

## **Course-specific Examination Regulations**

**for the Master of Science Degree Program**

**Electrical Engineering, Information Technology and  
Computer Engineering**

**at RWTH Aachen University**

**as of 07.06.2018**

**as version of the 4<sup>th</sup> amendment regulations of the Course-specific Ex-  
amination Regulations**

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On the basis of §§ 2 para. 4, 64 of the Law governing the Universities of the Federal State of North Rhine-Westphalia (Higher Education Act – HEA) in the version published on September 16<sup>th</sup>, 2014 (GV. NRW p. 547), last amended by Article 10 on the Act on the Consistent and Solidarity-Based Management of the COVID 19 Pandemic in North Rhine-Westphalia and on the Adaptation of the State Law in View of the Effects of the Pandemic of April 14, 2020 (GV. NRW S. 218b, ber. S. 304a) RWTH Aachen University (RWTH) has issued the following examination regulations:

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## I. General

### § 1 Scope of Application and Academic Degree

- (1) These examination regulations apply to the Master of Science Degree Program Electrical Engineering, Information Technology and Computer Engineering (Elektrotechnik, Informationstechnik und Technische Informatik) at RWTH Aachen University. It only applies in conjunction with the General Examination Regulations (GER) in the relevant applicable version and includes additional course-specific regulations. In cases of doubt, the rules of the GER take priority.
- (2) After the successful completion of the Master of Science Degree Program, the Faculty of Electrical Engineering and Information Technology awards the academic degree of Master of Science, RWTH Aachen University (M.Sc. RWTH).

### § 2 Objectives of the Course of Study and Language Provisions

- (1) The Master of Science Degree Program under consideration is building upon the Bachelor of Science Degree Electrical Engineering, Information Technology and Computer Engineering (Elektrotechnik, Informationstechnik und Technische Informatik) thus fulfilling the definition as given in § 2 para. 3 GER. ~~The overall study objectives have been set out in § 2 para. 1, 3 and 4 GER.~~
- (2) The superordinate study objectives are regulated in § 2 para. 1, 3 and 4 GER. Further details on the objectives of this Master's Course can be found in annex 5 of these examination regulations ~~at the beginning of the module catalogue (Annex 1).~~
- (3) The course of study is mainly taught in English. If modules are taught in a different language this has to be indicated in the ~~corresponding~~ module catalogue.
- (4) Examinations may be taken in German or English, in agreement with the examiner in question.

### § 3 Admission Requirements

- (1) Basic requirement for admission is a recognised university degree according to § 3 para. 4 GER.
- (2) To meet the educational prerequisites for a successful completion of the Master of Science Degree Program Electrical Engineering, Information Technology and Computer Engineering, the student applicant must have the necessary competence in the following subject areas:
  - At least 28 credit points for Advanced Mathematics
  - At least 10 credit points for Physics and Physical Principles of Electronic Devices
  - At least 34 credit points for Fundamentals of Electrical Engineering including Circuit Technology
  - At least 12 credit points for Informatics (Computer Science) and Programming
  - At least 8 credit points for Fundamentals of Control and Mathematical Systems Theory
  - At least 8 credit points for Advanced Electromagnetic Field Theory or Theoretical Information Theory
  - At least 20 credit points for application-oriented courses, from the areas Circuit Technology, Microelectronics, Communications Engineering, Electrical Power Engineering, Computer Engineering or Medical Engineering.

The proven performance must be comparable to those of the Bachelor's course Electrical Engineering, Information Technology and Computer Engineering (Elektrotechnik, Informationstechnik und Technische Informatik) at RWTH Aachen University. The learning content linked to these subjects as taught at RWTH is described in appendix 4.

In their application, applicants should enclose a proposal for the crediting of credits gained in the previous course of study according to § 3 section 1 to the areas of competence of the above-mentioned admission requirements in form of the application supplementary sheet.

In addition, all applicants are obliged to prove at the time of application the Graduate Record Examination (GRE) General Test with the following scores to be achieved: above 85% of all test takers in the subject area Quantitative Reasoning (GRE-QR) and above 15% of all test takers in the subject area Verbal Reasoning (GRE-VR) as indicated in the official GRE test report. Applicants who are citizens of a Member State of the European Union or the European Economic Area (EEA) as well as educational nationals, so called "Bildungsinländer" are exempted from this rule.

- (3) Conditional admissions are possible as described in § 3 para. 6 GER. In this case additional study requirements have to be fulfilled. Conditional admission to this Master's course is not possible if
  - in the competence area of Advanced Mathematics, more than 11 credit points have to be fulfilled as additional requirements or
  - the additional requirements to be fulfilled in total exceed 25 credit points.
- (4) Admission to this Master's course requires prove of an adequate knowledge of the English language according to § 3 para. 9 GER.
- (5) § 3 para. 12 GER applies for deciding whether admission requirements are met.
- (6) General regulations for the recognition of examinations passed successfully in a previous study program are outlined in § 13 GER.

#### **§ 4 Standard Period of Study, Course Structure, Credit Points and Scope of Study**

- (1) The standard period of study is four terms (two years) full-time, including preparation of the Master thesis. The course of study may be commenced in either term.
- (2) This Master of Science Degree Program consists of two areas of mandatory-elective modules specific to each major. The Master of Science Degree Program offers six majors of which one has to be completed. Prior to the first examination registration, the student needs to indicate his/her choice of major to the Central Examination Office. This needs to be done in person. In addition, an industrial internship of 18 weeks duration according to the detailed descriptions of the internship guidelines (appendix 2) must be completed.

Successful completion of the study program requires 120 credit points in total divided as defined in the table below:

Mandatory-elective modules out of the subject area CORE subjects and ELECTIVE subjects of the selected major (graded exams)	40 CP
Modules out of the subject catalogue GENERAL elective subjects from the overall Master's course (graded exams)	8 CP
Laboratory course (LABORATORY) or project (PROJECT) as offered by the selected major (ungraded)	4 CP
Graded seminar from the catalogue of seminars offered by the Faculty of Electrical Engineering and Information Technology (SEMINAR)	4 CP
Ungraded additional qualifications (ADDITIONAL) (including the possibility to choose 1 additional seminar or 1 additional lab course or 1 additional project offered by the Faculty of Electrical Engineering and Information Technology )	12 CP
Ungraded industrial internship (including an internship related seminar 4 CP)	22 CP
Master's thesis (including the required Colloquium)	30 CP
<b>Total</b>	<b>120 CP</b>

The allotment of the 40 credit points to the subject areas CORE and ELECTIVE respectively depend on the individual major as defined in the table below:

a) Major in Electrical Power Engineering (EPEN):

Catalogue of CORE subjects EPEN	20 CP
Catalogue of ELECTIVE subjects EPEN	20 CP

b) Major in Communications Engineering (COMM):

Catalogue of CORE subjects COMM	16 CP
Catalogue of ELECTIVE subjects COMM	24 CP

c) Major in Computer Engineering (COMP):

Catalogue of CORE subjects COMP	16 CP
Catalogue of ELECTIVE subjects COMP	24 CP

d) Major in Micro- and Nanoelectronic (MINA):

Catalogue of CORE subjects MINA	16 CP
Catalogue of ELECTIVE subjects MINA	24 CP

e) Major in Biomedical Systems Engineering (BMSE):

Catalogue of CORE subjects BMSE	16 CP
Catalogue of ELECTIVE subjects BMSE (of these, a maximum of 8 CP can be taken from the subarea Complementary Elective BMSE)	24 CP

f) Major in Systems and Automation (SYAT):

Catalogue of CORE subjects SYAT	16 CP
Catalogue of ELECTIVE subjects SYAT	24 CP

- (3) The course of study, including the Master's thesis module, comprises 19 to 20 modules. All modules are defined in the module catalogue. The weighting of the examinations to be taken in the individual modules with credit points is carried out according to § 4 para. 4 GER.
- (4) Participants in double or multiple degree programmes, e.g. according to the T.I.M.E. guidelines, participate in the regular courses of the Master's degree programme. After successful completion, the participation in the corresponding program will be stated on the certificate.

### **§ 5 Mandatory Attendance at Course Sessions**

- (1) According to § 5 para. 2 GER, mandatory attendance can only be stipulated in courses of the following type:
  1. Seminars
  2. Colloquia
  3. Laboratories or other practical courses
- (2) The courses for which attendance is required according to para. 1 are identified as such in the module catalogue.

### **§ 6 Examinations and Examination Periods**

- (1) General regulations on examinations and examination periods are included in § 6 GER.
- (2) Provided that 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 further examinations, this is indicated accordingly in the module catalogue.

### **§ 7 Forms of Examinations**

- (1) General regulations on the types of examination are included in § 7 GER.
- (2) The duration of a written exam is
  - 60 to 90 minutes if up to 5 CP,
  - 90 to 120 minutes if 6 or 7 CP,
  - 120 and more minutes if 8 CP or moreare awarded.
- (3) The duration of an oral exam per candidate is a minimum of 15 to a maximum of 30 minutes if up to 5 CP are awarded and a minimum of 30 to a maximum of 60 minutes if more than 5 CP are awarded. An oral examination as a group examination is carried out with no more than four candidates.
- (4) The scope of the seminar paper of a presentation is a minimum of one page to a maximum of 100 pages. The duration of the presentation within a seminar is at least one to a maximum of 45 minutes.

- (5) The following applies to projects (project work): Within the framework of a given project, small groups of students shall independently but under guidance develop, document and present the solution for a narrowly defined scientific problem. The scope of the project documentation is one to a maximum of 100 pages. The duration of the presentation is at least one to a maximum of 45 minutes.
- (6) The following applies to colloquia: The duration of a colloquium is between 15 and a maximum of 60 minutes.
- (7) The following applies to laboratories or other practical courses: In a laboratory/ practical course, students shall learn independent experimental or programming work, the evaluation of measurement data and the scientific presentation of the results. The quality of independently created programs can also be evaluated as examination achievements in the laboratories/ practical courses.
- (8) The examiner specifies the duration and, if applicable, other modalities of the examination at the start of the corresponding course.
- (9) Admission to module examinations may require the successful completion of so-called components of the module in accordance with § 7 para. 15 GER. For the relevant modules, this is indicated in the module catalogue. At the start of term or at latest by the time of the first course session, the lecturer provides in the CMS the precise criteria regarding the possibility of improving the grades by the completion of module components, particularly the number and type of exercises during the semester which are eligible for a bonus as well as the mode of the correction and assessment.

## **§ 8 Assessment and Grading**

- (1) General regulations for assessing the examinations and fixing the grades are included in § 10 GER.
- (2) If an examination consists of several partial exams, each partial exam must be completed with the grade of at least "sufficient" (4.0) or passed.
- (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-specific examination regulations.
- (4) The overall grade is formed from the grades of the modules according to § 10 para. 10 GER. Deviating from this, the grade of the Master's thesis (including the Master's colloquium) is weighted with the factor 16/30. Upon application and by permission of the examination board one of the graded modules can be transformed into an ungraded module.
- (5) In case that all module examinations of the Master of Science Degree Program have been completed within the standard period of study, one weighted module grade of a module of 6 credit points at maximum can be deleted according to § 10 para. 13 GER.

## **§ 9 Examination Board**

The responsible Examination Board according to § 11 GER is the Examination Board Master Electrical Engineering, Information Technology and Computer Engineering at the Faculty of Electrical Engineering and Information Technology.

## **§ 10 Retake of Examinations, Master's thesis and Forfeiture of the Right to Take an Examination**

- (1) General regulations for the retake of examinations, the Master's thesis, and the forfeiture of the right to examinations are included in § 14 GER.
- (2) Modules that can be freely selected within the catalogues of mandatory-elective modules from this Master's course can be replaced once with the approval of the Examination Board provided the last attempt for the selected examination has not taken place and this is permitted in the relevant module catalogue. It is not possible to replace mandatory modules.

## **§ 11 Cancellation, Non-Attendance, Withdrawal, Deception, or Non-Compliance**

General provisions on cancellation, non-attendance, withdrawal, deception or non-compliance are included in § 15 GER

## **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. Examinations that are to be completed based on the structure of the course according to § 4 para. 2 and detailed in the module catalogue, as well as
  2. the Master's thesis and the Master's final colloquium.
- (2) The order of the courses is based on the curriculum (appendix 1). The assignment for the Master's thesis can only be issued if 60 credit points have been attained.

### **§ 13 Master's Thesis**

- (1) General regulations for the Master's thesis are included in § 17 GER.
- (2) Reference is made to § 17 para. 2 GER with regard to supervision of the Master's thesis.
- (3) The Master's thesis can be written in English or German in agreement with the examiner in question.
- (4) The time frame for completion of the Master's thesis is six months maximum during the course of study. In justified exceptional cases, this processing time can be extended by a maximum of up to six weeks upon application to the Examination Board in accordance with § 17 para. 7 GER. The scope of the written work (without attachments) should not exceed 80 pages.
- (5) The candidate presents the results of the Master's thesis as part of a Master's final colloquium. § 7 para. 12 GER in connection with § 7 para. 6 apply accordingly.
- (6) The scope of work for execution and written preparation of the Master's thesis as well as the colloquium corresponds to 30 credit points. The grading for the Master's thesis can only be carried out after the Master's final colloquium.



## § 14 Acceptance and Assessment of the Master's Thesis

- (1) General provisions on acceptance and assessment of the Master's Thesis are included in § 18 GER.
- (2) The Master's thesis is to be submitted in due time in triplicate to the Examination Board. Printed and bound copies must be submitted.

### III. Final Provisions

## § 15 Right of Access to Inspection of Examination Documents

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

## § 16 Coming into Effect, Publication and Transitional Provisions

- (1) These examination regulations come into effect from winter semester 2018/2019 onwards, they are published in the RWTH Official Announcements.
- (2) These examination regulations apply to all students who are enrolled in the Master of Science Degree Program Electrical Engineering, Information Technology and Computer Engineering at RWTH starting winter semester 2018/19.
- (3) Students who are enrolled in the Master of Science Degree Program Electrical Engineering, Information Technology and Computer Engineering at RWTH earlier than winter semester 2018/19 can apply to switch over to the present examination regulations. They can also continue their study program according to the examination regulations from April 26<sup>th</sup> 2016 in its valid version respectively up to the summer semester 2021 at latest. After the end of the summer semester 2021 a change to the present examination regulations comes into effect inevitably.
- ~~(4) Achievements in examinations performed according to the examination regulations from April 26<sup>th</sup> 2016 in its valid version respectively are validated according to the present examination regulations by making use of the list of equivalent subjects as defined in appendix 6.~~

These examination regulations are issued after release and resolution of the faculty council of the Faculty of Electrical Engineering and Information Technology dated November 28<sup>th</sup> 2017, October 23<sup>rd</sup> 2018 and April 9<sup>th</sup> 2019.

The Rector of RWTH Aachen University

Aachen, May 7<sup>th</sup>, 2019

Signed Rüdiger

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Translation, not legally binding

Translation, not legally binding

## Appendix 1: Curriculum

The scope of studies of the Master of Science Degree Program "Electrical Engineering, Information Technology and Computer Engineering" is explained using the following recommended study plan with required credits points (CP):

<p>Module group mandatory-elective courses (graded examinations)</p> <p>Modules from the subject catalogue CORE and from the catalogue ELECTIVES of the study program. The distribution of credits between CORE and ELECTIVE depends on the respective study program</p>	40 CP
<p>Module group elective courses (graded examinations)</p> <p>Modules from the elective course catalogue GENERAL of the complete Master of Science Degree Program in Electrical Engineering, Information Technology and Computer Engineering (usually 2 x 4 CP), including subjects from the catalogues CORE and ELECTIVE which have not been taken in these catalogues</p>	8 CP
<p>Module group Seminar (graded performance)</p> <p>One seminar offered by the Faculty of Electrical Engineering and Information Technology</p>	4 CP
<p>Module group PRAK/ PROJ (ungraded performance)</p> <ul style="list-style-type: none"> <li>One lab course or project from the catalogue of the selected study program</li> </ul>	4 CP
<p>Module group ADDITIONAL qualifications (ungraded examinations or performances)</p> <p>The following courses from the course offer of RWTH Aachen University, including subjects of the Faculty of Electrical Engineering and Information Technology (FB 6), can be selected in an individual portfolio:</p> <ul style="list-style-type: none"> <li>Modules from the subject catalogues CORE modules and ELECTIVES of all study programs, as well as from the GENERAL elective course catalogue of the Master of Science Degree Program Electrical Engineering, Information Technology and Computer Engineering (max. 4 CP)</li> <li>One additional seminar/lab course/project from FB 6 (ungraded) (max. 4 CP)</li> <li>Courses from other faculties of RWTH Aachen University (for example, Faculty of Business and Economics or Faculty of Mechanical Engineering), which can be completed with a certificate about the individual performance and an indication of the corresponding semester week-hours (SWS). Aside from lectures with their corresponding examinations, these courses can include projects (such as Leonardo), practical course work (lab courses) or other didactic formats</li> </ul>	12 CP

<p>(soft skills) – always depending on available capacity (min. 4 CP, max.12 CP).</p> <ul style="list-style-type: none"> <li>• Foreign language courses of the RWTH Aachen University Language Centre</li> <li>• In all majors, in this module group, 8 CP <b>must</b> be obtained by <b>proof of German language skills</b> at the level reached through DMS language courses at the RWTH Aachen University Language Centre and proven by passing the DSM exam. If German language skills of at least B1 level already can be proven at the beginning of the course of study by a corresponding certificate, an application for recognition can be submitted to the Examination Board. <b>This rule does not apply to students whose mother tongue is German or who have gained their study qualification or a first university degree at a German speaking institution.</b></li> </ul>	
<p>Module group INTERNSHIP (PRAXIS) (ungraded performance)  Industrial Internship (18 Weeks – 18 CP)  Seminar related to the internship semester (4 CP)</p>	22 CP
<p>Master's Thesis including colloquium (graded examination)</p>	30 CP
<p>Sum</p>	120 CP

## Exemplary sequence of the required modules:

### First Semester

Module	CP	Summed
5 mandatory-elective modules from the catalogues CORE and ELECTIVE of the selected study program	20	32
1 module from the catalogue GENERAL	4	
2 modules from the module group lab course/project and/or seminars, e.g. 1 lab course and 1 seminar	8	

### Second Semester

5 mandatory-elective modules from catalogues CORE and ELECTIVE of the selected study program	20	32
1 module from the catalogue GENERAL	4	
2 modules from the catalogue ADDITIONAL	8	

### Third Semester

Industrial Internship (18 weeks)	18	26
Seminar related to the internship semester	4	
1 module from the catalogue GENERAL	4	

### Fourth Semester

Master's thesis including colloquium	30
<b>Total</b>	<b>120</b>

In summary:

Graded mandatory-elective modules from the catalogues CORE and ELECTIVE of the selected major	40 CP
Graded elective modules from the catalogue GENERAL	8 CP
Lab course or project of the selected major	4 CP
Graded seminar offered by the Faculty of Electrical Engineering and Information Technology	4 CP
Additional qualifications ADDITIONAL	12 CP
Industrial internship	22 CP
Master's thesis (including colloquium)	30 CP
<b>Total</b>	<b>120 CP</b>

## Appendix 2

### **Guidelines for the practical work experience of students of the Faculty of Electrical Engineering and Information Technology at RWTH Aachen University for the Master's degree program Electrical Engineering, Information Technology and Computer Engineering**

Internship Office of the Faculty of Electrical Engineering and Information Technology, RWTH Aachen University

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#### **1. Purpose and nature of the practical work experience**

The practical work experience, hereafter also referred to as professional practice, represents a part of the job-qualifying study competences taught in the Master's degree program Electrical Engineering, Information Technology and Computer Engineering. It permits the practical application of the knowledge and skills already acquired for a greater part at the recommended time (third academic semester). It equips students with application-specific methods and experiences from an engineer's professional practice and is furthermore intended to enhance interdisciplinary and social skills and facilitate the subsequent transition to professional life. Professional practice is therefore an important part of successful studies with regards to future professional activity, and in particular an essential part of the Master's degree program Electrical Engineering, Information Technology and Computer Engineering.

The professional practice should cover activities which

- provide insights into the current task spectrum of engineers, in particular into modern processes and equipment for the development, design and production of components and systems, as well as for hardware and software development and integration for systems in electrical engineering, information technology and/or computer engineering,
- involve planning and methodological-conceptual elements,
- are related to already attended courses of the Master's degree program.

Organizational areas eligible for professional practice are:

research, development, planning, calculation, project planning, construction and integration of or on components or systems (hardware and software), production, maintenance, quality testing, commissioning.

It is recommended that the professional practice covers several of the areas mentioned above. Moreover, professional practice should not only consider purely subject-specific problems, but also more general aspects of the working world. These include (among others):

- organization, processes and workflow as well as information management in the company, profitability aspects and quality management, corporate culture, teamwork and social structures, occupational safety and protection of the environment.

Not to be considered for professional practice are activities without any reference to electrical engineering, as well as activities relating exclusively to administration, software development or installation, the repair of equipment or the setting up of household installations – to name a few typical examples.

#### **2. Duration of the professional practice**

The approved practical work experience must have a duration of at least 18 weeks in total and should be carried out during the Master studies (projected for the third semester). In general, it must be completed in a coherent period. If, by exception, the practical work experience is done in segments, the training period in one company must be at least four coherent weeks. Hourly or daily employment (part time activities) does not comply with the purpose of the practical work experience and can therefore not be approved.

Missed working days (vacation, illness, other days off, however no legal holidays) must be made up for.

### 3. Companies for the practical work experience and compliance with the guidelines

The knowledge and experience which should be gained during the practical work experience can especially be acquired in medium-sized and large industrial companies or in technology enterprises which are focused on systems development. In addition, industry-oriented research institutions are also suited. Furthermore, it is possible to do the internship in companies such as power plants, public authorities and institutions and also start-ups provided they can ensure an engineering supervision of the professional activity.

Not suitable are small enterprises without development or systems orientation or craft businesses. Professional work experience at higher education institutions and universities or in one's own business or that of one's parents cannot be approved either.

The internship office of the Faculty of Electrical Engineering and Information Technology does not arrange internship placements, however it gives advice on the suitability of companies offering internships based on these guidelines.

### 4. Registration of the conduct of the practical work experience

To ensure the existence of appropriate framework conditions for the implementation of the practical work experience, when registering the intended conduct of the practical work experience at the internship office of the faculty, the student needs to provide a confirmation of the supervising company or institution stating that the planned professional practice of the student can be ensured and executed in accordance with the set criteria of the faculty. For this purpose the student and the company/institution should use the form available at the faculty's internship office or online. Alternative confirmation formats are possible. It is the responsibility of the student himself and the supervising company or the supervising institution to actually ensure the proper conduct of the professional practice.

### 5. Substitute activities and exemptions

Work student activities (however, no activities by the hour or by the day), other training periods (e.g., relevant apprenticeships with final examination before the chamber of commerce and industry), and professional activities will be approved in so far as they conform to the purpose and nature of the practical work experience described in these guidelines, and if the activity was carried out in a company as described in section 3.

Training at vocational colleges as well as skills acquisition through courses do not comply with the purpose of the practical work experience and will therefore not be approved.

Professional practice required in the framework of exchange programs (e.g. T.I.M.E. double degree programs) can be regulated by contractual agreements of the partner universities different from the present regulations, in order to take into account the specific requirements of both partners in an appropriate and balanced manner. Thus, for example, industrial experience or research-oriented activities, which are scheduled in the curriculum at one partner university, can be approved as professional practice by the other university.

Physically challenged students can arrange special agreements with the internship office.

### 6. Reporting on the practical work experience

The student has to create an internship report about his practical work experience. It should start with a coherent description of the activities carried out. This text should be complemented by the experience gained at work (e.g. about workflows, about use of working resources like devices and machines, about methods, about organizational arrangements, about effects on man and the environment and also about problems encountered). A brief description of the internship company should also be given (branch, size and product range).



The description of practical work and experiences should be as detailed as necessary, since it must clearly reflect that the author has carried out the indicated work himself. Internal methods or processes which might be a secret, should be explained in a global way in order not to touch internal secrets.

Sketches, circuit diagrams, flow diagrams, etc. often save a long text. Illustrations from external material must be marked as such and the source must be given. One self-created illustration per week of practical work experience should be included.

In addition to the coherent work report, the internship report must also contain lists of the work carried out per working day, indicating the daily working time.

The work report and the daily lists must be attested by the supervisor in the company at the end of the practical activity.

The internship documents must be submitted to the internship office for approval no later than six months after the end of the respective practical work experience.

The following format applies:

- cover page with the student's name and matriculation number and name and address of the internship company
- table of contents
- coherent work report on DIN A4-sheets
- scope: a minimum of one page of text per week (excluding appendix, illustrations, etc.)  
font size: 12
- line spacing: 1.5 lines
- binding: spring binder or similar
- Authorisation and authentication: stamp and signature of the internship supervisor on the last page of the report
- appendix: daily lists of effected work and internship certificate.

## 7. Certification of the practical work experience

For the approval of the effected practical work experience, an internship certificate of the company must be submitted as original document.

This certificate must include:

- student's personal details (last name, given name, date of birth),
- company name, department, and location,
- date and duration of the internship,
- topic of the assignment (for project work),
- missed days and vacation or remark that no missed days were accumulated and/or no vacation was taken.

## 8. Practical work experience abroad

Practical work experience abroad is recommended and approved if it fulfils all requirements of these guidelines. The internship report must be written in German or English. The internship certificate needs an authenticated translation if it is issued in another language than the aforementioned.

Information on internships abroad and possible financial support is given by the International Office of RWTH Aachen University and the German Academic Exchange Service (DAAD) (among other institutions).

Deviations from these rules require prior consultation with the internship office.

## 9. Supervision of the practical work experience

Though the correct execution of the practical work experience is the responsibility of the student and the supervising company (see also 4.), the internship office of the faculty takes its own quality assurance measures. These range from contacting the company and the students, company visits and regular evaluation of the student's and/or the company's feedback. Should difficulties arise during the practical work experience which cannot be settled in the company, the internship office should be informed so that it can take appropriate actions if needed.

## 10. Final approval of the practical work experience as examination performance

A professor of the faculty of Electrical Engineering and Information Technology decides on the approval of the professional practice as examination performance, based on the submitted written internship report and an oral report held during the seminar associated to the internship. The approval of the professional practice as examination performance should preferably be carried out by the professor who will supervise the student's Master thesis, as well. Upon successful approval, the student receives a certificate from the professor which must be submitted to the central examination office.

## Appendix 3

### Guidelines for Master's theses outside the Faculty of Electrical Engineering and Information Technology at RWTH Aachen University

The Master's thesis in the Master of Science Degree Program Electrical Engineering, Information Technology and Computer Engineering is an examination. Therefore, as principle, it can only be issued and evaluated by a professor or a private lecturer of the Faculty of Electrical Engineering and Information Technology.

For Master's theses outside the faculty, the GER stipulates in § 17 para. 2:

" In exceptional cases, with the agreement of the responsible Examination Board, the Bachelor's or Master's thesis can be carried out outside the faculty or department involved in the relevant course of study, or outside RWTH Aachen University, if it is issued and supervised by a person named in clause 1. External supervisors can be nominated as second examiners according to § 65 para. 1 Higher Education Act (HEA) by the responsible Examination Board."

This regulation is explained by the following specification:

#### a) General regulations

The topic of the Master's thesis is provided in consultation with the external second supervisor by the supervising university professor of the Faculty of Electrical Engineering and Information Technology. During the thesis, the candidate should give regular verbal or written reports on the work in progress to the primary supervisor at RWTH Aachen. It is the responsibility of the external institution to ensure that there is enough opportunity to substantiate the thesis both theoretically and through study of literature. The final assessment of the work will be made by the primary supervisor at RWTH Aachen after the secondary supervisor at the external institution has made a suggestion. A payment of the examination is not to be granted. An exception may be a scholarship or a subsidy for the increased cost of living due to external accommodation.

#### b) Master's theses at other universities in Germany or abroad

It is assumed that partner faculties in Germany or abroad provide equivalent working opportunities and supervision. In general, a member of the faculty at RWTH should have convinced him/herself about this on site. Under these conditions, Master's theses at faculties of electrical engineering and information technology abroad should be particularly supported.

#### c) Master's theses in industry and research institutions

In case that a Master's thesis at an industry company or at a research institution fulfills the supervision requirement of the Master's Examination Regulations directly on site, e.g. because the institution is located in the surrounding area or by supervision on site by a member of the faculty working there (for example a professor or an industrial lecturer), the general regulations will suffice.

In all other cases, an external Master's thesis should be limited to the case of collaborations between the external institution and the institute of the primary supervisor at RWTH and if a special work environment that is essential for the successful completion of an agreed topic is only provided at the external institution. The primary supervisor at RWTH should have made sure on site that a qualified secondary supervision is available.

d) Approval of the examination board

For exceptional cases in which there is reasonable interest in agreeing to a Master's thesis outside the Faculty of Electrical Engineering and Information Technology or outside RWTH University, an application to the Examination Board must be made by mentioning this circumstance on the registration form. In this case, the application form for the submission of the Master thesis topic must be accompanied by a statement of reasons for the external thesis and evidence that the conditions for appropriate technical guidance and working environment according to the Master's Examination Regulations are given at the place of carrying out the thesis.

Translation, not legally binding

**Appendix 4:**

**Content assignment of the necessary admission requirements to modules of the Bachelor's degree course Electrical Engineering, Information Technology and Computer Engineering at RWTH Aachen University**

Area	Minimum admission requirement in ECTS	B. Sc. Elektrotechnik, Informationstechnik und Technische Informatik an der RWTH Aachen	CP
Advanced Mathematics	28	Höhere Mathematik 1	7
		Höhere Mathematik 2	7
		Höhere Mathematik 3	7
		Höhere Mathematik 4	4
		Numerische Mathematik	4
Classical and Modern Physics, Physical Principles of Electronic Devices	10	Physik 1	5
		Physik 2	5
Fundamentals of Electrical Engineering including Circuit Technology	34	Grundgebiete der Elektrotechnik 1 – Einführung in die Schaltungsanalyse	7
		Grundgebiete der Elektrotechnik 2 – Modellierung und Analyse elektrischer Komponenten und Schaltungen	8
		Grundgebiete der Elektrotechnik 3- Signale und Systeme	8
		Grundgebiete der Elektrotechnik 4- Einführung in die Elektromagnetischen Felder	8
		Schaltungstechnik 1	5
Informatics (Computer Science) and Programming	12	Grundgebiete der Informatik 1 – Programmierung, Algorithmen und Datenstrukturen	4
		Grundgebiete der Informatik 2 – Prinzipien des Digitalrechners	4
		Grundgebiete der Informatik 3 – Optimierung, Modellierung und Parallelität	4
Fundamentals of Control Theory and Mathematical System Theory	8	Systemtheorie 1	5
		Systemtheorie 2	5
Theoretical Consolidation in Electrical Engineering or Computer Science	8	Elektrodynamik-Elektromagnetische Wellen oder Theoretische Informationstechnik 1	4
		Theoretische Grundlagen der Hochfrequenztechnik/ Elektromagnetische Felder in der Informationstechnik oder Theoretische Informationstechnik 2	4
Application oriented Courses.	20	Elektrizitätsversorgungssysteme	4
		Komponenten und Anlagen der Elektrizitätsversorgung	4
		Informationsübertragung	4
		Schaltungstechnik 2	4
		Grundlagen integrierter Schaltungen und Systeme	4
		Kommunikationstechnik	4
		Kommunikationsnetze	4
		Betriebssysteme	4
		Power Electronics	4
Optimierung und Betrieb von Strom- und Gasnetzen	4		

	Grundlagen elektrischer Maschinen	4
	Hoch- und Mittelspannungsschaltgeräte und -anlagen	4
	VLSI-Schaltungen und -Architekturen	4
	Grundlagen der Hochfrequenzsystemtechnik	4
	Sensoren	4
	Herstellungsprozesse für siliziumbasierte Mikrosysteme	4
	Cryptography	4
	Grundlagen des Compilerbaus	4
	Mustererkennung in Bilddaten	4
	Einführung in die Medizintechnik	4

## Appendix 5:

### Objectives of the course of study

Building on a Bachelor's degree in electrical engineering and information technology and/or computer engineering, in this research-oriented Master of Science Degree Program, the theoretically supported fundamental concepts and methods of the field are further consolidated, which enable graduates to pick up, analyse and understand technical and scientific questions from the practical field in order to formulate creative solutions and implement them. The education provided at RWTH Aachen University emphasizes the scientific and research relevance with a high degree of personal responsibility of the students for the course of their studies.

Involving the students of the Master's course, for example with project and theses work, in research activities which are largely funded by industry, ensures a high application relevance.