



## Master of Science (M.Sc.) in Computer Aided Conception and Production in Mechanical Engineering

The programme *Master of Science in Computer Aided Conception and Production in Mechanical Engineering* provides in-depth knowledge and understanding of the fundamentals of

- advanced mathematics and numerical methods,
- solid and fluid mechanics,
- software engineering and simulation techniques.

On this basis the specialised development and application of computer-aided simulation techniques is taught in two areas of emphasis:

- The option *Conception of Machines* prepares the student to develop and to apply modern computer-aided methods focused on the construction and dimensioning of structural members and mechanical engineering systems according to the functional requirements. The core compulsory courses for this area of specialisation include the fundamentals of structural mechanics, computational analysis, finite element methods and computer-aided design.

- The option *Production* prepares students to develop and to use computer-aided systems in modern industrial production, which includes manufacturing, production systems, planning, and management.

Compulsory courses cover modelling, simulation and control of manufacturing processes and production systems, automatic control, quality management and production management. In both areas of emphasis, students can choose lectures from a wide range of elective courses according to their personal interest.

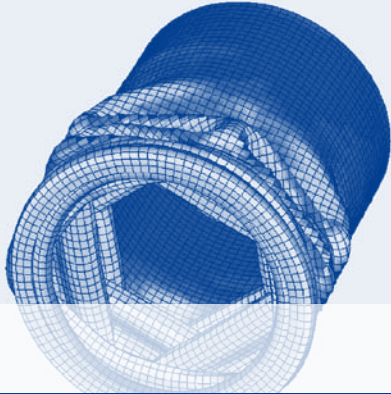
### Career Opportunities

Graduates will be qualified to work in a multitude of different areas of industry, including research and development, design, manufacturing and production. In granting the RWTH Master Degree, the programme gives the graduate a degree that is recognised world-wide and qualifies for further PhD studies.

### Your Contact:

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## Preface

Good skills in computer-aided methods are of growing importance for every engineer in all fields of activity. This is taken into account in modern teaching of all leading institutions of higher education all around the world.

In contrast to other programmes, the RWTH master programme *Computer Aided Conception and Production in Mechanical Engineering* addresses specifically the purposes of the practicing mechanical engineer, with emphasis on conception and production. According to your educational and professional background, we design together with you in the forefield of your stay with us a customized learning programme that enables you to carry out your studies according to your personal professional ideas and plans. You will be exposed to the most advanced techniques in the field, presented by internationally known specialists, in an environment focusing on your intellectual, professional and personal advancement.

Our candidates typically detain a B.Sc. degree with good results in all subjects. Their educational record reflects their interest in theoretical and numerical approaches to solve mechanical engineering problems. Industrial experience beyond the requirements of the B.Sc. curriculum is highly welcome but not obligatory to join the programme.

Prof. Dr.-Ing. Dieter Weichert, Scientific Director  
Prof. Dr.-Ing. Rüdiger Schmidt, Programme Coordinator  
(Institute of General Mechanics of RWTH Aachen University)



## Structure of the Programme

This programme is comprised of three semesters of lectures, exercises, seminars, and laboratory courses, a two month industrial internship, and a four month period devoted to preparing a master's thesis. In the 4<sup>th</sup> semester the master's thesis has to be performed.

The programme is especially designed for international students and offers particular services aimed at this target group:

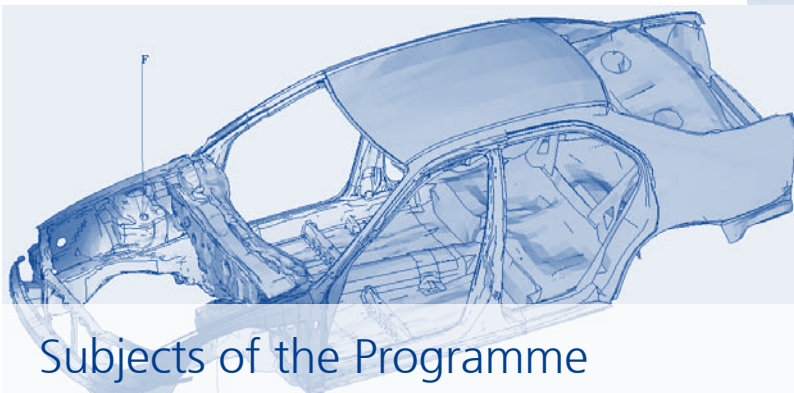
- **Content Coaching**

The participants of the master programme will benefit from personal coaching on all issues regarding the contents of the course. The students will find assistance with the preparation and the wrap-up of classes as well as the preparation of exams.

- **Social Coaching**

The content coaching will be complemented by an extensive social coaching on a broad spectrum of issues. The aim is to create an efficient learning and working environment at the study place Aachen. Support is offered from the admission all the way to graduation and beyond.

# Conception and Production in Mechanical Engineering



## Subjects of the Programme

This programme is designed to broaden and to increase the knowledge and practical use of computer-aided simulation techniques in mechanical engineering. Its particular focus is on the development and application of computer-aided methods and systems in all stages of the product development from the initial conception to the manufacturing process.

The programme focuses on the important principles needed to understand and to apply simulation techniques in mechanical engineering, with special emphasis on topics, such as design of machines and structures, or production and manufacturing.

In learning about computational engineering and simulation techniques, the students will be trained to develop and to use computer-aided engineering methods in either the area of emphasis *Conception of Machines* or *Production*.

The knowledge gained from ongoing research at RWTH flows directly into lectures, seminars, and workshops, thus ensuring an up-to-date and innovative curriculum.

### Outline of the Programme

The following table displays the course structure of the two areas of emphasis *Conception of Machines* and *Production*. In addition to the displayed compulsory courses, the students can choose elective courses from a wide range of options.

	SUBJECT	ECTS Credits	SWH
	<b>FOR BOTH STUDY MAJORS</b>		
	Continuum Mechanics	5	4
	Computational Fluid Mechanics I & II	7	5
	Advanced Software Engineering	5	4
	Introduction to Simulation Techniques	5	4
	Simulation of Discrete Event Systems	5	4
	Foundations of Numerical Methods in Mechanical Engineering	3	2
	Foundations of Finite Element Methods	5	4
	<b>STUDY MAJOR "Production"</b>		
COMPULSORY COURSES	Simulation and Control of Production Systems	5	4
	Modelling and Simulation in Manufacturing Technology	4	3
	Automatic Control	7	5
	Quality Management	5	4
	Production Management	5	4
	<b>STUDY MAJOR "Conception"</b>		
	Nonlinear Structural Mechanics	5	3
	Failure of Structures and Structural Elements	4	2
	Finite Elements Methods in Lightweight Design	5	3
	Systematic Engineering Design	6	4
Practical Applications of Computer-Aided Engineering Tools	1	1	
Virtual Machine Tool - Modelling and Simulation	5	4	
	<b>Total Compulsory Courses</b>	61	47
		61	44
	<b>Technical Elective Course</b>	15	12
	<b>German Language Course</b>	6	4
	<b>Industrial Internship</b>	9	9 weeks
	<b>Mini thesis</b>	9	260 h
	<b>Master's thesis</b>	20	4 months
	<b>TOTAL</b>	120	63
		120	60

SWH = numbers of hours per week per semester



## Organisational Information

Duration of Study:	4 semesters (2 years)
Next Start:	every year, 1 <sup>st</sup> of October + 6 weeks before start: German Course
Master Certificate:	Master Certificate of RWTH Aachen University
Master Degree:	M.Sc. (Master of Science) in Computer Aided Conception and Production in Mechanical Engineering
Tuition Fee:	3700 € per semester
Scientific Director:	Univ.-Prof. Dr.-Ing. Dieter Weichert
Programme Coordinator:	apl. Prof. Dr.-Ing. Rüdiger Schmidt (Institute of General Mechanics of Aachen University)
Place of Study:	Aachen, RWTH Aachen University

Please send your application until 1<sup>st</sup> of March to:

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Internet: [www.master-computer-aided-mechanical-engineering.com](http://www.master-computer-aided-mechanical-engineering.com)



## Prerequisites

A candidate should have a recognised first degree (Bachelor of Science or Engineering) in Mechanical Engineering or a related discipline, such as Automotive, Aerospace or Energy Engineering, Manufacturing, Industrial or Production Engineering, awarded by an internationally recognised university-level institution. Candidates should have also performed above average in their undergraduate studies and should be able to speak and write fluently in English (TOEFL 550 paper-based/213 computer-based or IELTS 6.0). The Graduate Record Examination (GRE) is also required. Please check our website for special entrance requirements.

## RWTH Aachen University

RWTH Aachen University is the largest university of technology in Germany and one of the most renowned technical universities in Europe, with around 28,000 students, more than half of which are in engineering. Every year numerous international students and scientists come to the RWTH Aachen to benefit from the internationally recognised world-class courses and facilities. Almost 5,000 international students are currently enrolled within the undergraduate, graduate or PhD programmes. The proximity of Aachen to the Netherlands, Belgium and Luxembourg combined with the subsequent exposure to a variety of cultural heritages has placed RWTH Aachen University in a unique position with regards to the reflection and promotion of international aspects and intensive interaction with other universities.