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Please note: This publication is an English translation of the Examination Regulations for the M.Sc. Computer Aided Conception and Production in Mechanical Engineering created by RWTH International Academy. Only the German original of these regulations as published in the Official Announcements of RWTH Aachen University ("Amtliche Bekanntmachungen") is legally binding.

Program-Specific Examination Regulations

for the Master's degree program

Computer Aided Conception and Production in Mechanical Engineering

of RWTH Aachen University

dated July 27, 2021

(2021 version of the Examination Regulations)

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 dated September 16, 2014 (GV. NRW p. 547), most recently amended by article 1 of the Act on further protective measures taken in management of the Corona pandemic within the context of higher education dated December 1, 2020 (GV. NRW p. 1110), RWTH Aachen University (RWTH) has issued the following examination regulations:

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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 Computer Aided Conception and Production in Mechanical Engineering at RWTH Aachen University. They apply in conjunction with the General Examination Regulations (GER) in their relevant applicable version only, 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
Type 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 Computer Aided Conception and Production in Mechanical Engineering, the applicant must have the necessary competence in the following areas:

- A total of 113 Credit Points from the fields of engineering, mathematics and natural sciences, exclusive of practical work experience

- These 113 Credit Points must include the following basic modules of the Bachelor degree program 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	
Introduction to CAD	
Physics	
Machine Design I	
Machine Design II	
Machine Design III	
Control Engineering	**38 CP**
Fluid Dynamics I	
Fundamentals of the Finite Element Method	
Basics of Product Development	
Joining Technology II -Material Aspects	
Manufacturing Technology I	
Simulation Methods in Mechanical Engineering	
Numerical Mathematics	

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 minimum 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 this Master's degree program is not possible.

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

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

Conception Track	CP	**Production Track**	CP
Compulsory Courses	48	Compulsory Courses	47
Compulsory Electives I	4	Compulsory Electives I	4
Compulsory Electives II	23	Compulsory Electives II	24
Electives: Internship or Research Project	9	Electives: Internship or Research Project	9
Language Courses	6	Language Courses	6
Master Thesis	30	Master Thesis	30
Sum	120	Sum	120

(3) Depending on the composition in the compulsory electives, this program comprises 13 compulsory courses and 7 to 8 compulsory elective courses in the Conception track; and 13 compulsory courses and 7 to 8 compulsory elective courses in the Production track. The Master's thesis module is included. 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 deadlines are stipulated by § 6 GER.

(1) 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 handbook.

§ 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 are allowed:

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. For a **case study report**, the following applies specifically: in a project (Case Study), students will in a small group under tutelage independently work out the solution to a narrowly defined and practical problem and describe it in writing. The scope of the written description is at least 5 and at most 100 pages.

(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 to 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 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.

(6) The following applies to **seminar papers and term papers**: the scope 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).

(7) In their **Mini Thesis** students work on a problem in the field of computer-aided mechanical engineering. The Mini Thesis will be supervised and its preparation should not exceed 260 hours. The complete work should not exceed 18 to 20 pages.

(8) Before beginning the Mini Thesis, the student and supervisor will determine the topic of the Mini Thesis, the structure of the content and the subtasks and resources required to complete the task. An expected processing time is to be defined for each subtask. These must be recorded on the Mini Thesis Recording Sheet (*Erfassungsbogen Mini Thesis*), which is available on the website of the Faculty of Mechanical Engineering, and must be signed by the student and the examiner, and – if applicable – by the supervising research assistant. The Mini Thesis must be evaluated no later than eight weeks after submission by entering the evaluation in the Mini Thesis Recording Sheet.

(9) The Mini Thesis may also be carried out as project work, provided that the corresponding offers are made by the teaching units of the faculty. Regarding type and scope of the project, the regulations governing the Mini Thesis apply.

(10) The following applies to **project work** in particular: in a project, students will in a small group under tutelage independently work out the solution to a narrowly defined, scientific problem, describe it in writing and present it. The scope of the written work is at least 10 and at most 100 pages. The scope should be based on the scope of the Credit Points awarded (30 hours per Credit Point). The duration of the presentation is at least 10 and at most 45 minutes.

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

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

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

(14) 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 partial 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.

(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 a maximum of 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, as long as no examination has been taken before, and provided this 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 catalog, 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 for the Master's thesis are set out in § 17 GER.

(2) The topic of the Master's Thesis must be related to the field of computer-aided methods in Mechanical Engineering. The Master's thesis can be issued and supervised by any professor from the Faculty of Mechanical Engineering active in research or teaching at RWTH Aachen University. Additionally, reference is made to § 17 para. 2 GER regarding the supervision of the Master's thesis.

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

(4) The time frame for students to complete their Master's thesis is usually at least 18 and at most 22 weeks. 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 of the Master's thesis should not exceed 80 pages without annexes. Topic and tasks must be such that the Master's thesis can be completed within the specified deadline with an equivalent workload of six months of full-time work.

(5) The workload for preparing and composing the Master's thesis as well as for the colloquium corresponds to 30 Credit Points. § 7 para. 12 GER applies accordingly. The grading for the Master's thesis can only be carried out after the Master's 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 storage device.

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 will come into effect with the Winter Semester 2021/2022 and are published in the Official Announcements of RWTH Aachen University (“Amtliche Bekanntmachungen”).

(2) These Examination Regulations apply to all students who enrolled in the Master’s degree program Computer Aided Conception and Production in Mechanical Engineering at RWTH for the first time in or after the Winter Semester 2021/2022.

(3) Students who enrolled in the Master’s degree program Computer Aided Conception and Production in Mechanical Engineering before the Winter Semester 2021/2022 may apply to transfer to the present Examination Regulations. The Examination Regulations from August 31, 2012 in their currently valid version will apply to students until the Summer Semester 2024 at maximum. After the Summer Semester 2024, it is mandatory to transfer to the present Examination Regulations.

(4) Examinations completed based on the Examination Regulations dated August 31, 2012 in their currently valid version will be transferred to the examinations required by the present Examination Regulations in accordance with the equivalence list in appendix 4.

Issued based on the resolutions of the Faculty Council of the Faculty of Mechanical Engineering dated September 29, 2020 and February 23, 2021.

It should be noted that, according to § 12, para. 5 of the law governing the Universities of the Federal 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, July 27, 2021

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

Appendix 1: Curriculum

Track: Conception

Module	CP	WS			SS			WS			SS			SWS
		L	E	P	L	E	P	L	E	P	L	E	P	
Compulsory Courses														
Numerical Methods in Mechanical Engineering	7	3	2											5
Advanced Finite Element Methods	5	2	2											4
Advanced Software Engineering	5	2	2											4
Continuum Mechanics	5				2	2								4
Multibody Dynamics	5				2	2								4
Nonlinear Structural Mechanics	5				2	2								4
Failure of Structures and Structural Elements	5				2	1								3
Artificial Neural Networks in Structural Mechanics	6							2	2					4
Computational Intelligence in Engineering	5							2	1					3
Compulsory Electives I - 4 CP are to be taken	**4**													
Porous Media Mechanics	4				2	1								3
Computational Fluid Dynamics I	4				2	1								3
Total Compulsory Courses	**52**	17			24			11						
Compulsory Electives II - 23 CP are to be taken														
Practical Introduction to FEM-Software I	5	1		2										3
Machine Design Process	5	2	2											4
Fundamentals of Light Weight Design	4	2	1											3
Tensor Algebra and Tensor Analysis for Engineering Students I	5	2	2											4
Tensor Algebra and Tensor Analysis for Engineering Students II	5				2	2								4
Finite Element Methods in Lightweight Design	5				2	1								3
Simulation of Discrete Event Systems	5				2	2								4
Intelligent Monitoring of Engineering Systems	5				2	1								3
Practical Introduction to FEM-Software II	5				1		2							3
Modeling, Model Reduction and Simulation in Laser Processing - Laser	5				2	2								4
Modeling, Model Reduction and Simulation in Laser Processing - Application	5							2	2					4
Computational Fluid Dynamics II	3							1	1					2
Molecular Mechanics and Multi-Scale Modelling of Materials	5							2	2					4
Language Courses	**6**													
Language Course (1)*	2	1	1											2
Language Course (2)*	2				1	1								2
Linguistic Elective**	2							1	1					2
Electives: Internship or Research Project	**9**													
Mini Thesis	9							260 h						
Industrial Internship	9							9 weeks						
Master Thesis	**30**													
Master Thesis	30										6 months			
Total	**120**													

CP = Credit Points
SS = Summer Semester
WS = Winter Semester
L = Lecture
E = Excersise
P = Practical Session
SWS = Weekly Semester Hours (Semesterwochenstunden)

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

Track: Production

Module	CP	WS			SS			WS			SS			SWS
		L	E	P	L	E	P	L	E	P	L	E	P	
Compulsory Courses														
Advanced Finite Element Methods	5	2	2											4
Numerical Methods in Mechanical Engineering	7	3	2											5
Advanced Software Engineering	5	2	2											4
Continuum Mechanics	5				2	2								4
Multibody Dynamics	5				2	2								4
Computational Intelligence in Engineering	5							2	1					3
Quality Management	5							2	2					4
Simulation Techniques in Manufacturing Technology	5							2	1					3
Production Management A	5							2	2					4
Compulsory Electives I - 4 CP are to be taken	**4**													
Porous Media Mechanics	4				2	1								3
Computational Fluid Dynamics I	4				2	1								3
Total Compulsory Courses	**51**	17			14			20						
Compulsory Electives II - 24 CP are to be taken														
Practical Introduction to FEM-Software I	5	1		2										3
Control Engineering	3	2	2											4
Manufacturing Technology I	5	2	2											4
Industrial Engineering and Ergonomics	5	2	2											4
Production Metrology	5				2	2								4
Computational Modeling of Membranes and Shells	5				2	1								3
Practical Introduction to FEM-Software II	5				1		2							3
Simulation of Discrete Event Systems	5				2	2								4
Modeling, Model Reduction and Simulation in Laser Processing - Laser	5				2	2								4
Intelligent Monitoring of Engineering Systems	5				2	1								3
Artificial Neural Networks in Structural Mechanics	6							2	2					4
Computational Fluid Dynamics II	3							1	1					2
Modeling, Model Reduction and Simulation in Laser Processing - Application	5							2	2					4
Molecular Mechanics and Multi-Scale Modelling of Materials	5							2	2					4
Language Courses	**6**													
Language Course (1)*	2	1	1											2
Language Course (2)*	2				1	1								2
Linguistic Elective**	2							1	1					2
Electives: Internship or Research Project	**9**													
Mini Thesis	9							260 h						
Industrial Internship	9							9 weeks						
Master Thesis	**30**													
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E = Excersise
P = Practical Session
SWS = Weekly Semester Hours (Semesterwochenstunden)

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

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 and organizations.

In order to secure that students acquire experience in a company in a field related to their studies, they must pursue an internship in the field of computer-aided design of spare parts, assemblies and computer-aided production in Mechanical Engineering or in using industry-specific software systems in an industrial corporate environment. The complete 9-week internship must be completed and credited before the registration of the Master's thesis.

The internship will be completed as a project internship. Knowledge and skills acquired during the study program will be applied in the project internship. During the project internship students will work on a clearly defined problem in engineering (constructive/ experimental/ theoretical/ simulation) related to the program's track under guidance from an experienced engineer.

2. Duration and structure of the internship

In the Master of Science in Computer Aided Conception and Production in Mechanical Engineering, students need to complete at least 9 weeks of practical work experience.

3. Internship positions

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

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

(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 providers.

(5) As a general rule, internships at non-producing craft businesses, 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 internships and issuing the final certificate. It specifically examines, whether the contents of the internship is suitable with regard to the study program and track. Students are encouraged to have the internship's content approved by their academic advisor prior to the internship, so as to not jeopardize its recognition.

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

a. in the field of computer-aided design of spare parts and assembly groups
b. in the field of computer-aided production, modelling and simulation in Mechanical Engineering
c. in the use of industry-specific software systems in industrial corporate environments

(3) In order that the internship is 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. The intern will report on their internship in the form of a presentation held at the institute of the supervising tutor. Tutors are all university professors at the Faculty of Mechanical Engineering. The tutor and intern will agree upon the format and duration of the presentation will be agreed. Following the presentation and discussion, the tutor issues a certificate which needs to be submitted to the Internship Office along with the internship report and the internship certificate in order to have the internship recognized.

(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 of the required length has been completed and the internship report and the internship certificate have been submitted within the given deadlines and the internship presentation has been held.

(6) Appeals against recognition decisions may be lodged with the Examination Board 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 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, which needs to be edited on the computer, should be 2 DIN A4-pages per week (drawings and texts). The report should present the project work in a coherent way. Worksheets and copies (e.g. regulations, literature, etc.) will not replace the student’s report. In the coherent text, the student must briefly describe their tasks during the internship. In addition, the student must 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 intern will receive a certificate from the internship company, stating the duration of the internship in the respective departments or the intern’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 completed. Certificates from recruiting agencies may not be recognized.

7. Internships abroad

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

(2) The internship report and the internship certificate must be written 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

In the Master's degree program Computer Aided Conception and Production in Mechanical Engineering (CAME), the knowledge acquired in the Bachelor's degree program is deepened in such a way, that graduates will be able to resolve complex problems and to independently do research and work scientifically. Students acquire advanced knowledge of methods, processes and technologies in the area of computer-aided design of components, modules and of computer-aided production in mechanical engineering. In addition, this Master's degree program teaches both theoretical and practical content related to the use of industry-specific software systems for an industrial corporate environment. Students do not only acquire technological and technical competencies in the field of computer-aided production, modeling and simulation as well as in the field of software engineering, but – by choosing a specific specialization area (track) – they also gain experience in evaluating and solving problems in order to manage complex modeling and simulation projects.

Students acquire the ability to develop, read and understand complex technical drawings and, based on this, to independently design computer-aided structures. They will be able to purposefully advance existing structures in compliance with its operational use. Students will be able to successfully apply the methods and expertise in engineering they acquired and refined to formulate and solve complex problems in the industry or in research institutions.

Additionally, students will be supported in developing interdisciplinary skills. In particular, these include presentation and communication techniques as well as the ability to act independently and autonomously, to think abstractly, the ability to think system-analytically and to work in a team. With their education at RWTH Aachen University, students are qualified to work in a variety of fields of work and industries around the world. After successfully completing this Master's program, students additionally acquire the scientific qualification to pursue a doctorate.

Appendix 4: Equivalence list

Master of Science in Conception and Production in Computer Aided Mechanical Engineering (CAME) Äquivalenzliste Übergang PO 2012/105 zu PO 2021			
Module Prüfungsordnung 2012/105	CP	Module PO 2021	CP
Advanced Finite Element Methods	5	Advanced Finite Element Methods	5
Finite Element Methods for Engineers	5	Advanced Finite Element Methods	5
Foundations of Finite Element Methods	5	Advanced Finite Element Methods	5
Numerical Methods in Mechanical Engineering	7	Numerical Methods in Mechanical Engineering	7
Foundations of Numerical Methods in Mechanical Engineering	7	Numerical Methods in Mechanical Engineering	7
Advanced Software Engineering	5	Advanced Software Engineering	5
Continuum Mechanics	5	Continuum Mechanics	5
Multibody Dynamics	5	Multibody Dynamics	5
Porous Media Mechanics	4	Porous Media Mechanics	4
Simulation of Discrete Event Systems	5	Simulation of Discrete Event Systems	5
Control Engineering	3	Control Engineering	3
Quality Management	5	Quality Management	5
Production Management A	5	Production Management A	5
Computational Intelligence in Engineering	5	Computational Intelligence in Engineering	5
Nonlinear Structural Mechanics	5	Nonlinear Structural Mechanics	5
Failure of Structures and Structural Elements	5	Failure of Structures and Structural Elements	5
Machine Design Process and Practical Applications of Computer-Aided Engineering Tools	7	Machine Design Process	5
Mechatronics and Control Techniques for Production Plants	5		
Practical Introduction to FEM-Software I	5	Practical Introduction to FEM-Software I	5
Machine Tools	5		
Manufacturing Technology I	5	Manufacturing Technology I	5
Industrial Engineering and Ergonomics	5	Industrial Engineering and Ergonomics	5
Industrial Engineering	5	Industrial Engineering and Ergonomics	6
Industrial Engineering, Ergonomics and Work Organisation	5	Industrial Engineering and Ergonomics	7
Manufacturing Technology II	5		
Production Metrology	5	Production Metrology	5
Computational Modeling of Membranes and Shells	5	Computational Modeling of Membranes and Shells	5
Welding and Joining Technologies	5		
Finite Element Methods in Lightweight Design	5	Finite Element Methods in Lightweight Design	5
Practical Introduction to FEM-Software II	5	Practical Introduction to FEM-Software II	5
Modeling, Model Reduction and Simulation in Laser Processing - Laser	5	Modeling, Model Reduction and Simulation in Laser Processing - Laser	5
Modeling, Model Reduction and Simulation in Laser Processing - Design	5		
Reliable Simulation in the Mechanics of Materials and Structures	6		
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Computational Fluid Dynamics II	3	Computational Fluid Dynamics II	3
Micro- and Macrosimulation of Casting Processes	4		
Modeling, Model Reduction and Simulation in Laser Processsing - Applications	5	Modeling, Model Reduction and Simulation in Laser Processsing - Applications	5
Selected Topics of Inelasticity Theory	6		
Molecular Mechanics and Multi-Scale Modelling of Materials	5	Molecular Mechanics and Multi-Scale Modelling of Materials	5
Mechanics of Forming Processes	5		
Intelligent Monitoring of Engineering Systems	5	Intelligent Monitoring of Engineering Systems	5
Artificial Neural Networks in Structural Mechanics	6	Artificial Neural Networks in Structural Mechanics	6
Fundamentals of Lightweight Design	4	Fundamentals of Lightweight Design	4
Tensor Algebra and Tensor Analysis for Engineering Students I	5	Tensor Algebra and Tensor Analysis for Engineering Students I	5
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Machine Dynamics of Rigid Systems (WP)	6		
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Mechanics of Soft Engineering Materials: Rubbers, Textiles and Non-Crimp Fabrics	3		
Modelling, Model Reduction and Simulation in Laser Processing	5		
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Robotic Systems	5		
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German Language Course	6	Language Course 1	2
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