Please note that the English version of this guideline is purely for your convenience and is not legally binding. Only the German version is legally binding.

Based on §§ 2 (4, 64) of the Higher Education Act of the State of North Rhine-Westphalia (Higher Education Act; 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 Art. 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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Appendix:

Curriculum
I. General

§ 1 Scope of Application and Academic Degree

(1) These examination regulations apply to the Software Systems Engineering Master’s course of study at RWTH. They only apply in conjunction with the currently valid version of the General Examination Regulations (GER) in the relevant applicable version, supplementing it with an additional set of study-specific regulations. In cases of doubt, the provisions of the General Examination Regulations take priority.

(2) Upon successful completion of the Master’s course, the academic degree of Master of Science RWTH Aachen University (M. Sc. RWTH) is awarded by the Faculty of Mathematics, Computer Science and Natural Sciences.

§ 2 Objectives of the Course of Study and Language Provisions

(1) This Master’s program builds upon the Bachelor’s programs in Computer Science in accordance with § 2 Para. 3 GER.

(2) The overall educational objectives are set out in § 2 para. 1, 3 and 4 GER.

(3) Teaching predominantly takes place in English.

§ 3 Admission Requirements

(1) A basic requirement for admission is a recognized university degree according to § 3 para. 4 GER.

(2) To meet the educational prerequisites and successfully complete the Master in Software Systems Engineering, the student applicant must have the necessary skills 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 proven achievements must be comparable to the Bachelor of Computer Science taught at RWTH.

(3) In addition, proof of 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) and in the Verbal Reasoning (GRE-VR) measure, 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 mem-
ber state of the European Union or of the European Economic Area (EEA) as well as "Bildungsinstländer" or "Bildungsinländer", i.e. non-German citizens who have a school leaving certificate or university degree that is recognized by German Law are exempt from this rule.

(4) For admission conditional on the completion of additional requirements, § 3 para. 6 GER applies. If additional requirements corresponding to more than 22 credit points are required, admission to the Master’s course of study is not possible.

(5) For this Master’s course of study, sufficient knowledge of the English language must be proven according to § 3 para. 9 GER.

(6) § 3 para. 12 GER applies when determining whether the admission requirements are met.

(7) General regulations for the recognition of prior examinations 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 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. One seminar (4 CP)
3. A lab course (7 CP)
4. An oral focus colloquium (3 CP)
5. 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 is determined by the examiner according to content criteria. The scope of all modules examined in one of the five content 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 modules from computer science from the sub-catalog of the so-called "Core Subjects". The "Core Subjects" are identified in the module catalog.
In the area of "Software Engineering", examinations 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 modules from Computer Science from the sub-catalog of the "Core Subjects", which are shown in the module catalog.

(4) Students whose native language is not German must attend the German course for English-language Master's programs offered by the RWTH Language Center and take the "German Language Examination for Students in English-language Master's Programs". Students who have sufficient knowledge of German as evidenced by the Zertifikat Deutsch (ZD), minimum grade "good", the Test Deutsch als Fremdsprache (TestDAF), level 3 in all examination areas, or a Goethe-Zertifikat B2 are exempt from taking the German course and the associated examination and instead take an examination in a freely selectable non-technical area worth at least 4 CP. The same applies to students whose native language is German.

(5) The degree program 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 examinations with credit points to be taken in the individual modules is carried out according to § 4 para. 4 GER.

§ 5
Obligatory Attendance in Classes

(1) According to § 5 para. 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, for which attendance is required in accordance with para. 1, shall be identified as such in the module catalog.

§ 6
Examinations and Examination Deadlines

(1) General regulations on examinations and examination periods are included in § 6 GER.

(2) Where successful participation in modules or examinations or passing of module components according to § 5 para. 4 GER is stipulated as a precondition for participation in other examinations, this is indicated accordingly in the module catalog.

§ 7
Types of Examinations

(1) General regulations on types of examination are included in § 7 GER.
(2) The following other forms of examination are stipulated according to § 7 para. 1 GER:

- In the focus colloquium, the combined material from at least three modules totaling 12 to 18 CP is examined orally in context. With regard to its implementation, the provisions for oral examinations according to § 7 para. 6 GER apply. The duration of the examination 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 brought in can also be examined separately and the subject grades counted towards the Master's examination.

(3) The duration of the exam is least 60 minutes and a maximum of 120 minutes long.

(4) The duration of an oral examination is at least 15 minutes and at most 45 minutes per candidate. An oral examination may be carried out as a group examination with up to four candidates.

(5) The following applies to seminar and term papers in detail: Depending on the topic, the volume of the term paper is between 5 and 20 pages. As a rule, the work is to be completed over the semester and is concluded with a presentation.

(6) Term papers range from 5 and 40 pages. Students are typically given one week to three months to complete a written term paper.

(7) The written version of the oral presentation shall be 40 pages in length at most. The duration of the presentation shall be least 10 minutes and a maximum of 60 minutes.

(8) The following applies to colloquia in particular: The duration of a colloquium is 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 of designing, implementing, and testing software and hardware systems and performing experiments and measurements. Usually, an assignment takes place in small groups in order to train the students' ability to work in a team.

(10) The examiner specifies the duration of the examination and, if applicable, other modalities of the examination at the start of the course.

(11) Admission to module examinations may be conditional on the successful completion of module components as examination requirements in accordance with § 7 para. 15 GER. For the relevant modules, this is outlined in the module catalog. At the start of term, or by the time of the first course session, the lecturer provides precise criteria in the CMS regarding possible improvement of grades through the completion of module components, particularly the number and type of bonus-enabling tutorials as well as the mode of correction and assessment.

§ 8
Assessment and Grading

(1) General regulations for assessing the examinations and the formation of grades are included in § 10 GER.

(2) If an examination 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 examinations 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 Para. 10 ÜPO, with the exception of the focus colloquium (§ 7 Para. 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) In the case that all module examinations 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 para. 13 GER.

§ 9
Examination Board

The responsible examination board according to § 11 ÜPO is the examination board for computer science of the Faculty of Mathematics, Computer Science and Natural Sciences.

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

(1) General regulations governing retaking exams or the Master’s thesis, and 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 replaced, provided this is permitted according to the module catalog. It is not possible to replace mandatory modules.

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

(1) General provisions on deregistration, non-attendance, withdrawal, deception or non-compliance are included 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 events, 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 examinations that are to be completed based on the structure of the course of study according to § 4 para. 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 of 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 provided 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 time frame for the Master’s thesis 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 para. 7 GER. The written work should not exceed 80 pages, excluding appendices.

(5) The candidate presents the results of the Master’s thesis as part of a Master final colloquium. § 7 para. 12 GER in connection with § 7 para. 8 apply accordingly. It is possible to hold the Master’s final colloquium before submission of the Master’s thesis.

(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 acceptance and assessment of Master’s thesis are included in § 18 GER.

(2) Three copies of the Master’s thesis are to be submitted on time to the Central Examination Office. Printed and bound copies are to be submitted.
III. Final Provisions

§ 15
Viewing of Examination Records

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

§ 16
Coming into Effect, 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 modules passed before the winter semester 2015/2016 are accepted for all examination attempts offered for a course.


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

Aachen, January 09, 2020

sgd. Rüdiger

Univ.-Prof. Dr. rer. nat. Dr. h. c. mult. Rüdiger
Appendix: Curriculum

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>SWS</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Semester (WiSe)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Core elective lecture (Core Subject from the area &quot;Theoretical Foundations of Software Systems Engineering&quot;)</td>
<td>V3 U2</td>
<td>6</td>
</tr>
<tr>
<td>Core elective lecture computer science(^{(1)})</td>
<td>V3 U2</td>
<td>6</td>
</tr>
<tr>
<td>Core elective lecture computer science(^{(1)})</td>
<td>V3 U1</td>
<td>6</td>
</tr>
<tr>
<td>Core elective lecture in computer science (Core Subject from the area &quot;Software Engineering&quot;)</td>
<td>V3 U2</td>
<td>6</td>
</tr>
<tr>
<td>German course or Examination in a non-technical area</td>
<td>U2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28</td>
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<tr>
<td><strong>2nd Semester (SuSe)</strong></td>
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<tr>
<td>Seminar(^{(2)})</td>
<td>S2</td>
<td>4</td>
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<tr>
<td>Core elective lecture (Core Subject from the area &quot;Theoretical Foundations of Software Systems Engineering&quot;)</td>
<td>V3 U2</td>
<td>6</td>
</tr>
<tr>
<td>Core elective lecture computer science(^{(1)})</td>
<td>V3 U2</td>
<td>6</td>
</tr>
<tr>
<td>Core elective lecture computer science(^{(1)})</td>
<td>V3 U2</td>
<td>6</td>
</tr>
<tr>
<td>Compulsory lecture Software Project Management</td>
<td>V2 U1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
</tr>
<tr>
<td><strong>3rd Semester (WiSe)</strong></td>
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<tr>
<td>Lab course</td>
<td>P4</td>
<td>7</td>
</tr>
<tr>
<td>Seminar or core elective lecture in computer science</td>
<td>S2 / V2U1</td>
<td>4</td>
</tr>
<tr>
<td>Core elective lecture computer science(^{(1)})</td>
<td>V3 U2</td>
<td>6</td>
</tr>
<tr>
<td>Core elective lecture computer science(^{(1)})</td>
<td>V3 U1</td>
<td>6</td>
</tr>
<tr>
<td>Core elective lecture in computer science (Core Subject from the area &quot;Software Engineering&quot;)</td>
<td>V3 U2</td>
<td>6</td>
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<tr>
<td>Focus colloquium</td>
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<td></td>
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<tr>
<td><strong>4th Semester (SuSe)</strong></td>
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<tr>
<td>Master’s thesis</td>
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</tr>
<tr>
<td>Master’s final colloquium</td>
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<td></td>
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</tr>
<tr>
<td><strong>Total:</strong></td>
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Annotations

\(^{(1)}\) Per content area, the scope of all modules may not exceed 35 CP.