Module Catalogue for the Master's Degree Course
'Master of Science in Computer Aided Conception and Production in Mechanical Engineering' (M.Sc.)

Appendix 1 – Module Catalogue

This module catalogue provides the current status on the day the decision on the examination regulations was made; any changes that do not concern the examination forms will be announced online under: Link http://master-mechanical-engineering.com/.

The complete and current module contents can be seen in the module handbook of the programme. The module handbooks can requested online under http://www.campus.rwth-aachen.de/rwth/mhb/mhblist.aspx?tguid=0xBA76F399D1893541BFCF7CBC6BAFE455 or through the QR-Code above.

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Compulsory Modules – First Term (Winter Semester)

Course Track: Conception and Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Numerical Methods in Mechanical Engineering

MODULE: NUMERICAL METHODS IN MECHANICAL ENGINEERING					
Term	1	**Credit Points**	7	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Numerical Methods in Mechanical Engineering		Compulsory Module	1	7	0
Lecture: Numerical Methods in Mechanical Engineering		Compulsory Module	1	0	3
Exercise / Practical Work: Numerical Methods in Mechanical Engineering		Compulsory Module	1	0	2
Requirements		**Grading**			
-none-		**Numerical Methods in Mechanical Engineering** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Advanced Finite Element Methods

MODULE: ADVANCED FINITE ELEMENT METHODS					
Term	1	**Credit Points**	5	**Language**	English

Title	**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Advanced Finite Element Methods	Compulsory Module	1	5	0
Lecture: Advanced Finite Element Methods	Compulsory Module	1	0	2
Exercise: Advanced Finite Element Methods	Compulsory Module	1	0	2

Requirements	**Grading**
-none-	**Advanced Finite Element Methods** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination

Module: Advanced Software Engineering

MODULE: ADVANCED SOFTWARE ENGINEERING					
Term	1	**Credit Points**	5	**Language**	English

Title	**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Advanced Software Engineering	Compulsory Module	1	5	0
Lecture: Advanced Software Engineering	Compulsory Module	1	0	2
Exercise: Advanced Software Engineering	Compulsory Module	1	0	2

Requirements	**Grading**
-none-	**Advanced Software Engineering** The module grading is weighted according to the CP-allocation • Oral Examination

Compulsory Module– First Term (Winter Semester)

Course Track: Conception and Production

Module: German Language Course

MODULE: GERMAN LANGUAGE COURSE					
Term	1	**Credit Points**	6	**Language**	German
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: German Language Course		Compulsory Module	1	6	0
Lecture: German Language Course		Compulsory Module	1	0	2
Exercise: German Language Course		Compulsory Module	1	0	2
Requirements		**Grading**			
-none-		**German Language Course** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Practical Introduction to FEM-Software I

MODULE: PRACTICAL INTRODUCTION TO FEM-SOFTWARE I					
Term	1	**Credit Points**	3	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Practical Introduction to FEM-Software I		Compulsory Elective Module	1	3	0
Lecture: Practical Introduction to FEM-Software I		Compulsory Elective Module	1	0	1
Practical Session: Practical Introduction to FEM-Software I		Compulsory Elective Module	1	0	2
Requirements		**Grading**			
-none-		**Practical Introduction to FEM-Software I** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Compulsory Elective Modules – First Term (Winter Semester)

Course Track: Conception

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Fandamentals of Lightweight-Design

MODULE: FUNDAMENTALS OF LIGHTWEIGHT-DESIGN					
Term	1	**Credit Points**	4	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Fandamentals of Lightweight-Design		Compulsory Elective Module	1	4	0
Lecture: Fandamentals of Lightweight-Design		Compulsory Elective Module	1	0	2
Exercise: Fandamentals of Lightweight-Design		Compulsory Elective Module	1	0	1
Requirements		**Grading**			
-none-		**Fandamentals of Lightweight-Design** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Tensor Algebra and Tensor Analysis for Engineering Students I

MODULE: TENSOR ALGEBRA AND TENSOR ANALYSIS FOR ENGINEERING STUDENTS I					
Term	1	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Tensor Algebra and Tensor Analysis for Engineering Students I		Compulsory Elective Module	1	5	0
Lecture: Tensor Algebra and Tensor Analysis for Engineering Students I		Compulsory Elective Module	1	0	2
Exercise: Tensor Algebra and Tensor Analysis for Engineering Students I		Compulsory Elective Module	1	0	2
Requirements		**Grading**			
-none-		**Tensor Algebra and Tensor Analysis for Engineering Students I** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Compulsory Elective Modules – First Term (Winter Semester)

Course Track: Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Control Engineering

MODULE: CONTROL ENGINEERING					
Term	1	**Credit Points**	2	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Control Engineering		Compulsory Elective Module	1	3	0
Lecture: Control Engineering		Compulsory Elective Module	1	0	2
Exercise: Control Engineering		Compulsory Elective Module	1	0	2
Requirements		**Grading**			
Basic knowledge in mathematics as defined in the examination regulations.		**Control Engineering** The module grading is weighted according to the CP-allocation • Written Examination			

Module: Machine Tools

MODULE: MACHINE TOOLS					
Term	1	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Machine Tools		Compulsory Elective Module	1	5	0
Lecture: Machine Tools		Compulsory Elective Module	1	0	2
Exercise: Machine Tools		Compulsory Elective Module	1	0	2
Requirements		**Grading**			
-none-		**Machine Tools** The module grading is weighted according to the CP-allocation • Written Examination			

Module: Manufacturing Technology I

MODULE: MANUFACTURING TECHNOLOGY I					
Term	1	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Manufacturing Technology I		Compulsory Elective Module	1	5	0
Lecture: Manufacturing Technology I		Compulsory Elective Module	1	0	2
Exercise: Manufacturing Technology I		Compulsory Elective Module	1	0	2
Requirements		**Grading**			
-none-		**Manufacturing Technology I** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Industrial Engineering and Ergonomics

MODULE: INDUSTRIAL ENGINEERING AND ERGONOMICS					
Term	1	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Industrial Engineering and Ergonomics		Compulsory Elective Module	1	5	0
Lecture: Industrial Engineering and Ergonomics		Compulsory Elective Module	1	0	2
Exercise: Industrial Engineering and Ergonomics		Compulsory Elective Module	1	0	2
Requirements		**Grading**			
-none-		**Industrial Engineering and Ergonomics** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Compulsory Modules – Second Term (Summer Semester)
Course Track: Conception and Production
RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Continuum Mechanics

MODULE: CONTINUUM MECHANICS					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Continuum Mechanics		Compulsory Module	2	5	0
Lecture: Continuum Mechanics		Compulsory Module	2	0	2
Exercise: Continuum Mechanics		Compulsory Module	2	0	2
Requirements		**Grading**			
-none-		**Continuum Mechanics** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Multibody Dynamcis

MODULE: MULTIBODY DYNAMICS					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Multibody Dynamcis		Compulsory Module	2	5	0
Lecture: Multibody Dynamcis		Compulsory Module	2	0	2
Exercise: Multibody Dynamcis		Compulsory Module	2	0	2
Requirements		**Grading**			
-none-		**Multibody Dynamcis** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Computational Fluid Dynamics I

MODULE: COMPUTATIONAL FLUID DYNAMICS I					
Term	2	**Credit Points**	4	**Language**	English

Title	**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Computational Fluid Dynamics I	Compulsory Module	2	4	0
Lecture: Computational Fluid Dynamics I	Compulsory Module	2	0	2
Exercise: Computational Fluid Dynamics I	Compulsory Module	2	0	1

Requirements	**Grading**
-none-	**Computational Fluid Dynamics I** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination

Compulsory Modules – Second Term (Summer Semester)

Course Track: Conception

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Nonlinear Structural Mechanics

MODULE: NONLINEAR STRUCTURAL MECHANICS					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Nonlinear Structural Mechanics		Compulsory Module	2	5	0
Lecture: Nonlinear Structural Mechanics		Compulsory Module	2	0	2
Exercise: Nonlinear Structural Mechanics		Compulsory Module	2	0	2
Requirements		**Grading**			
-none-		**Nonlinear Structural Mechanics** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Failure of Structures and Structural Elements

MODULE: FAILURE OF STRUCTURES AND STRUCTURAL ELEMENTS					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Failure of Structures and Structural Elements		Compulsory Module	2	5	0
Lecture: Failure of Structures and Structural Elements		Compulsory Module	2	0	2
Exercise: Failure of Structures and Structural Elements		Compulsory Module	2	0	1
Requirements		**Grading**			
-none-		**Failure of Structures and Structural Elements** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Compulsory Elective Modules – Second Term (Summer Semester)

Course Track: Conception and Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Welding and Joining Technologies

MODULE: WELDING AND JOINING TECHNOLOGIES					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Welding and Joining Technologies		Compulsory Elective Module	2	5	0
Lecture: Welding and Joining Technologies		Compulsory Elective Module	2	0	2
Exercise: Welding and Joining Technologies		Compulsory Elective Module	2	0	2
Requirements		**Grading**			
-none-		**Welding and Joining Technologies** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Finite Element Methods in Lightweight Design

MODULE: FINITE ELEMENT METHODS IN LIGHTWEIGHT DESIGN					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Finite Element Methods in Lightweight Design		Compulsory Elective Module	2	5	0
Lecture: Finite Element Methods in Lightweight Design		Compulsory Elective Module	2	0	2
Exercise: Finite Element Methods in Lightweight Design		Compulsory Elective Module	2	0	1
Requirements		**Grading**			
-none-		**Finite Element Methods in Lightweight Design** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Practical Introduction to FEM-Software II

MODULE: PRACTICAL INTRODUCTION TO FEM-SOFTWARE II					
Term	2	**Credit Points**	3	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Practical Introduction to FEM-Software II		Compulsory Elective Module	2	3	0
Lecture: Practical Introduction to FEM-Software II		Compulsory Elective Module	2	0	1
Practical Session: Practical Introduction to FEM-Software II		Compulsory Elective Module	2	0	2
Requirements		**Grading**			
Recommended: Practical Introduction to FEM-Software I		**Practical Introduction to FEM-Software II** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Modeling, Model Reduction and Simulation in Laser Processing - Laser

MODULE: MODELING, MODEL REDUCTION AND SIMULATION IN LASER PROCESSING – Laser					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Modeling, Model Reduction and Simulation in Laser Processing - Laser		Compulsory Elective Module	2	5	0
Lecture: Modeling, Model Reduction and Simulation in Laser Processing - Laser		Compulsory Elective Module	2	0	2
Exercise: Modeling, Model Reduction and Simulation in Laser Processing - Laser		Compulsory Elective Module	2	0	2
Requirements		**Grading**			
-none-		**Modeling, Model Reduction and Simulation in Laser Processing – Laser** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Modeling, Model Reduction and Simulation in Laser Processing - Design

MODULE: Modeling, Model Reduction and Simulation in Laser Processing - Design					
Term	2	**Credit Points**	5	**Language**	English

Title	**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Modeling, Model Reduction and Simulation in Laser Processing - Design	Compulsory Elective Module	2	5	0
Lecture: Modeling, Model Reduction and Simulation in Laser Processing - Design	Compulsory Elective Module	2	0	2
Exercise: Modeling, Model Reduction and Simulation in Laser Processing - Design	Compulsory Elective Module	2	0	2

Requirements	**Grading**
-none-	**Modeling, Model Reduction and Simulation in Laser Processing - Design** The module grading is weighted according to the CP-allocation • Written Examination

Module: Reliable Simulation in the Mechanics of Materials and Structures

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Reliable Simulation in the Mechanics of Materials and Structures</td><td>Compulsory Elective Module</td><td>2</td><td>6</td><td>0</td></tr>
<tr><td colspan="3">Lecture:
Reliable Simulation in the Mechanics of Materials and Structures</td><td>Compulsory Elective Module</td><td>2</td><td>0</td><td>2</td></tr>
<tr><td colspan="3">Exercise:
Reliable Simulation in the Mechanics of Materials and Structures</td><td>Compulsory Elective Module</td><td>2</td><td>0</td><td>2</td></tr>
<tr><td colspan="3">Requirements</td><td colspan="4">Grading</td></tr>
<tr><td colspan="3">-none-</td><td colspan="4">Reliable Simulation in the Mechanics of Materials and Structures
The module grading is weighted according to the CP-allocation
• Written Examination or
• Oral Examination</td></tr>
</table>

Module: Mechanics of Engineering Materials

MODULE: MECHANICS OF ENGINEERING MATERIALS					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Mechanics of Engineering Materials		Compulsory Elective Module	2	5	0
Lecture: Mechanics of Engineering Materials		Compulsory Elective Module	2	0	2
Exercise: Mechanics of Engineering Materials		Compulsory Elective Module	2	0	1
Requirements		**Grading**			
-none-		**Mechanics of Engineering Materials** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Compulsory Elective Module– Second Term (Summer Semester)

Course Track: Conception

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Tensor Algebra and Tensor Analysis for Engineering Students II

<table>
<tr><th colspan="6">MODULE: TENSOR ALGEBRA AND TENSOR ANALYSIS FOR ENGINEERING STUDENTS II</th></tr>
<tr><td>Term</td><td>2</td><td>Credit Points</td><td>5</td><td>Language</td><td>English</td></tr>
<tr><td colspan="2">Title</td><td>Curricular Embedding</td><td>Term</td><td>Credit Points</td><td>SWS</td></tr>
<tr><td colspan="2">Examination:
Tensor Algebra and Tensor Analysis for Engineering Students II</td><td>Compulsory Elective Module</td><td>2</td><td>5</td><td>0</td></tr>
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The module grading is weighted according to the CP-allocation
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</table>

Compulsory Elective Modules – Second Term (Summer Semester)

Course Track: Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Manufacturing Technology II

MODULE: MANUFACTURING TECHNOLOGY II					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Manufacturing Technology II		Compulsory Elective Module	2	5	0
Lecture: Manufacturing Technology II		Compulsory Elective Module	2	0	2
Exercise: Manufacturing Technology II		Compulsory Elective Module	2	0	2
Requirements		**Grading**			
-none-		**Manufacturing Technology II** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Production Metrology

MODULE: PRODUCTION METROLOGY					
Term	2	**Credit Points**	5	**Language**	English

Title	**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Production Metrology	Compulsory Elective Module	2	5	0
Lecture: Production Metrology	Compulsory Elective Module	2	0	2
Exercise: Production Metrology	Compulsory Elective Module	2	0	2

Requirements	**Grading**
-none-	**Production Metrology** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination

Module: Computational Modeling of Membranes and Shells

MODULE: COMPUTATIONAL MODELING OF MEMBRANES AND SHELLS					
Term	2	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Computational Modeling of Membranes and Shells		Compulsory Elective Module	2	5	0
Lecture: Computational Modeling of Membranes and Shells		Compulsory Elective Module	2	0	2
Exercise: Computational Modeling of Membranes and Shells		Compulsory Elective Module	2	0	1
Requirements		**Grading**			
-none-		**Computational Modeling of Membranes and Shells** The module grading is weighted according to the CP-allocation • Oral Examination			

Compulsory Modules – Third Term (Winter Semester)

Course Track: Conception and Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Computational Fluid Dynamics II

MODULE: COMPUTATIONAL FLUID DYNAMICS II					
Term	3	**Credit Points**	3	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Computational Fluid Dynamics II		Compulsory Module	3	3	0
Lecture: Computational Fluid Dynamics II		Compulsory Module	3	0	1
Exercise: Computational Fluid Dynamics II		Compulsory Module	3	0	1
Requirements		**Grading**			
Computational Fluid Dynamics I		**Computational Fluid Dynamics II** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Simulation of Discrete Event Systems

MODULE: SIMULATION OF DISCRETE EVENT SYSTEMS					
Term	3	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Simulation of Discrete Event Systems		Compulsory Module	3	5	0
Lecture: Simulation of Discrete Event Systems		Compulsory Module	3	0	2
Exercise: Simulation of Discrete Event Systems		Compulsory Module	3	0	2
Requirements		**Grading**			
-none-		**Simulation of Discrete Event Systems** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Compulsory Modules – Third Term (Winter Semester)

Course Track: Conception

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Machine Design Process and Practical Applications of Computer-Aided Engineering Tools

MODULE: MACHINE DESIGN PROCESS AND PRACTICAL APPLICATIONS OF COMPUTER-AIDED ENGINEERING TOOLS					
Term	3	**Credit Points**	7	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Machine Design Process and Practical Applications of Computer-Aided Engineering Tools		Compulsory Module	3	7	0
Lecture: Machine Design Process and Practical Applications of Computer-Aided Engineering Tools		Compulsory Module	3	0	2
Exercise: Machine Design Process and Practical Applications of Computer-Aided Engineering Tools		Compulsory Module	3	0	2
Practical Session: Machine Design Process and Practical Applications of Computer-Aided Engineering Tools		Compulsory Module	3	0	1
Requirements		**Grading**			
-none-		**Machine Design Process and Practical Applications of Computer-Aided Engineering Tools** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Compulsory Modules – Third Term (Winter Semester)

Course Track: Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Quality Management

MODULE: QUALITY MANAGEMENT					
Term	3	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Quality Management		Compulsory Module	3	5	0
Lecture: Quality Management		Compulsory Module	3	0	2
Exercise: Quality Management		Compulsory Module	3	0	2
Requirements		**Grading**			
-none-		**Quality Management** The module grading is weighted according to the CP-allocation • Written Examination			

Module: Simulation Techniques (Modeling and Simulation) in Manufacturing Technology

MODULE: SIMULATION TECHNIQUES (MODELING AND SIMULATION) IN MANUFACTURING TECHNOLOGY						
Term	3	**Credit Points**	5	**Language**	English	
Title			**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Simulation Techniques (Modeling and Simulation) in Manufacturing Technology			Compulsory Module	3	5	0
Lecture: Simulation Techniques (Modeling and Simulation) in Manufacturing Technology			Compulsory Module	3	0	2
Exercise: Simulation Techniques (Modeling and Simulation) in Manufacturing Technology			Compulsory Module	3	0	1
Requirements			**Grading**			
-none-			**Simulation Techniques (Modeling and Simulation) in Manufacturing Technology** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Production Management A

MODULE: PRODUCTION MANAGEMENT A					
Term	3	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Production Management A		Compulsory Module	3	5	0
Lecture: Production Management A		Compulsory Module	3	0	2
Exercise: Production Management A		Compulsory Module	3	0	2
Requirements		**Grading**			
-none-		**Production Management A** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Compulsory Elective Modules – Third Term (Winter Semester)

Course Track: Conception and Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Modelling, Model Reduction and Simulation in Laser Processing – Applications

MODULE: MODELLING; MODEL REDUCTION AND SIMULATION IN LASER PROCESSING – Applications					
Term	3	**Credit Points**	5	**Language**	English

Title	**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Modelling, Model Reduction and Simulation in Laser Processing – Applications	Compulsory Elective Module	3	5	0
Lecture: Modelling, Model Reduction and Simulation in Laser Processing – Applications	Compulsory Elective Module	3	0	2
Exercise: Modelling, Model Reduction and Simulation in Laser Processing – Applications	Compulsory Elective Module	3	0	2

Requirements	**Grading**
-none-	**Modelling, Model Reduction and Simulation in Laser Processing – Applications** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination

Module: Selected Topics of Inelasticity Theory

MODULE: SELECTED TOPICS OF INELATASTICITY THEORY					
Term	3	**Credit Points**	6	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Selected Topics of Inelasticity Theory		Compulsory Elective Module	3	6	0
Lecture: Selected Topics of Inelasticity Theory		Compulsory Elective Module	3	0	2
Exercise: Selected Topics of Inelasticity Theory		Compulsory Elective Module	3	0	2
Requirements		**Grading**			
Mechanics I – III Recommended: Basic knowledge in continuum mechanics and the theory of materials		**Selected Topics of Inelasticity Theory** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination			

Module: Molecular Mechanics and Multi-scale Modelling

MODULE: MOLECULAR MECHANICS AND MULTI-SCALE MODELLING					
Term	3	**Credit Points**	5	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Molecular Mechanics and Multi-scale Modelling		Compulsory Elective Module	3	5	0
Lecture: Molecular Mechanics and Multi-scale Modelling		Compulsory Elective Module	3	0	2
Exercise: Molecular Mechanics and Multi-scale Modelling		Compulsory Elective Module	3	0	2
Requirements		**Grading**			
-none-		**Molecular Mechanics and Multi-scale Modelling** The module grading is weighted according to the CP-allocation • Oral Examination			

Module: Mechanics of Forming Processes

MODULE: MECHANICS OF FORMING PROCESSES					
Term	3	**Credit Points**	5	**Language**	English

Title	**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Examination: Mechanics of Forming Processes	Compulsory Elective Module	3	5	0
Lecture: Mechanics of Forming Processes	Compulsory Elective Module	3	0	2
Exercise: Mechanics of Forming Processes	Compulsory Elective Module	3	0	2

Requirements	**Grading**
-none-	**Mechanics of Forming Processes** The module grading is weighted according to the CP-allocation • Written Examination or • Oral Examination

Module: Micro- and Macrosimulation of Casting Processes

<table>
<tr><th colspan="6">MODULE: MICRO- AND MACROSIMULATION OF CASTING PROCESSES</th></tr>
<tr><td>Term</td><td>3</td><td>Credit Points</td><td>4</td><td>Language</td><td>English</td></tr>
<tr><td colspan="2">Title</td><td>Curricular Embedding</td><td>Term</td><td>Credit Points</td><td>SWS</td></tr>
<tr><td colspan="2">Examination:
Micro- and Macrosimulation of Casting Processes</td><td>Compulsory Elective Module</td><td>3</td><td>4</td><td>0</td></tr>
<tr><td colspan="2">Lecture:
Micro- and Macrosimulation of Casting Processes</td><td>Compulsory Elective Module</td><td>3</td><td>0</td><td>2</td></tr>
<tr><td colspan="2">Exercise:
Micro- and Macrosimulation of Casting Processes</td><td>Compulsory Elective Module</td><td>3</td><td>0</td><td>1</td></tr>
<tr><td colspan="3">Requirements</td><td colspan="3">Grading</td></tr>
<tr><td colspan="3">• Basic knowledge in numerical methods (e.g. finite element method)
• Basic knowledge in materials science and continuum mechanics
• Conservation equations
• Numerical methods to solve systems of PDEs
• Notion of thermodynamics (e.g. phase diagrams)</td><td colspan="3">Micro- and Macrosimulation of Casting Processes
The module grading is weighted according to the CP-allocation
• Written Examination or
• Oral Examination</td></tr>
</table>

Compulsory Module– Third Term (Winter Semester)

Course Track: Conception and Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Mini Thesis

<table>
<tr><th colspan="6">MODULE: MINI THESIS</th></tr>
<tr><td>Term</td><td>3</td><td>Credit Points</td><td>9</td><td>Language</td><td>English</td></tr>
<tr><td colspan="3">Title</td><td>Curricular Embedding</td><td>Term</td><td>Credit Points</td><td>SWS</td></tr>
<tr><td colspan="3">Mini Thesis</td><td>Compulsory Module</td><td>3</td><td>9</td><td>0</td></tr>
<tr><td colspan="3">Requirements</td><td colspan="4">Grading</td></tr>
<tr><td colspan="3">-none-</td><td colspan="4">Quality Management
The module grading is weighted according to the CP-allocation
• Written Examination (written paper, 40-70 pages)</td></tr>
</table>

Compulsory Module– Fourth Term (Summer Semester)

Course Track: Conception and Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Industrial Internship

MODULE: INDUSTRIAL INTERNSHIP					
Term	4	**Credit Points**	9	**Language**	English
Title		**Curricular Embedding**	**Term**	**Credit Points**	**SWS**
Report, Colloquium; Industrial Internship		Compulsory Module	4	9	0
Requirements		**Grading**			
-none-		**Industrial Internship** -none-			

Compulsory Module– Fourth Term (Summer Semester)

Course Track: Conception and Production

RWTH Aachen (Faculty 4 – Mechanical Engineering)

Module: Master Thesis

<table>
<tr><th colspan="6">MODULE: MASTER THESIS</th></tr>
<tr><td>Term</td><td>4</td><td>Credit Points</td><td>20</td><td>Language</td><td>English</td></tr>
<tr><td colspan="3">Title</td><td>Curricular Embedding</td><td>Term</td><td>Credit Points</td><td>SWS</td></tr>
<tr><td colspan="3">Master Thesis:
Master Thesis</td><td>Compulsory Module</td><td>4</td><td rowspan="2">20</td><td>0</td></tr>
<tr><td colspan="3">Master Thesis Colloquium:
Master Thesis</td><td>Compulsory Module</td><td>4</td><td>0</td></tr>
<tr><td colspan="3">Requirements</td><td colspan="4">Grading</td></tr>
<tr><td colspan="3">Industrial Internship
Mini Thesis
At least 92 ECTS</td><td colspan="4">Master Thesis
The grade will be formed from the arithmetical average according to §18 ÜPO.</td></tr>
</table>