OFFICIAL ANNOUNCEMENT

RWTH AACHEN UNIVERSITY

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Please note: This publication is an English translation of the Examination Regulations for the M.Sc. Networked Production Engineering. Only the German original of these regulations as published in the Official Announcements of RWTH Aachen University ("Amtliche Bekanntmachungen") is legally binding.

The correction of these Examination Regulations (Amtliche Bekanntmachung 2021/159) dated 13 September 2021 is already included in this reading aid.

Program-Specific Examination Regulations

for the Master's degree program

Networked Production Engineering

of RWTH Aachen University

dated July 9, 2020

in the first revised version of the Examination Regulations

dated December 1, 2021

published as a complete version

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 of the Announcement from September 16, 2014 (GV. NRW p. 547), most recently amended by Article 1 of the Act to on the progress of digital technology in higher education in view of the experiences made during the Coronavirus-Pandemic as well as on the operation of universities in the event of an epidemic situation or a major disaster dated November 3, 2021 (GV. NRW p-1180), RWTH Aachen University (RWTH) has issued the following examination regulations:

ISSUED ON BEHALF OF THE RECTOR BY DIVISION 1.1, DEPARTMENT 1.0, OF RWTH AACHEN UNIVERSITY
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I. General Information

§ 1
Scope of Application and Academic Degree

(1) These examination regulations apply to the Master's degree program Networked Production Engineering at RWTH Aachen University. They only apply in conjunction with the General Examination Regulations (GER) in their relevant applicable version, and include additional program-specific regulations. In cases of doubt, the General Examination Regulations take precedence over the program-specific Examination Regulations.

(2) After the successful completion of this Master's degree program, the Faculty of Mechanical Engineering awards the academic degree of Master of Science RWTH Aachen University (M.Sc. RWTH).

§ 2
Types and Objectives of the Study Program and Language Provisions

(1) This is a Master's degree program for the purpose of further education according to § 2 para. 4 GER.

(2) The overall educational objectives are set out in § 2 para. 1, 3 and 4 GER. For further information and provisions on the objectives of this Master's degree program, please refer to appendix 3 of the present examination regulations.

(3) Teaching takes place in the English language.

§ 3
Admission Requirements

(1) Requirement for admission is a recognized first degree from a recognized university according to § 3 para. 4 GER.

(2) To meet the educational prerequisites and successfully complete the Master's degree program Networked Production Engineering, the applicant must have the necessary competence in the following areas:

- A total of 120 Credit Points from the fields of engineering, mathematics and natural sciences, excluding practical work experience.
- These 120 Credit Points must include the following basic modules of the Bachelor of Mechanical Engineering at RWTH Aachen University to a comparable extent:

Module	CP
Mechanics I	**75 CP**
Mechanics II	
Mechanics III	
Mathematics I	
Mathematics II	
Mathematics III	
Materials Science I	
Materials Science II	
Thermodynamics I	
Thermodynamics II	
Computer Science in Mechanical Engineering	
Physics	
Machine Design I	
Machine Design II	
Machine Design III	
Fluid Mechanics I	
Control Engineering	**45 CP**
Engineering Design I	
Production Management	
Machine Tools	
Manufacturing Technology	
Fundamentals of Fluid Power	

In addition, all applicants are required to successfully pass the Graduate Record Examination (GRE) General Test. Applications without the GRE will not be considered. The following scores must be achieved in the individual sections:

Verbal Reasoning: 145 points
Quantitative Reasoning: 160 points
Analytical Writing: 3 points

Applicants who are citizens of a member state of the European Union or the European Economic Area (EEA), as well as graduates with a Bachelor's degree from a German university are exempt from this rule.

(3) When admission is granted on condition of completion of additional requirements, § 3 para. 6 GER applies. If additional requirements corresponding to more than 30 Credit Points are required, admission to the Master's degree program is not possible.

(4) For this Master's degree program, proof of adequate proficiency in the English language must be provided according to § 3 para. 9 GER.

(5) § 3 para. 12 GER applies for determining whether admission requirements are met.

(6) General regulations on the recognition of prior examination performances are stated 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. This degree program can only be commenced in the winter semester.

(2) The study program consists of three tracks: Additive Manufacturing, Smart Factory and Electric Mobility Production, of which only one track may be chosen. Each track consists of three compulsory areas and two elective areas. A total of 120 Credit Points must be acquired to successfully complete this program. The Master's examination is composed as follows:

Track: Additive Manufacturing	
Compulsory Area 1 (Program Specific)	28 CP
Compulsory Area 2 (Track Specific)	29 CP
Compulsory Elective Area - Internship (12 CP) + Elective Courses (15 CP) *or* - Elective Courses (27 CP)	27 CP
Compulsory Area 3 (Language Courses and Linguistic Elective)	6 CP
Master Thesis	30 CP
Sum	120 CP
Track: Smart Factory	
Compulsory Area 1 (Program Specific)	28 CP
Compulsory Area 2 (Track Specific)	23 CP
Compulsory Elective Area - Internship (12 CP) + Elective Courses (21 CP) or - Elective Courses (21 CP)	33 CP
Compulsory Area 3 (Language Courses and Linguistic Elective)	6 CP
Master Thesis	30 CP
Sum	120 CP
Track: Electric Mobility Production	
Compulsory Area 1 (Program Specific)	28 CP
Compulsory Area 2 (Track Specific)	21 CP
Compulsory Elective Area - Internship (12 CP) + Elective Courses (23 CP) *or* - Elective Courses (35 CP)	35 CP
Compulsory Area 3 (Language Courses and Linguistic Elective)	6 CP
Master Thesis	30 CP
Sum	120 CP

(3) Depending on the composition of the electives, this program comprises 14 compulsory modules and 4 to 6 compulsory elective modules in the Additive Manufacturing track, 13 compulsory modules and 5 to 7 compulsory elective modules in the Smart Factory track, and 14 compulsory modules and 5 to 8 compulsory elective modules in the Electric Mobility Production track, each including the Master's thesis module. All modules are defined in the module handbook. The weighting of the examinations with Credit Points to be taken in the individual modules is carried out in compliance with § 4 para. 4 GER.

(4) In administering this program, RWTH International Academy gGmbH ensures that the standard period of study can be adhered to, and that the modules required for a degree in particular and the corresponding examinations as well as the master's thesis can be completed within the scheduled time frame and deadlines.

§ 5
Obligatory Attendance in Classes

(1) According to § 5 para. 2 GER, obligatory attendance can only be stipulated in courses of the following type:

1. Tutorials
2. Seminars and introductory seminars
3. Colloquia
4. (Laboratory) practicals
5. Excursions
6. Projects
7. Simulation games

(2) Courses for which attendance is compulsory according to para. 1, are identified as such in the module handbook.

§ 6
Examinations and Examination Deadlines

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

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

§ 7
Types of Examinations

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

(2) In accordance with § 7 para. 1 GER, the following other forms of examination a:

1. In **simulation games**, students will learn to implement the given company projects in teams (small groups) while assuming a defined assigned role. Simulation games can be computer-aided on the basis of programmed software or without such software. Students make active (managerial) decisions on the basis of defined rules and content discussed in the other modules, which are to be implemented in actions. Simulation games can be offered in cooperation with one or more university lecturers, or together with management practice.

2. During their **internship**, students will acquire knowledge of the technical processes used in practice as well as the economic processes used to select and control them and gain insights into the social processes and structures of companies. The internship is not graded but evaluated on the basis of the internship report. Further information can be found in appendix 2.

(3) The duration of a written examination usually is ...

- 60 to 90 minutes for up to 5 Credit Points awarded
- 90 to 120 minutes for 6 or 7 Credit Points awarded
- 120 minutes or more for 8 or more Credit Points awarded.

(4) The duration of an oral examination is 15 minutes at least and 60 minutes at most per candidate. An oral examination as a group examination is carried out with no more than four candidates.

(5) The following applies to seminar papers and term papers: the length of a written seminar paper or term paper is at least 10 and at most 100 pages. The time frame for completing a written seminar paper or term paper should be based on the scope of the Credit Points awarded (30 hours per Credit Point).

(6) The scope of a written paper is 10 to 20 pages. The time frame for completing a written paper is at least 75 and at most 150 hours.

(7) The following applies to project work in particular: the time frame completing project work should be based on the scope of the Credit Points awarded (30 hours per credit point).

(8) The scope of a written preparation for a presentation is 5 to 10 pages. The duration of a presentation is 15 to 45 minutes.

(9) The following applies to colloquia in particular: the duration of a colloquium is 30 minutes at least and 60 minutes at most.

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

(11) The regulations as per appendix 2 apply to the professional practice.

(12) Admission to module examinations may be conditional on the successful completion of module components as pre-examination within the meaning of § 7 para. 15 GER. For relevant modules, this will be outlined in the module handbook. At the start of the semester and no later than by the time of the first course session, the lecturer provides precise criteria in the CMS regarding possible improvement of grades through the completion of module components, particularly the amount and type of tutorials qualifying for bonus as well as the mode of correction and evaluation.

§ 8
Assessment and Grading

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

(2) If an examination consists of several tests, each test must be passed, or have a grade of at least "sufficient" (4.0).

(3) A module has been passed if all associated examinations have been passed with a grade of at least "sufficient" (4.0), and all other Credit Points have been achieved or module components have been completed according to the relevant program-specific Examination Regulations.

(4) The overall grade is formed taking into account all module grades and the grade of the Master's thesis in accordance with § 10 para. 10 GER.

(5) In accordance with § 10 para. 13 GER, one weighted module grade corresponding to 5 Credit Points can be removed from the student's academic record, in the case that all module examinations of the Master's degree program have been completed within the standard period of study.

§ 9
Examination Board

The responsible Examination Board according to § 11 GER is the Master's Examination Board Mechanical Engineering of the Faculty of Mechanical Engineering.

§ 10
Repeating Examinations or the Master's Thesis and the Loss of Right to Examination

(1) General regulations on repeat examinations, the Master's thesis, and the loss of right to examinations are stipulated in § 14 GER.

(2) Freely selectable modules within an area of this Master's degree program can be replaced after approval by the examination board as long as no examination has been taken and it is permitted in the relevant module handbook. It is not possible to change compulsory modules.

(3) The specialization area (track) of this Master's degree program can be changed once and upon application to the responsible Examination Board.

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

General provisions on deregistration, non-attendance, withdrawal, deception or noncompliance 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. examinations that are to be completed based on the structure of the degree program according to § 4 para. 2 and detailed in the module handbook, as well as

2. the Master's thesis and the Master's colloquium.

(2) The order of courses is based on the curriculum (appendix 1). The assignment for the Master's thesis can only be issued if 80 Credit Points have been attained.

§ 13
Master's Thesis

(1) General regulations on the Master's thesis are set out in § 17 GER.

(2) Regarding the supervision of the Master's thesis, reference is made to § 17 para. 2 GER.

(3) The Master's thesis is written in the English language.

(4) The time frame for students to complete their Master's thesis is usually a minimum of 18 and a maximum of 22 weeks alongside studies. In justified exceptional cases, the time frame 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 should not exceed 80 pages without annexes. The topic and task must be such that completion within the specified period can be achieved with an equivalent workload of six months of full-time work.

(5) The workload for preparing and completing the Master's thesis as well as for the colloquium corresponds to 30 credit points. § 7 para. 9 ÜPO applies accordingly. The grading for the Master's thesis can only be carried out after the Master's final colloquium was held.

§ 14
Acceptance and Assessment of the Master's Thesis

(1) General provisions on acceptance and assessment of the Master's thesis are stipulated in § 18 GER.

(2) The Master's thesis must be submitted in due time in duplicate copies to the Central Examination Office (Zentrales Prüfungsamt, ZPA). The copies must be printed and bound. Additionally, the thesis must be submitted as a PDF file on a data carrier.

III. Final Provisions

§ 15
Viewing of Examination Files

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

§ 16
Coming into Effect, Publication and Transitional Provisions

(1) These Examination Regulations are published as an Official Announcement of RWTH Aachen University (“Amtliche Bekanntmachungen”) and come into effect on the day after publication.

(2) These Examination Regulations apply to all students who enrolled in the Networked Production Engineering Master’s degree program at RWTH.

(3) Students were able to enroll in the Master’s degree program Networked Production Engineering for the last time in the Winter Semester 2021/2022.

(4) Courses in the Master’s degree program Networked Production Engineering will be offered for the last time in the Sommer Semester 2024.

(5) Examinations in the Master’s degree program Networked Production Engineering will be offered for the last time in the Summer Semester 2024.

(6) Student can apply for admission of the Master’s thesis – including the second attempt at the Master’s thesis – for the last time in the Winter Semester 2024/2025.

(7) After the end of the Summer Semester 2025, graduating from the Master’s degree program Networked Production Engineering will no longer be possible.

Issued based on the resolutions of the Faculty Council of the Faculty of Mechanical Engineering dated June 29, 2021.

It should be noted that, according to § 12, para. 5 of the law governing the Universities of the Fedearl State of North Rhine-Westphalia (Higher Education Act - HEA), a violation of procedural or formal regulations of the regulatory law or other autonomous law of the university can no longer be asserted after the expiry of one year from the date of this announcement, unless

1) the regulations were not duly announced,
2) the rector’s office has previously objected to the decision of the body deciding the regulations,
3) the university has been notified in advance of the formal or procedural defect, indicating the legal provision that has been violated and the fact that gives rise to the defect.
4) the legal consequences of the exclusion of the right of appeals was not pointed out when the regulations were published.

The Rector
of RWTH Aachen University

Aachen, December 1, 2021

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

Appendix 1 – Curriculum

Track: Additive Manufacturing

M.Sc. Networked Production Engineering (Additive Manufacturing)

Module		CP	WS - 1. Sem.			SS - 2. Sem.			WS - 3. Sem.			SS - 4. Sem.		
			L	E	P	L	E	P	L	E	P	L	E	P
			SWS			SWS			SWS			SWS		
Compulsory Courses		**63**	**25**			**25**			**13**			**0**		
Program specific		**28**	**11**			**11**			**6**			**0**		
Mechatronics and Control Techniques for Production Plants		6	2	2										
Manufacturing Technology I		5	2	2										
Manufacturing Technology II		6				2	2							
Production Management B		5				2	2							
Quality Management		6							2	2				
Track specific		**29**	**12**			**12**			**5**			**0**		
Laser Applications		6	2	2										
Additive Manufacturing I - Technologies and Processes		6	2	2										
Additive Manufacturing II - Engineering and Design		6				2	2							
Welding and Joining Technologies		6				2	2							
Materials for Additive Manufacturing		5							2	1				
Language Courses		**6**	**2**			**2**			**2**			**0**		
Language Course (1)*		2	1	1										
Language Course (2)*		2				1	1							
Linguistic Elective**		2							1	1				
Elective Courses		**15**	**5**			**5**			**5**			**0**		
Practical Experience or Elective Courses		**12**	**0**			**0**			**12**			**0**		
Internship (Practical Experience)	1 of 2	12							12 weeks					
Elective Courses		12							See elective courses					
Master Thesis		**30**	**0**			**0**			**0**			**30**		
Master Thesis		30										6 Months		
Total		**120**	**30**			**30**			**30**			**30**		

Elective Courses	**CP**	**L**	**E**	**Term**	
Tribology	5	2	2	WS	
Gear and Transmission Technology	6	2	2	WS	
Simulation Techniques in Manufacturing Technology	6	2	1	WS	
Process Analysis in Manufacturing Technology	5	2	1	WS	
Control Engineering	3	2	2	WS	
Modeling, Model Reduction and Simulation in Laser Processing - Applications	5	2	2	WS	
Industrial Logistics	5	2	1		SS
Multibody Dynamics	6	2	2		SS
Factory Planning	6	2	2		SS
Modeling, Model Reduction and Simulation in Laser Processing - Laser	5	2	2		SS
Production Metrology	5	2	2		SS
Intelligent Monitoring of Engineering Systems	5	2	1		SS

* German recommended (if not proficient/native speaker)
** e.g. Technical English

L = Lecture
E = Exercise
CP = Credit Points
SS = Summer Semester
WS = Winter Semester

M.Sc. Networked Production Engineering (Smart Factory)

Module		CP	WS - 1. Sem.			SS - 2. Sem.			WS - 3. Sem.			SS - 4. Sem.		
			L	E	P	L	E	P	L	E	P	L	E	P
			SWS			SWS			SWS			SWS		
Compulsory Courses		**57**	**19**			**25**			**13**			**0**		
Program specific		**28**	**11**			**11**			**6**			**0**		
Mechatronics and Control Techniques for Production Plants		6	2	2										
Manufacturing Technology I		5	2	2										
Manufacturing Technology II		6				2	2							
Production Management B		5				2	2							
Quality Management		6							2	2				
Track specific		**23**	**6**			**12**			**5**			**0**		
Embedded Systems		6				3	1							
Model based Systems Engineering		6	2	3										
Factory Planning		6				2	2							
Process Analysis in Manufacturing Technology		5							2	1				
Language Courses		**6**	**2**			**2**			**2**			**0**		
Language Course (1)*		2	1	1										
Language Course (2)*		2				1	1							
Linguistic Elective**		2							1	1				
Elective Courses		**21**	**11**			**5**			**5**			**0**		
Practical Experience or Elective Courses		**12**	**0**			**0**			**12**			**0**		
Internship (Practical Experience)	1 of 2	12							12 weeks					
Elective Courses		12							See elective courses					
Master Thesis		**30**	**0**			**0**			**0**			**30**		
Master Thesis		30										6 Months		
Total		**120**	**30**			**30**			**30**			**30**		

Elective Courses	**CP**	**L**	**E**	**Term**	
Advanced Software Engineering	5	2	2	WS	
Modeling, Model Reduction and Simulation in Laser Processing - Applications	5	2	2	WS	
Tribology	5	2	2	WS	
Gear and Transmission Technology	6	2	2	WS	
Simulation Techniques in Manufacturing Technology	6	2	1	WS	
High Precision Glass Optics Manufacturing	6	2	2	WS	
Control Engineering	3	2	2	WS	
Robotic Systems	5	2	2	WS	
Industrial Logistics	5	2	1		SS
Production Metrology	5	2	2		SS
Modeling, Model Reduction and Simulation in Laser Processing - Laser	5	2	2		SS
Modeling, Model Reduction and Simulation in Laser Processing - Design	5	2	2		SS
Multibody Dynamics	6	2	2		SS
Welding and Joining Technologies	6	2	2		SS
Industrial product development process - battery systems for hybrid and electric vehicles	5	2	2		SS
Intelligent Monitoring of Engineering Systems	5	2	1		SS

* German recommended (if not proficient/native speaker
** e.g. Technical English

L = Lecture
E = Exercise
CP = Credit Points
SS = Summer Semester
WS = Winter Semester

M.Sc. Networked Production Engineering (Electric Mobility Production)

Module		CP	WS - 1. Sem.			SS - 2. Sem.			WS - 3. Sem.			SS - 4. Sem.		
			L	E	P	L	E	P	L	E	P	L	E	P
			SWS			SWS			SWS			SWS		
Compulsory and Elective Courses		**55**	**19**			**28**			**8**			**0**		
Program specific		**28**	**11**			**11**			**6**			**0**		
Mechatronics and Control Techniques for Production Plants		6	2	2										
Manufacturing Technology I		5	2	2										
Manufacturing Technology II		6				2	2							
Production Management B		5				2	2							
Quality Management		6							2	2				
Track specific		**21**	**6**			**15**			**0**			**0**		
Gear and Transmission Technology		6	2	2										
Battery Production		3				1	1							
Electric Mobility Components Production		3				1	1							
Production of Electric Drives		3				1	1							
Welding and Joining Technologies		6				2	2							
Language Courses		**6**	**2**			**2**			**2**			**0**		
Language Course (1)*		2	1	1										
Language Course (2)*		2				1	1							
Linguistic Elective**		2							1	1				
Elective Courses		**23**	**12**			**5**			**6**			**0**		
Practical Experience or Elective Courses		**12**	**0**			**0**			**12**			**0**		
Internship (Practical Experience)	1 of 2	12							12 weeks					
Elective Courses		12							See elective courses					
Master Thesis		**30**	**0**			**0**			**0**			**30**		
Master Thesis		30										6 Months		
Total		**120**	**31**			**33**			**26**			**30**		

Elective Courses	CP	L	E	Term	
Advanced Software Engineering	5	2	2	WS	
Modeling, Model Reduction and Simulation in Laser Processing - Applications	5	2	2	WS	
Tribology	5	2	2	WS	
High Precision Glass Optics Manufacturing	6	2	2	WS	
Laser Applications	6	2	2	WS	
Simulation Techniques in Manufacturing Technology	6	2	1	WS	
Process Analysis in Manufacturing Technology	5	2	1	WS	
Power Electronics	4	2	1	WS	
Control Engineering	3	2	2	WS	
Multibody Dynamics	6	2	2		SS
Modeling, Model Reduction and Simulation in Laser Processing - Laser	5	2	2		SS
Modeling, Model Reduction and Simulation in Laser Processing - Design	5	2	2		SS
Factory Planning	6	2	2		SS
Industrial product development process - battery systems for hybrid and electric vehicles	5	2	2		SS
Intelligent Monitoring of Engineering Systems	5	2	1		SS

* German recommended (if not proficient/native speaker
** e.g. Technical English

L = Lecture
E = Exercise
CP = Credit Points
SS = Summer Semester
WS = Winter Semester

Appendix 2 – Internship guidelines

1. Purpose of the internship

Practical work experience (or internship) in companies is essential for students to evaluate their choice of program, to understanding technical modules sufficiently and to prepare for their future career (in Germany). Students will acquire knowledge of technical processes used in practice as well as the economic processes used to select and control them. They will also gain insights into the social processes and structures of companies.

In order to ensure that students gain operational experience in a subject area related to their study program, they are encouraged to carry out their internship in the field of product development, production planning or production.

2. Duration and structure of the internship

In the Master of Science in Networked Production Engineering students need to complete at least 12 weeks of practical work experience.

3. Internship companies

(1) Students are wholly responsible for organizing suitable internship positions.

(2) The internship will be regulated legally by the internship contract between the company and the student. The contract stipulates all rights and obligations of the student and the company.

(3) Missed working days (vacation, sickness, and other absences) – except for public holidays – must be made up in any event.

(4) Interns are subject to compulsory insurance. Information on compulsory insurance can be obtained from German health insurance companies.

(5) As a general rule, internships at university institutes (including affiliated institutes) and at a student’s own or their parents' company cannot be recognized.

4. Recognition of the internship

(1) The Internship Office (Praktikantenamt) of the Faculty of Mechanical Engineering is in charge of recognizing a student’s practical work experience and issuing the final certificate. It specifically examines, whether the contents of the internship is suitable with regard to the study program and track. It is not possible to have prior practical work experience recognized (internship waiver).

(2) The internship must be completed in one of the following company departments in order to ensure its recognition:

a. Product Development
b. Production Planning
c. Production

(3) In order that the internship recognized, students must submit the original of the internship report compiled in accordance with point 5 of these guidelines as well as the original of the internship certificate issued in accordance with point 6 of these guidelines.

(4) Late submission of the documents referred to in (3) may lead to non-recognition of the internship due to lack of verifiability. The relevant deadlines are specified in (7).

(5) Overall recognition will only be granted, if the internship has been completed to the required extent and the internship report and certificate have been submitted within the given deadlines.

(6) Appeals against recognition decisions may be lodged with the Examination Board for Mechanical Engineering within one month after notification of the decision. The Examination Board will decide on the appeal. The Examination Board will communicate its decision in writing.

(7) The following deadlines must be observed in the recognition process: The complete internship documents (internship report and internship certificate) must be submitted to the Internship Office (Praktikantenamt) of the Faculty of Mechanical Engineering no later than two months after the end of the internship.

5. Internship report

(1) During their internship, interns are required to write a report on their work and activities.

(2) The scope of the internship report shall be at least 10 and at most 12 pages of coherent text edited on a computer. In the coherent text, the student will briefly describe their tasks during the internship. In addition, the student should spend at least one page on critically reflecting on the internship (e.g. supervision, learning objectives and successes or problems). The report must be stamped and signed by the instructor.

6. Internship certificate

(1) At the end of their work experience, the student receives a certificate from the internship company, stating the duration of the internship in the individual departments or the student’s tasks and the number of days of absence due to illness or leave.

(2) The certificate must be issued by the company at which the internship was carried out. Certificates from recruitment agencies may not be recognized.

7. Internships abroad

(1) The internship may be completed abroad. The above guidelines shall apply to the recognition of such internships.

(2) The internship report and the internship certificate must be written and issued in German or English. The internship certificate may also be a certified translation into German or English, provided that the original document in the corresponding national language is submitted as well.

Appendix 3 – Objectives of this Master's degree program

This non-consecutive, Master's degree program has the purpose of further education and focuses on research and methods. It aims at deepening and specializing the academic fundamentals conveyed in Bachelor's degree programs in engineering. Students acquire the ability to grasp complex problems and solve them independently using scientific methods, even beyond the limits of current knowledge. This program does not only teach current content, but also theoretically substantiated, fundamental concepts and methods that endure beyond current trends. Thus the fundamental orientation of this study program enables graduates to work successfully throughout their entire professional life. The professional training qualifies students for a career in production engineering and teaches them these fundamental principles, concepts and methods in production engineering. After completing this Master's program, graduates will be able to apply the acquired methods and concepts to future developments in production engineering and to work on production engineering problems under different technical, economic and social conditions.

Independent of their track, students gain in-depth knowledge in the areas of manufacturing technology, production management, quality management, mechatronics and control engineering of production plants. Building on these fundamentals, students follow three different study tracks, each representing a highly topical and industry-relevant focus in the field of production engineering. All three tracks focus on the research-oriented approach to application-oriented tasks.

In the *Additive Manufacturing* track, students specialize in the field of generative manufacturing processes. This technology is currently experiencing a very strong growth and offers considerable potential in agile production and in the Industry 4.0 environment. In addition to the foundations of additive manufacturing, students learn about relevant materials and acquire important knowledge about the application of laser technologies. Graduates thus gain the ability to understand and analyze the different additive manufacturing processes and to develop them further for the future.

The *Smart Factory* track offers a profound insight into the factories and production facilities of the future. Important aspects of the Smart Factory are flexible production, the networking of cyber-physical systems and the progressive automation of manufacturing processes. Students learn the technical foundations in the field of factory planning and process analysis in manufacturing technology. The track also deals with information technology topics such as embedded systems and model-based plant engineering. Graduates will be able to use the acquired overall understanding of the intelligent factory to develop the production facilities of tomorrow in an application-oriented way.

The *Electric Mobility Production* track focuses on the electrification of vehicles. Students gain skills in the production of vehicle components. They also learn about the individual components in detail, such as the batteries, the drive train, the transmission and the electric motor. They are given a deeper understanding of basic electrical engineering and additional knowledge in the field of factory planning. Graduates of this track will gain comprehensive knowledge to qualify them to drive forward the development and production of electric vehicles.

All tracks include the possibility for students to take electives so that they can follow their own interests in their studies. This ensures the individuality of the graduates and promotes the students' independence. Additionally, this program includes an internship, which will provide opportunities for students to familiarize with the topics of an external Master's thesis and to start their career. Alternatively, the internship can be replaced by further elective courses. Several German language courses round off the curriculum and make it easier for students to enter the German job market.