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Course of Study-Specific Examination Regulations

for the Master's Course of Study

in Materials Engineering

at RWTH Aachen University

Dated February 3, 2022

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) and 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

ISSUED BY DIVISION 1.1 OF DEPARTMENT 1.0 ON BEHALF OF THE RECTOR OF RWTH AACHEN UNIVERSITY
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Official Gazette of the State of North Rhine-Westphalia p. 547), most recently 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 regulations:

Contents

Appendices:

1. Curriculum
2. Guidelines for Internships

I. General

§ 1 Scope of Application and Academic Degree

(1) These examination regulations apply to the Materials 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), supplementing it with an additional set of course-specific regulations. In cases of doubt, the provisions of the General Examination Regulations take precedence.

(2) Upon successful completion of the master's course of study, the academic degree of Master of Science RWTH Aachen University (M. Sc. RWTH) is awarded by the Faculty of Georesources and Materials Technology.

§ 2 Objectives of the Course of Study and Language Provisions

(1) This is a master's degree program according to § 2 (3) GER.

(2) The overall educational objectives are set out in § 2 (1, 3, and 4) GER. More detailed regulations on the educational objectives of this master's program can be found in the examination regulations description at the beginning of the module handbook.

(3) The course of study is taught in English. Insofar as individual modules are taught in another language, this is to be indicated in the module handbook.

§ 3 Admission Requirements

(1) An essential requirement for admission is a recognized first university degree according to § 3 (4) GER.

(2) To meet the educational prerequisites and successfully complete the Materials Engineering course of study, the student applicant must have the necessary knowledge and skills in the following areas:

A total of 60 CP from the mathematical-scientific and engineering fields; these must be

a) at least 30 CP from the fields of mathematics, physics, inorganic chemistry, physical chemistry

and

b) at least 10 CP from the field of mechanics, machine components, electrical engineering, crystallography

(3) For admission conditional on the completion of additional requirements, § 3 (6) GER applies. If additional requirements corresponding to more than 10 credit points are imposed, admission to the master's course of study will be denied.

(4) For this master's degree program, students who have not acquired their university entrance qualification at an exclusively English-speaking institution or who have not learned English as their native language must provide proof of sufficient command of the English language in accordance with § 3 (10) GER.

(5) If admission is dependent on the completion of additional requirements and one or more of these requirements can only be completed in German, then, in addition to the language skills as outlined in paragraph 4, the candidate must also provide evidence of sufficient proficiency in German pursuant to § 3 (7 a) GER.

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

(7) 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. The course of study may be commenced in either semester.

(2) The program consists of an overarching compulsory area (basic part), an elective area depending on the specialization (supplementary part) and the master's thesis. Majors are offered in Materials Physics and Design, Energy Materials, Materials Science of Steel, Corrosion Engineering, Structural Integrity, and Sustainable Process Metallurgy and Metal Recycling and Sustainable Metal Forming and Casting, one of which must be completed.
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:

Overarching compulsory area (basic part)	32 CP
Core elective area depending on the specialization (supplementary part)	58 CP
Master's thesis	30 CP
Total	120 CP

(3) The degree program, including the master's thesis module, is comprised of 16-19 modules. All modules are specified in the module handbook. The weighting of the assessments to be taken in the individual modules in CP 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 handbook.

§ 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 handbook.

§ 7
Types of Exams

(1) General regulations on types of exams are stipulated in § 7 GER.

(2) The following other forms of exams are stipulated according to § 7 (1) GER:

A **Presentation** is a presentation of at least 10 and at most 30 minutes duration. Students should demonstrate that they are capable of working out a topic scientifically, taking into account the contexts of the subject, and that they can present the results orally.

(3) The duration of an 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 an 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 in detail to term papers and student research projects: Student research projects consist of a written paper; they are then concluded with a colloquium and graded. Students are typically given 5 weeks to a maximum of 6 months to complete research projects. In exceptional cases, the responsible examination board can extend the working time for the research project by up to 6 weeks upon justified application by the candidate and approval by the person submitting the assignment.

(6) The following applies to colloquia in particular: The colloquium can be started 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 exam and, if applicable, other modalities of the exam 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 the semester, or by the 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 partial 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.

§ 9
Examination Board

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

§ 10
Retaking Exams or Rewriting the Master's Thesis, and the 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) Modules that can be freely selected within a core elective section of this master's course can be replaced, provided that this is permitted according to the module handbook. It is not possible to substitute mandatory modules.

(3) A specialization in this master's program can be changed once upon application to the responsible examination board.

§ 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.

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 structure of the course of study 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 in which students shall take the courses is based on the curriculum (Appendix 1). The master's thesis can only be registered once the student has attained 82 credit points and all compulsory modules are completed.

§ 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 English.

(4) The turnaround time for the master's thesis is usually at least four and at most six months during the course of study. 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 thesis 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 (6) applies accordingly. The master's final colloquium may be held before the master's thesis is submitted. The master's final colloquium is to be held no later than six weeks after the 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 the acceptance and assessment of the master's thesis are stipulated in § 18 GER.

(2) One copy of the master's thesis, printed and bound, is to be submitted to the Central Examination Office by the set deadline. The thesis must furthermore be submitted as a PDF file on a data carrier.

III. Final Provisions

§ 15
Viewing of Examination Records

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 on the day after publication.

(2) These examination regulations apply to all students who have enrolled in the Materials Engineering master’s course of study at RWTH Aachen University.

Issued based on the resolutions of the Faculty Council of the Faculty of Georesources and Materials Engineering of June 9, 2021.

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.

Rector
of RWTH
Aachen University

Aachen, dated February 3, 2022

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

Appendix 1: Curriculum

Studienverlaufsplan
"Materials Physics and Design"

	Dozenten	SWS	LP
1. Semester (WS)			
Materials Chemistry II	Schneider	V4Ü2	8
Materials Physics	Korte-Kerzel	V4Ü2	8
Mineral Materials I	Roos/Gonsalez-Julian	V1,5Ü1,5	4
Metallic Materials I	Krupp	VÜ3	4
Process Technology	Bührig-Polaczek	VÜ7	8
			32
2. Semester (SS)			
Introduction to Metall Casting	Bührig-Polaczek	V2Ü2	4
Introduction to Metal Forming	Hirt	V2Ü2	4
Materials Physics and Design II	Korte-Kerzel	V2Ü2	6
Sustainable Materials	Sandlöbes-Haut/Raabe	V4SE3	4
Process Metallurgy and Recycling of Non-Ferrous Metals	Friedrich	V2Ü1	4
Introduction to Data Mining and Machine Learning	Sandfeld	V2Ü1	3
Surface Engineering for Corrosion Protection	Zander	VÜK5	5
			30
3. Semester (WS)			
Materials Physics & Design I	Korte-Kerzel	V3Ü4	8
Materials Physics Lab	Korte-Kerzel	P6	7
Materials Data Science and Materials Informatics	Sandfeld	V2Ü1	3
Wahlpflichtbereich I	all		10
			28
4. Semester (SS)			
Masterarbeit incl. Colloquium			30
			30
Gesamt			**120**

Wahlpflichtbereich I:

Student Mini Thesis	all	-	10
Internship	all	-	10
Entrepreneurship	Brettel	-	1-10
Mineral Materials II	Gonzalez/Roos	V1,5Ü1,5	4
Refractories for Molten Metal Contact	Tonnesen	V2Ü2P1	4
X-Ray and Neutron Scattering in Material Research	Zobel	V2Ü1	4
Electron Microscopy: Methods and Applications	Weirich	V2P1	4
Process Control Systems	Kleinert	V2Ü1	4
Transport Phenomena II	Spatschek	V2Ü1	4
Hydrometallurgy	Friedrich	V2Ü1	4
Materials Science of Steel	Krupp	V2Ü1P4	8
Process Chains in Metal Forming	Hirt	V3P3	6
Material Flow Analysis and Assessment Methods	Greiff	S4	4

Studienverlaufsplan "Energy Materials"

	Dozenten	SWS	LP
1. Semester (WS)			
Materials Chemistry II	Schneider	V4Ü2	8
Materials Physics	Korte-Kerzel	V4Ü2	8
Mineral Materials I	Roos/Gonsalez-Julian	V1,5Ü1,5	4
Metallic Materials I	Krupp	VÜ3	4
Process Technology	Bühring-Polaczek	VÜ7	8
			32
2. Semester (SS)			
Materials Physics and Design II	Korte-Kerzel	V2Ü2	6
Software Tools for Integrated Computational Materials Design	Spatschek	V2Ü2	4
Fundamentals of Corrosion Science	Zander	V2Ü2	8
Surface and Interface Structure and Processes	Schwaiger/Rheinheimer	VÜ5	5
Interface Theory and Computational Electrocatalysis	Eikerling	V2Ü2Pr1	5
			28
3. Semester (WS)			
Fundamentals of Fracture Mechanics	Münstermann	V2Ü3P2	8
AI for Accelerated Materials Modeling and Design	Eikerling/maybe IEK-1 on MAPs	V2Pr1	3
Ceramics in Energy Technology	Guillon/Menzler	VÜ6	6
Metal-Hydrogen Systems: Fundamentals and Applications	Schwaiger	VÜ3	3
Wahlpflichtbereich I	all		10
			30
4. Semester (SS)			
Masterarbeit incl. Colloquium			30
			30
Gesamt			**120**

Wahlpflichtbereich I:

Student Mini Thesis	all	-	10
Internship	all	-	10
Entrepreneurship	Brettel	-	1-10
Mineral Materials II	Gonzalez/Roos	V1,5Ü1,5	4
Refractories for Molten Metal Contact	Tonnesen	V2Ü2P1	4
X-Ray and Neutron Scattering in Material Research	Zobel	V2Ü1	4
Electron Microscopy: Methods and Applications	Weirich	V2P1	4
Process Control Systems	Kleinert	V2Ü1	4
Transport Phenomena II	Spatschek	V2Ü1	4
Hydrometallurgy	Friedrich	V2Ü1	4
Materials Science of Steel	Krupp	V2Ü1P4	8
Process Chains in Metal Forming	Hirt	V3P3	6
Material Flow Analysis and Assessment Methods	Greiff	S4	4

Studienverlaufsplan
"Materials Science of Steel"

	Dozenten	SWS	LP
1. Semester (WS)			
Materials Chemistry II	Schneider	V4Ü2	8
Materials Physics	Korte-Kerzel	V4Ü2	8
Mineral Materials I	Roos/Gonsalez-Julian	V1,5Ü1,5	4
Metallic Materials I	Krupp	VÜ3	4
Process Technology	Bührig-Polaczek	VÜ7	8
			32
2. Semester (SS)			
Introduction to Metall Casting	Bührig-Polaczek	V2Ü2	4
Introduction to Metal Forming	Hirt	V2Ü2	4
Sustainable Materials	Sandlöbes-Haut/Raabe	V4SE3	4
Software Tools for Integrated Computational Materials Design	Spatschek	V2Ü2	4
Materials Characterization	Krupp	Ü1P2	3
Introduction to Data Mining and Machine Learning	Sandfeld	V2Ü1	3
Metallic Materials II (Microstructure, Microscopy, Modelling)	Krupp	V2Ü2	4
Process Metallurgy and Recycling of Iron and Steel	Senk	V2Ü2	4
			30
3. Semester (WS)			
Materials Physics Lab	Korte-Kerzel	P6	7
Materials Science of Steel	Krupp	V2Ü1P4	8
Sustainable Materials Design	Krupp	V3	3
Wahlpflichtbereich I	all		10
			28
4. Semester (SS)			
Masterarbeit incl. Colloquium			30
			30
Gesamt			**120**

Wahlpflichtbereich I:

Student Mini Thesis	all	-	10
Internship	all	-	10
Entrepreneurship	Brettel	-	1-10
Mineral Materials II	Gonzalez/Roos	V1,5Ü1,5	4
Refractories for Molten Metal Contact	Tonnesen	V2Ü2P1	4
X-Ray and Neutron Scattering in Material Research	Zobel	V2Ü1	4
Electron Microscopy: Methods and Applications	Weirich	V2P1	4
Process Control Systems	Kleinert	V2Ü1	4
Transport Phenomena II	Spatschek	V2Ü1	4
Hydrometallurgy	Friedrich	V2Ü1	4

Process Chains in Metal Forming	Hirt	V3P3	6
Material Flow Analysis and Assessment Methods	Greiff	S4	4

Studienverlaufsplan "Corrosion Engineering"

	Dozenten	SWS	LP
1. Semester (WS)			
Materials Chemistry II	Schneider	V4Ü2	8
Materials Physics	Korte-Kerzel	V4Ü2	8
Mineral Materials I	Roos/Gonsalez-Julian	V1,5Ü1,5	4
Metallic Materials I	Krupp	VÜ3	4
Process Technology	Bühring-Polaczek	VÜ7	8
			32
2. Semester (SS)			
Introduction to Metal Forming	Hirt	V2Ü2	4
Software Tools for Integrated Computational Materials Design	Spatschek	V2Ü2	4
Surface Engineering for Corrosion Protection	Zander	VÜK5	5
Introduction to Data Mining and Machine Learning	Sandfeld	V2Ü1	3
Fundamentals of Corrosion Science	Zander	V2Ü2	8
Surface and Interface Structure and Processes	Schwaiger/Rheinheimer	VÜ5	5
			29
3. Semester (WS)			
Corrosion Control in Industries	Zander	VÜ3	3
Corrosion Lab	Zander	P6	8
Materials Design in Corrosion Engineering	Zander	VÜK5	5
Metal-Hydrogen Systems: Fundamentals and Applications	Schwaiger	VÜ3	3
Wahlpflichtbereich I	all		10
			29
4. Semester (SS)			
Masterarbeit incl. Colloquium			30
			30
Gesamt			**120**

Wahlpflichtbereich I:

Student Mini Thesis	all	-	10
Internship	all	-	10
Entrepreneurship	Brettel	-	1-10
Mineral Materials II	Gonzalez/Roos	V1,5Ü1,5	4
Refractories for Molten Metal Contact	Tonnesen	V2Ü2P1	4
X-Ray and Neutron Scattering in Material Research	Zobel	V2Ü1	4
Electron Microscopy: Methods and Applications	Weirich	V2P1	4
Process Control Systems	Kleinert	V2Ü1	4
Transport Phenomena II	Spatschek	V2Ü1	4
Hydrometallurgy	Friedrich	V2Ü1	4
Materials Science of Steel	Krupp	V2Ü1P4	8
Process Chains in Metal Forming	Hirt	V3P3	6
Material Flow Analysis and Assessment Methods	Greiff	S4	4

Studienverlaufsplan "Structural Integrity"

	Dozenten	SWS	LP
1. Semester (WS)			
Materials Chemistry II	Schneider	V4Ü2	8
Materials Physics	Korte-Kerzel	V4Ü2	8
Mineral Materials I	Roos/Gonsalez-Julian	V1,5Ü1,5	4
Metallic Materials I	Krupp	VÜ3	4
Process Technology	Bühring-Polaczek	VÜ7	8
			32
2. Semester (SS)			
Introduction to Metal Forming	Hirt	V2Ü2	4
Sustainable Materials	Sandlöbes-Haut/Raabe	V4SE3	4
Software Tools for Integrated Computational Materials Design	Spatschek	V2Ü2	4
Materials Characterization	Krupp	Ü1P2	3
Fundamentals of Damage Mechanics	Münstermann	V4Ü2P1	8
Introduction to Data Mining and Machine Learning	Sandfeld	V2Ü1	3
Mechanical Properties of Ceramic Materials	Guillon	VS3	3
			29
3. Semester (WS)			
Corrosion Control in Industries	Zander	VÜ3	3
Fundamentals and Solving Methods in Metal Forming	Hirt	V2 Ü2 P3	8
Fundamentals of Fracture Mechanics	Münstermann	V2Ü3P2	8
Wahlpflichtbereich I	all		10
			29
4. Semester (SS)			
Masterarbeit incl. Colloquium			30
			30
Gesamt			**120**

Wahlpflichtbereich I:

Student Mini Thesis	all	-	10
Internship	all	-	10
Entrepreneurship	Brettel	-	1-10
Mineral Materials II	Gonzalez/Roos	V1,5Ü1,5	4
Refractories for Molten Metal Contact	Tonnesen	V2Ü2P1	4
X-Ray and Neutron Scattering in Material Research	Zobel	V2Ü1	4
Electron Microscopy: Methods and Applications	Weirich	V2P1	4
Process Control Systems	Kleinert	V2Ü1	4
Transport Phenomena II	Spatschek	V2Ü1	4
Hydrometallurgy	Friedrich	V2Ü1	4
Materials Science of Steel	Krupp	V2Ü1P4	8
Process Chains in Metal Forming	Hirt	V3P3	6
Material Flow Analysis and Assessment Methods	Greiff	S4	4

Studienverlaufsplan
"Sustainable Process Metallurgy and Metal Recycling"

	Dozenten	SWS	LP
1. Semester (WS)			
Materials Chemistry II	Schneider	V4Ü2	8
Materials Physics	Korte-Kerzel	V4Ü2	8
Mineral Materials I	Roos/Gonsalez-Julian	V1,5Ü1,5	4
Metallic Materials I	Krupp	VÜ3	4
Process Technology	Bührig-Polaczek	VÜ7	8
			32
2. Semester (SS)			
Introduction to Metal Casting	Bührig-Polaczek	V2Ü2	4
Transport Phenomena I	Spatschek	V2Ü1	4
Digitalization and Artificial Intelligence in Process Automation	Kleinert	V2 Ü1	4
Process Metallurgy and Recycling of Iron and Steel	Senk	V2Ü1	4
Process Metallurgy and Recycling of Non-Ferrous Metals	Friedrich	V2Ü1	4
Student Mini Thesis (alt. Internship)	all		10
			30
3. Semester (WS)			
Sustainable Iron and Steel Making: Melt Treatment and Continuo	Senk	V2Ü1P1	4
Thermal Operations in Nonferrous Metallurgy	Friedrich	P7	8
Industrial Process Control Seminar	Kleinert	S2	2
Transport Phenomena II	Spatschek	V2Ü1	4
Wahlpflichtbereich I	all		10
			28
4. Semester (SS)			
Masterarbeit incl. Colloquium			30
			30
Gesamt			**120**

Wahlpflichtbereich I:

Student Mini Thesis	all	-	10
Internship	all	-	10
Entrepreneurship	Brettel	-	1-10
Mineral Materials II	Gonzalez/Roos	V1,5Ü1,5	4
Refractories for Molten Metal Contact	Tonnesen	V2Ü2P1	4
X-Ray and Neutron Scattering in Material Research	Zobel	V2Ü1	4
Electron Microscopy: Methods and Applications	Weirich	V2P1	4
Process Control Systems	Kleinert	V2Ü1	4

Hydrometallurgy	Friedrich	V2Ü1	4
Materials Science of Steel	Krupp	V2Ü1P4	8
Process Chains in Metal Forming	Hirt	V3P3	6
Material Flow Analysis and Assessment Methods	Greiff	S4	4

Studienverlaufsplan
"Sustainable Metal Forming and Casting"

	Dozenten	SWS	LP
1. Semester (WS)			
Materials Chemistry II	Schneider	V4Ü2	8
Materials Physics	Korte-Kerzel	V4Ü2	8
Mineral Materials I	Roos/Gonsalez-Julian	V1,5Ü1,5	4
Metallic Materials I	Krupp	VÜ3	4
Process Technology	Bühring-Polaczek	VÜ7	8
			32
2. Semester (SS)			
Introduction to Metal Casting	Bühring-Polaczek	V2Ü2	4
Introduction to Metal Forming	Hirt	V2Ü2	4
Transport Phenomena I	Spatschek	V2Ü1	4
Digitalization and Artificial Intelligence in Process Automation	Kleinert	V2Ü1	4
Process Metallurgy and Recycling of Iron and Steel	Senk	V2Ü1	4
Student Mini Thesis (alt. Internship)	all		10
			30
3. Semester (WS)			
Fundamentals and Solving Methods in Metal Forming	Hirt	V2 Ü2 P3	8
Materials, Processes and Simulation Methods in Foundry Technology	Bühring-Polaczek	V(2+1)Ü2P	8
Industrial Process Control Seminar	Kleinert	SE2	2
Process Control Systems	Kleinert	V2Ü1	4
Wahlpflichtbereich I	all		6
			28
4. Semester (SS)			
Masterarbeit incl. Colloquium			30
			30
Gesamt			**120**

Wahlpflichtbereich I:

Entrepreneurship	Brettel	-	1-10
Mineral Materials II	Gonzalez/Roos	V1,5Ü1,5	4
Refractories for Molten Metal Contact	Tonnesen	V2Ü2P1	4
X-Ray and Neutron Scattering in Material Research	Zobel	V2Ü1	4
Electron Microscopy: Methods and Applications	Weirich	V2P1	4

Transport Phenomena II	Spatschek	V2Ü1	4
Hydrometallurgy	Friedrich	V2Ü1	4

Process Chains in Metal Forming	Hirt	V3P3	6
Material Flow Analysis and Assessment Methods	Greiff	S4	4

Appendix 2: Guidelines for Internships

An internship can be completed as an alternative to a research project upon application to the examination board and it 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.). This requires the approval of the Examination Board.

Objectives

The practical work experience is intended to give students an insight into the chosen occupational field, provide them with initial orientation for later career goals and an impression of the social environment at an industrial company. The familiarization with industrial processes should help them develop a better understanding or deepen their understanding of the subject matter offered in the course of the study.

Duration:

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

When Does It Take Place?

Internships can be completed during the lecture-free period. The focus of the work experience to be completed should be closely related to the chosen field of study. The student must choose an internship supervisor in consultation with the examination board. Internship supervisors are all university professors of the master's program Materials Engineering. The choice of the respective operational department is made by the student in consultation with the company and, if necessary, with the examination board for the master's degree program in Metallurgical Engineering. Particular emphasis is placed on acquiring knowledge of the production and processing of materials as well as gaining insights into the operating process.

Students should complete their internship in Europe or in a German company outside of Europe. The respective professional associations are helpful in arranging internships. Their addresses can be obtained from the administrative staff of the department or the respective institutes.

Internship Credit

Presentation:

The interns report on the internship that they have completed at the supervisor's institute in the form of a presentation. The form and duration of the presentation will be coordinated 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 to obtain academic credit for the practical work experience.

Internship Certificate:

After completion of the work experience, the student must have their internship work confirmed by the company. In addition to the exact designation of the facility and the department, information must be provided on the time, duration, and type of tasks that were carried out. Keeping an activity report book is not required.

Academic Credit:

The examination board of the master's program in Materials Engineering is responsible for approving academic credit for the internship and issuing the overall certificate of attendance. The internship credit includes the presentation and the internship certificate.