

**Course of Study-Specific Examination Regulations
for the Master’s Course of Study
Metallurgical Engineering
of RWTH Aachen University**

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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.

On the basis of §§ 2 (4) (64) of the law governing the Universities of the Federal State of North Rhine-Westphalia (or Hochschulgesetz – HG) in the version of the act dated September 16, 2014 (Law and Official Gazette of the State of North Rhine-Westphalia p. 547), last amended by the Act to Amend the Higher Education Act and the Art School Act dated November 25, 2021 (Law and Official Gazette of the State of North Rhine-Westphalia p. 1210a), RWTH Aachen University (RWTH) has issued the following Examination Regulations:

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Appendices:

1. Curriculum
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I. General

§ 1

Scope of Application and Academic Degree

- (1) These examination regulations apply to the Metallurgical Engineering Master's course of study at RWTH Aachen University. 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 course-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.

§ 2

Objectives of the Course of Study and Language Provisions

- (1) The overall educational objectives are set out in § 2 (1) (3) (4) GER.
- (2) The degree program is taught in English.

§ 3

Admission Requirements

- (1) A basic requirement for admission is a recognized 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 Metallurgical Engineering, the applicant must have the necessary knowledge evidenced by credit points (CP) in the following areas:

Fundamentals section:

- a) At least 30 CP from the fields of mathematics, physics, inorganic chemistry, physical chemistry
- b) At least 10 CP from the field of mechanics, machine components, electrical engineering, crystallography

In sum of a) and b), however, at least 60 CP.

Engineering section:

- A total of 4 CP from the field of fundamentals of engineering

- (3) For this Master's course of study, adequate knowledge of the English language must be demonstrated by applicants who have not acquired their university entrance qualification at an English-language institution or who have a native language other than English.
- (4) § 3 (12) GER applies for determining whether the admission requirements are met.
- (5) General regulations for the recognition of prior assessments and exams are stipulated 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 usually only commence their studies in the winter semester.
- (2) The course of study consists of an core elective section depending on the chosen specialization, a supplementary section, a student research project, as well as an internship (practical work experience) of ten weeks (50 working days) according to the Guidelines for Practical Work Experience (Appendix 2). Students must choose one of the following specializations: Process Technology of Metals, Physical Metallurgy and Materials, Materials Science of Steels, Corrosion Engineering, and Structural Integrity. For successful completion of the degree program, a total of 120 credit points must be acquired. The Master's examination is comprised of the following components:

Core elective modules (depending on the specialization), of which: Basic subjects 48 CP Specialization 21 CP	69 CP
Student research project	8 CP
Internship or experimental student research project	10 CP
German course (supplementary section)	3 CP
Master's thesis	30 CP
Total	120 CP

- (3) The degree course, including the Master's thesis module, is comprised of 14 to 15 modules (depending on the chosen specialization). All modules are specified in module catalog. The weighting of the examinations with credit points 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, for which attendance is required in accordance with paragraph 1, shall be identified as such in the module catalog.

§ 6 Examinations and Examination Deadlines

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

§ 7 Types of Examinations

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

Students may be required to give a **presentation** of at least 10 and at most 30 minutes duration. The presentation should demonstrate that the student is able to prepare a topic in a scientific manner, have command of the subject and its objects of investigation, and are able to orally present their findings.
- (3) The duration of a written exam is as follows:
 - At least 15 and a maximum of 90 minutes for up to 3 CP
 - At least 30 and a maximum of 120 minutes for up to 6 CP
 - At least 60 and a maximum of 180 minutes for more than 6 CP
- (4) The duration of the oral exam shall be 15 to 30 minutes. An oral exam may be carried out as a group exam with up to four candidates.
- (5) The following applies to seminar papers and student research projects: Student research projects consist of a written paper; they are completed with a colloquium and are graded. The time to write the research project shall be least 5 weeks and a maximum of 6 months. In exceptional cases, the responsible examination board may extend the time required to complete the student research project by up to 6 weeks upon receipt of a justified request from the candidate and with the approval of the person submitting the assignment.
- (6) The following applies to colloquia: The colloquium may begin with a presentation according to paragraph 2. The duration of the examination shall be least 15 minutes and a maximum of 45 minutes.
- (7) The examiner specifies the duration of the examination at the start of the course.
- (8) Admission to module exams may be conditional on the successful completion of module components as examination requirements in accordance with § 7 (15) GER. For the relevant modules, this is outlined in the module handbook. At the start of term, or by the time of the first course session, the lecturer shall provide precise criteria in the CMS regarding possible improvement of grades through the completion of module components, particularly the number and type of tutorials that can be taken for extra credit as well as the mode of correction and assessment.

§ 8 Assessment and Grading

- (1) General regulations for assessing the exams and the formation of grades are stipulated in § 10 GER.
- (2) If an examination consists of several partial assessments, each partial assessment 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 taking into account all module grades and the grade of the Master's thesis according to § 10 (10) GER. The grades of the individual modules are weighted by the following factors, depending on the module area:

Module area	Weighting
Module area 1 (basic modules)	0.45
Module area 2 (modules of the specialization)	0.20
Module area 3 (all other modules including the Master's thesis)	0.35

§ 9 Examination Board

The responsible examination board according to § 11 GER is the Master's Examination Board of the Faculty of Georesources and Materials Engineering.

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

- (1) General regulations governing retaking exams or rewriting the Master's thesis, and the loss of the right to take exams are stipulated in § 14 GER.
- (2) Freely selectable modules within the specialization of this Master's program can be replaced with another module upon application to the Examination Board, provided that this is permitted according to the relevant module handbook. It is not possible to replace mandatory modules.
- (3) Students may transfer to another specialization upon application to the responsible examination board.

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

General provisions on deregistration, non-attendance, withdrawal, deception, or non-compliance are stipulated 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. exams that are to be completed based on the curriculum according to § 4 (2) and detailed in the module handbook, 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 1). The topic of the Master's thesis can only be issued once the student has attained least 77 credit points from all written and oral examinations. Evidence for having completed the the non-technical elective (complementary course) and the internship (practical work experience) can be provided after the topic of the Master's thesis has been issued.

§ 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 Master's thesis is to be written in the English language.
- (4) The time frame for the Master's thesis is usually six months at maximum alongside studies. In justified exceptional cases, the writing-up 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 as part of a Master's final colloquium. § 7 (12) GER in connection with § 7 (6) apply accordingly.
- (6) The work required for preparing and writing the Master's thesis and preparing the final 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 Examination Board by the set deadline.

III. Final Provisions

§ 15 Viewing of Examination Records

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

§ 16 Entry 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 effect on the day after announcement.
- (2) The Examination Regulations for the Master's Degree in Metallurgical Engineering dated September 27, 2010, in the first revised version dated November 29, 2013, are replaced by these Examination Regulations.
- (3) These examination regulations apply to all students who are enrolled in the Master's course of study at RWTH.
- (4) All students who started studying in this Master's program before the winter semester 2016/2017 may, provided that all module examinations have been passed within the standard period of study, apply to the responsible examination board to have the worst of the weighted module grades from the three module areas deleted.
- (5) Module modules passed before the 2015/2016 winter semester are accepted for all examination attempts offered for a course.
- (6) The last time that it was possible to enroll in the Metallurgical Engineering Master's degree program was in the 2021/2022 winter semester.
- (7) The courses in the Master's program Metallurgical Engineering will be held for the last time in the 2024 summer semester.
- (8) Examinations in the Master's program Metallurgical Engineering will be held for the last time in the 2024 summer semester.
- (9) Admission to the Master's thesis – including rewriting the master's thesis – can be applied for the last time in the 2024/2025 winter semester.
- (10) After the end of the 2025 summer semester, graduation from the Master's program in Metallurgical Engineering is no longer possible.

Issued on the basis of the resolutions of the Faculty Council of the Faculty of Georesources and Materials Engineering dated July 15, 2015; July 6, 2016; June 21, 2017; July 11, 2018; June 26, 2019; January 20, 2021; June 09, 2021; November 24, 2021; and May 18, 2022.

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,
dated

July 14, 2022

sgd. Rüdiger

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

Appendix 1: Curriculum

Curriculum: Specialization “Process Technology of Metals”

	SWS	CP
1st Semester (WS)		
Materials Chemistry II	V4 Ü2	8
Materials Physics	V4 Ü2	8
Process Measurement	V2 Ü1	4
Transport Phenomena II	V2 Ü1	4
Student Research Project (Studienarbeit)		8
		32
2nd Semester (SoSe)		
Introduction to Metal Casting	V2 Ü2	4
Introduction to Metal Forming	V2 Ü2	4
Process Metallurgy and Recycling of Non-Ferrous Metals	V2 Ü1	4
Process Metallurgy and Recycling of Iron and Steel	V2 Ü1	4
Transport Phenomena I	V2 Ü1	4
Process Control Systems	V2 Ü1	4
Unit Operations in Nonferrous Metallurgy	V2 Ü1 P2	5
		29
3rd Semester (WS)		
Casting Processes and Casting Alloys	V2 Ü1 P1	4
Sustainable Iron and Steel Making	V2Ü1P1	4
Fundamentals and Solving Methods in Metal Forming	V2 Ü2 P3	8
Complementary course		3
Internship (practical work experience) or Experimental Student Research Project		10
		29
4th Semester (SoSe)		
Master's Thesis		27
Master's Final Colloquium		3
		30
Total:		120

Annotations

V (Vorlesung) = Lecture, Ü (Übung) = Tutorial, S (Seminar), P (Praktikum) Lab course.

Curriculum: Specialization "Physical Metallurgy and Materials"

	SWS	CP
1st Semester (WS)		
Materials Chemistry II	V4 Ü2	8
Materials Physics	V4 Ü2	8
Metallic Materials I	VÜ3	4
Student Research Project		8
Mineral Materials I	V3	4
		32
2nd Semester (SS)		
Introduction to Metal Casting	V2 Ü2	4
Introduction to Metal Forming	V2 Ü2	4
Process Metallurgy and Recycling of Non-Ferrous Metals	V2 Ü1	4
Process Metallurgy and Recycling of Iron and Steel	V2 Ü1	4
Metallic Materials II (Microstructure, Microscopy, Modelling)	V2 Ü2	4
Advanced Physical Metallurgy II	V2 Ü1	4
Sustainable Materials	V3 Ü1	4
Complementary course		3
		31
3rd Semester (WS)		
Introduction to Texture Analysis	V2 Ü2	4
Mineral Materials II	V3	4
Advanced Physical Metallurgy I	V2 Ü1	3
Materials Physics Lab	Ü1 P5	6
Internship (practical work experience) or Experimental Student Research Project		10
		27
4th Semester (SS)		
Master's Thesis		27
Master's Final Colloquium		3
		30
Total:		120

Annotations

V (Vorlesung) = Lecture, Ü (Übung) = Tutorial, S (Seminar), P (Praktikum) Lab course.

Curriculum: Specialization "Materials Science of Steels"

	SWS	CP
1st semester (WS)		
Materials Chemistry II	V4 Ü2	8
Materials Physics	V4 Ü2	8
Metallic Materials I	VÜ3	4
Student Research Project		8
Mineral Materials I	V3	4
		32
2nd Semester (SoSe)		
Introduction to Metal Casting	V2 Ü2	4
Introduction to Metal Forming	V2 Ü2	4
Metallic Materials II (Microstructure, Microscopy, Modelling)	V2 Ü2	4
Process Metallurgy and Recycling of Non-Ferrous Metals	V2 Ü1	4
Process Metallurgy and Recycling of Iron and Steel	V2 Ü1	4
Software Tools for Integrated Computational Materials Design	V2 P2	4
Materials Characterization	Ü1 P2	3
		27
3rd Semester (WS)		
Materials Science of Steel	V2 Ü1 P3	5
Mineral Materials II	V3	4
Sustainable Materials Design	V2	3
Materials Physics Lab	Ü1 P5	6
Complementary course		3
Internship (practical work experience) or Experimental Student Research Project		10
		31
4 . semesters (SoSe)		
Master's Thesis		27
Master's Final Colloquium		3
		30
Total:		120

Annotations

V (Vorlesung) = Lecture, Ü (Übung) = Tutorial, S (Seminar), P (Praktikum) Lab course.

Curriculum: Specialization "Corrosion Engineering"

	SWS	CP
1st semester (WS)		
Materials Chemistry II	V4 Ü2	8
Materials Physics	V4 Ü2	8
Metallic Materials I	VÜ3	4
Student Research Project		8
		28
2nd Semester (SoSe)		
Metallic Materials II (Microstructure, Microscopy, Modelling)	V2 Ü2	4
Introduction to Metal Casting	V2 Ü2	4
Introduction to Metal Forming	V2 Ü2	4
Process Metallurgy and Recycling of Non-Ferrous Metals	V2 Ü1	4
Process Metallurgy and Recycling of Other	V2 Ü1	4
Fundamentals of Corrosion Science	V2Ü2	8
Surface Engineering for Corrosion Protection	V2 Ü2 K1	5
		33
3rd Semester (WS)		
Materials Design in Corrosion Engineering	VÜK5	5
Corrosion Control in Industries	V2 Ü1	3
Corrosion Lab	P6	8
Complementary Course		3
Internship (practical work experience) or Experimental Student Research Project Studienarbeit)		10
		29
4th Semesters (SoSe)		
Master's Thesis		27
Master's Final Colloquium		3
		30
Total		120

Annotations

V (Vorlesung) = Lecture, Ü (Übung) = Tutorial, S (Seminar), P (Praktikum) Lab course.

Curriculum: Specialization "Structural Integrity"

	SWS	CsP	
1st semester (WS)			
Materials Chemistry II	V4 Ü2	8	
Materials Physics	V4 Ü2	8	
Metallic Materials I	VÜ3	4	
Fundamentals of Fracture Mechanics	V2 Ü4 P1	9	
		29	
2nd Semester (SS)			
Introduction to Metal Casting	V2 Ü2	4	
Introduction to Metal Forming	V2 Ü2	4	
Process Metallurgy and Recycling of Non-Ferrous Metals	V2 Ü1	4	
Process Metallurgy and Recycling of Iron and Steel	V2 Ü1	4	
Metallic Materials II (Microstructure, Microscopy, Modelling)	V2 Ü2	4	
Fundamentals of Damage Mechanics and Material Modelling	V4 Ü2 P1	9	
Complementary course		3	
		32	
3rd Semester (WS)			
Fundamentals and Solving Methods in Metal Forming	V2 Ü1 P1	8	
Corrosion Control in Industries	V2 Ü1	3	
Student Research Project		8	
Internship (professional internship) or Experimental Student Research Project (exp. Research project)		10	
		29	
4th Semester (SS)			
Master's Thesis		27	
Master's Final Colloquium		3	
		30	
Total		120	

Annotations

V (Vorlesung) = Lecture, Ü (Übung) = Tutorial, S (Seminar), P (Praktikum) Lab course.

Appendix 2: Guidelines for Practical Work Experience

The practical work experience usually consists of an industrial internship. In the event that no internship is available, students have the option of completing the internship at a major research institution (Fraunhofer, Helmholtz, Max Planck Society, etc.), or to conduct a second experimental student research project instead. Both alternatives are subject to the approval of the examination board.

Objectives

The practical work experience is intended to give students an insight into the chosen occupational field, initial orientation for the goals of later professional activity, and an impression of the social conditions of an industrial company. The familiarization with industrial processes should serve for a better understanding or for a deepening of the subject matter offered in the course of the study.

Duration

For this purpose, a total duration of 10 weeks is prescribed for the company internship.

During the Course Session

The internship (practical work experience component) is to be completed during the lecture-free period. The focus of the internship should be closely related to the chosen specialization. The student must choose an internship supervisor in consultation with the examination board. All university professors of the Metallurgical Engineering Master's program may serve as internship supervisor. The students may choose the host department/division in consultation with the company and, possibly, the examination board. The internship should enable the student to acquire knowledge of the production and processing of materials and gain insights into operational processes in industry. It is not possible to complete an internship with a focus on research and development.

Students should complete their internship in Europe or worldwide in a German company. A professional association may assist students with arranging an internship. Their contact details can be obtained from the Division Office or via the Division's institutes.

Recognition of the Internship

Presentation

The interns give a presentation on their internship at their supervisor's institute. The form and duration of the presentation will be agreed with the supervisor. Following the presentation and a subsequent discussion, the supervisor issues a certificate which is submitted to the examination board together with the internship certificates so that the practical work experience can be officially recognized.

Internship Certificate

After completion of the internship, the student must ask the host company for an internship certificate. In addition to the exact designation of the company site and the host department, information must be provided on the time, duration, and activities performed. The student is not required to keep an internship activity report.

Recognition

The examination board of the Master's program in Metallurgical Engineering is responsible for officially recognizing the internship. Recognition is based on the internship certificate in combination with the presentation by the student.