

Module Handbook for Master's degree programmes offered by the Department of Mechanical Engineering

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Course timetables for Master's degree programmes

Degree programmes and specialisations	Valid from enrolment in
Master Mechanical Engineering, Specialisation in Agricultural Engineering	WS 20 / 21
Master Mechanical Engineering, Specialisation in Computational Engineering	WS 20 / 21
Master Mechanical Engineering, Specialisation in Product Development	WS 20 / 21
Master Mechanical Engineering in Part-Time, Specialisation in Agricultural Engineering	WS 20 / 21
Master Mechanical Engineering in Part-Time, Specialisation in Computational Engineering	WS 20 / 21
Master Mechanical Engineering in Part-Time, Specialisation in Product Development	WS 20 / 21
Master Business Administration & Engineering majoring in Mechanical Engineering	see ITB

Note:

Course timetables are governed by the Examination Regulations applicable at the time of enrolment.

The course timetables below reflect the status of the most recent Examination Regulations / amendment orders.

Abbreviations:

HPW	= hours per week per semester	SL	= seminaristic lecture (exercise class)
CP	= credit points	Е	= exercise
L	= lecture	Ρ	= practical course (laboratory class)

S = seminar

Additional abbreviations for Master's programmes in Mechanical Engineering

Full-Time = "FT""

Part-Time = "P" or "PT"

Master in Mechanical Engineering



Compulsory engineering modules

Compulsory elective engineering modules

Apart from the compulsory elective engineering modules, mentioned, students may also opt to take any of the elective or compulsory engineering modules from the other specialisations. In these cases, however, the Department of Mechanical Engineering is unable to guarantee that there will be no timetable clashes.



Integration modules

Practical modules

Specialisation in Agricultural Engineering

1st sem.	Agricultural Engineering 1	pineering 1 Drive Systems Advanced Fluid I		Advanced Mathematics	Advanced Technical Mechanics
2nd sem.	Plant Design / Fatigue Strength and Durability	Agricultural Engineering 2	Agricultural Process Technology	Piston Engines	Project Report
3rd sem.	Conveying Technology / Automotive Engineering	Renewable Resources	The German Legal System and Product Liability	Management Skills – Organisation and Leadership	Scientific Project
4th sem.		Mast	er Thesis		Colloquium

Specialisation in Computational Engineering

1st sem.	Operations Research	Drive Systems	Multibody Simulation	Advanced Mathematics	Robotics
2nd sem.	Knowledge-Based Engineering	Modern Programming Concepts	Application of Numerical Software	Developments in Computer Science	Project Report
3rd sem.	Advanced Finite Element Methods	Machine Tools	The German Legal System and Product Liability	Management Skills – Organisation and Leadership	Scientific Project
4th sem.		Mast	er Thesis		Colloquium

Specialisation in Product Development

1st sem.	Conveying Technology	ing Technology Drive Systems Advanced Fluid Machines		Advanced Mathematics	Advanced Technical Mechanics
2nd sem.	Material Flow Seminar / Polymer Engineering	Integrated Product Development	Dynamics of Machines	Piston Engines	Project Report
3rd sem.	Advanced Finite Element Methods / Technology of Mechanisms	Machine Tools	The German Legal System and Product Liability	Management Skills – Organisation and Leadership	Scientific Project
4th sem.		Colloquium			

- Specialisation in Agricultural Engineering

Subjects			1s	st se	m.	2n	nd se	em.	3r	d se	m.	4t	h se	m.
	HPW	СР	L	E	Ρ	L	E	Ρ	L	E	Р	L	Е	Ρ
Compulsory engineering modules		66												
Drive Systems	6	6	3	2	1									
Advanced Mathematics	6	6	4	2	0									
Advanced Fluid Machines	6	6	3	2	1									
Advanced Technical Mechanics	5	6	3	2	0									
Agricultural Engineering 1	5	6	3	1	1									
Agricultural Process Technology	5	6				3	1	1						
Piston Engines	6	6				3	1	2						
Agricultural Engineering 2	5	6				3	1	1						
Management Skills – Organisation and Leadership	5	6							3	2	0			
Renewable Resources	5	6							3	1	1			
The German Legal System and Product Liability	4	6							3	1	0			
Compulsory elective engineering modules		12												
Compulsory elective engineering module 1		6				х	х	х						
Compulsory elective engineering module 2		6							х	x	х			
Practical modules		42												
Project Report		6				х	х	х						
Scientific Project		6							x	x	x			
Master Thesis		25										x	х	x
Colloquium		5										х	х	х
		120												
Catalogue of compulsory elective engineer	ing mo	dules				2n	d se	em.	3r	d se	m.			
	HWP	СР				L	E	Ρ	L	E	Р			
Advanced English	4	6				0	4	0						
Plant Design	4	6				3	1	0						
Fatigue Strength and Durability	5	6				3	1	1						
Automotive Engineering	5	6							3	1	1			
Conveying Technology	5	6							2	2	1			

Apart from the compulsory elective engineering modules, mentioned, students may also opt to take any of the elective or compulsory engineering modules from the other specialisations. In these cases, however, the Department of Mechanical Engineering is unable to guarantee that there will be no timetable clashes.

- Specialisation in Computational Engineering

Subjects			1s	st se	m.	2n	d se	em.	3r	d se	m.	4t	h se	m.
	HPW	СР	L	Е	Ρ	L	E	Ρ	L	E	Ρ	L	Е	Ρ
Compulsory engineering modules		66												
Drive Systems	6	6	3	2	1									
Advanced Mathematics	6	6	4	2	0									
Multibody Simulation	5	6	2	1	2									
Operations Research	5	6	3	1	1									
Robotics	5	6	2	1	2									
Application of Numerical Software	5	6				2	1	2				**********		
Developments in Computer Science	4	6				2	1	1						
Modern Programming Concepts	5	6				2	1	2				******		
Management Skills – Organisation and Leadership	5	6							3	2	0			
The German Legal System and Product Liability	4	6							3	1	0			
Machine Tools	6	6							3	1	2			
Compulsory elective engineering modules		12												
Compulsory elective engineering module 1		6				х	х	х						
Compulsory elective engineering module 2		6							х	х	х			
Practical modules		42												
Project Report		6				х	х	х						
Scientific Project		6							x	x	x			
Master Thesis		25										х	х	х
Colloquium		5										х	х	х
		120												
Catalogue of compulsory elective engineer	ing mo	dules				2n	d se	em.	3r	d se	m.			
	HWP	СР				L	Ε	Ρ	L	E	Ρ			
Advanced English	4	6				0	4	0						
Knowledge-Based Engineering	5	6				2	1	2						
Advanced Finite Element Methods	5	6							2	1	2		ļ	

Apart from the compulsory elective engineering modules, mentioned, students may also opt to take any of the elective or compulsory engineering modules from the other specialisations. In these cases, however, the Department of Mechanical Engineering is unable to guarantee that there will be no timetable clashes.

- Specialisation in Product Development

Subjects			1s	st se	m.	2n	d se	em.	3r	d se	m.	4t	h se	m.
	HPW	СР	L	E	Ρ	L	Е	Ρ	L	E	Ρ	L	E	Ρ
Compulsory engineering modules		66												
Drive Systems	6	6	3	2	1			***						
Conveying Technology	5	6	2	2	1									
Advanced Mathematics	6	6	4	2	0									
Advanced Fluid Machines	6	6	3	2	1									
Advanced Technical Mechanics	5	6	3	2	0									
Integrated Product Development	5	6				3	2	0						
Piston Engines	6	6				3	1	2						
Dynamics of Machines	5	6				3	2	0						
Management Skills – Organisation and Leadership	5	6							3	2	0			
The German Legal System and Product Liability	4	6							3	1	0			
Machine Tools	6	6						***	3	1	2			
Compulsory elective engineering modules		12												
Compulsory elective engineering module 1		6				х	х	х						
Compulsory elective engineering module 2		6							х	x	х			
Practical modules		42												
Project Report		6				х	х	х						
Scientific Project		6							х	х	х			
Master Thesis		25										х	x	х
Colloquium		5										х	х	х
		120											-	
Catalogue of compulsory elective engineer	ing mo	dules				2n	d se	m.	3r	d se	m.			
	HWP	СР				L	E	Р	L	Е	Ρ			
Advanced English	4	6				0	4	0						
Material Flow Seminar	4	6				1	1	2						
Polymer Engineering	5	6				3	1	1						
Technology of Mechanisms	5	6							3	2	0			
Advanced Finite Element Methods	5	6							2	1	2			

Apart from the compulsory elective engineering modules, mentioned, students may also opt to take any of the elective or compulsory engineering modules from the other specialisations. In these cases, however, the Department of Mechanical Engineering is unable to guarantee that there will be no timetable clashes.

Master Mechanical Engineering (Part-Time)



Compulsory engineering modules

Compulsory elective engineering modules

Apart from the compulsory elective engineering modules, mentioned, students may also opt to take Advanced English and any of the elective or compulsory engineering modules from the other specialisations. In these cases, however, the Department of Mechanical Engineering is unable to guarantee that there will be no timetable clashes. Students may complete a literature-based study in place of a compulsary elective module.

Integration modules

Practical modules

Lecture **Specialisation in Agricultural Engineering** Day 1st sem. **Advanced Mathematics Drive Systems** Advanced Technical Mechanics Mon Tue 2nd sem. Agricultural Process Technology **Piston Engines** Project Report Mon Tue The German Legal System and 3rd sem. Advanced Fluid Machines Agricultural Engineering 1 Thu Fri Product Liability Plant Design / 4th sem. Agricultural Engineering 2 Scientific Project Thu Fri Fatigue Strength and Durability Conveying Technology / Management Skills – Organisation 5th sem. **Renewable Resources** Thu Fri Automotive Engineering and Leadership 6th sem. Master Thesis Colloquium

Specialisation in Computational Engineering

1st sem.	Advanced Mathematics	Drive Systems	Multibody Simulation	Mon Tue
2nd sem.	Modern Programming Concepts	Developments in Computer Science	Project Report	Mon Tue
3rd sem.	Operations Research	Robotics	The German Legal System and Product Liability	Thu Fri
4th sem.	Knowledge-Based Engineering	Application of Numerical Software	Scientific Project	Thu Fri
5th sem.	Advanced Finite Element Methods	Machine Tools	Management Skills – Organisation and Leadership	Thu Fri
6th sem.	Mas	ter Thesis	Colloquium	

Specialisation in Product Development

1st sem.	Advanced Mathematics	Drive Systems	Advanced Technical Mechanics	Mon Tue
2nd sem.	Dynamics of Machines	Piston Engines	Project Report	Mon Tue
3rd sem.	Advanced Fluid Machines	Conveying Technology	The German Legal System and Product Liability	Thu Fri
4th sem.	Material Flow Seminar / Polymer Engineering	Integrated Product Development	Scientific Project	Thu Fri
5th sem.	Advanced Finite Element Methods / Technology of Mechanisms	Machine Tools	Management Skills – Organisation and Leadership	Thu Fri
6th sem.	Mas	ter Thesis	Colloquium	

- Specialisation in Agricultural Engineering - Part-Time

		1s	t se	em.	2no	d se	em.	3rc	d se	əm.	4th	n se	əm.	5tł	n se	em.	6th	۱S€	₽m.
HPW	СР	L	E	Ρ	L	Е	Ρ	L	E	Ρ	L	E	Ρ	L	Е	Ρ	L	E	Ρ
	66																		
6	6	3	2	1															
6	6	4	2	0															
5	6	3	2	0															
5	6				3	1	1												
6	6				3	1	2												
6	6							3	2	1									
5	6							3	1	1									
4	6							3	1	0									
5	6										3	1	1						
5	6													3	2	0			
5	6													3	1	1			
5	12																		
	6										х	x	x						
	6													x	х	х			
	42																		
	6				x	x	x												
	6										x	x	x						
	25																x	x	x
	5																х	х	x
	120																		
ering m	odules										4th	n se	əm.	5th	n se	em.			
HWP	СР										L	Е	Ρ	L	Ε	Ρ			
4	6										0	4	0						
4	6										3	1	0						
5	6										3	1	1						
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<td>HPWCPLEPLEPLEP66632111111166632011111156632013111116666320131111116666320131111116666320131111116666111111111116666111111111116666111111111117661111111111176611111111111766111111111117661111111111176611111111111</td> <td>HPW CP L E P L E P L E P L 6 66 3 2 1 5 6 3 2 1 5 5 6 3 2 0 5 5 6 3 2 0 5 6 3 2 0 5 6 3 2 0 5 6 5 6 3 2 0 5 6 5 6 5 6 5 6 3 1</td> <td>HPW CP L E P L E P L E P L E P L E P L E 6 66 3 2 1 .</td> <td>HPW CP L E P 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7</td> <td>HPW CP L E P L E P L E P L E P L E P L 66 66 3 2 1 0 <td< td=""><td>HPW CP L E E E E</td><td>HPW CP L E P L E</td><td>HPW CP L E P L E</td><td>····································</td></td<></td>	HPW CP L E P L E P L 6 66 3 2 1 1 1 1 6 6 3 2 0 10 10 1 5 6 3 2 0 10 1 1 5 6 3 2 0 10 1 1 6 6 1 1 1 1 1 1 6 6 1 1 1 3 1 1 1 6 6 1 1 1 1 1 1 1 6 6 1 1 1 1 1 1 1 1 6 6 1 1 1 1 1 1 1 1 1 6 1 1 1 1 1 1 1 1 1 1 5 6 1 1 1 1 1	HPWCPLEPLEPLE6663215632155556632056320111156632056321111166661111111111166661111111111166661111111111166661111111111166661111111111175661111111111175661111111111175661111111111175661111111111176661111111111176611111<	HPWCPLEPLEPLEP66632111111166632011111156632013111116666320131111116666320131111116666320131111116666111111111116666111111111116666111111111117661111111111176611111111111766111111111117661111111111176611111111111	HPW CP L E P L E P L E P L 6 66 3 2 1 5 6 3 2 1 5 5 6 3 2 0 5 5 6 3 2 0 5 6 3 2 0 5 6 3 2 0 5 6 5 6 3 2 0 5 6 5 6 5 6 5 6 3 1	HPW CP L E P L E P L E P L E P L E P L E 6 66 3 2 1 .	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Apart from the compulsory elective engineering modules, mentioned, students may also opt to take any of the elective or compulsory engineering modules from the other specialisations. In these cases, however, the Department of Mechanical Engineering is unable to guarantee that there will be no timetable clashes.

- Specialisation in Computational Engineering - Part-Time

Subjects			1s	t se	em.	2no	d se	em.	3ro	d se	em.	4th	n se	em.	5th	n se	em.	6th	n se	em.
	HPW	СР	L	E	Ρ	L	E	Ρ	L	E	Ρ	L	Е	Ρ	L	Ε	Ρ	L	Ε	Ρ
Compulsory engineering modules		66																		
Drive Systems	6	6	3	2	1															
Advanced Mathematics	6	6	4	2	0															
Multibody Simulation	5	6	2	1	2															
Developments in Computer Science	4	6				2	1	1												
Modern Programming Concepts	5	6				2	1	2												
Operations Research	5	6							3	1	1				******			00		
The German Legal System and Product Liability	4	6							3	1	0									
Robotics	5	6							2	1	2									
Application of Numerical Software	5	6										2	1	2						
Management Skills – Organisation and Leadership	5	6													3	2	0			
Machine Tools	6	6						*****							3	1	2			
Compulsory elective engineering modules		12																		
Compulsory elective engineering module 1		6										х	х	х						
Compulsory elective engineering module 2		6													х	х	х			
Practical modules		42																		
Project Report		6				x	х	х												
Scientific Project		6										x	x	x						
Master Thesis		25																х	х	x
Colloquium		5																х	х	x
	·	120	<u> </u>									4.1			F (1					
Catalogue of compulsory elective engineer	ING MO	r		1	r		r	r		—		4tr L	······	ş	5tł				r	
Ashrana ad Eustich		-	-				000000			-			8	1	L	E	Ρ			<u> </u>
Advanced English	4	6										0	ļ	Į						
Knowledge-Based Engineering	5	6									·····	2	1	2						
Advanced Finite Element Methods	5	6		<u> </u>											2	1	2			

Apart from the compulsory elective engineering modules, mentioned, students may also opt to take any of the elective or compulsory engineering modules from the other specialisations. In these cases, however, the Department of Mechanical Engineering is unable to guarantee that there will be no timetable clashes.

- Specialisation in Product Development - Part-Time

Subjects			1s	t se	em.	2no	d se	em.	3rc	d se	em.	4th	n se	em	. 5t	h se	em.	6th	n se	em.
	HPW	СР	L	E	Ρ	L	Е	Ρ	L	E	Ρ	L	Е	P	L	E	Ρ	L	E	Ρ
Compulsory engineering modules		66																		
Drive Systems	6	6	3	2	1															
Advanced Mathematics	6	6	4	2	0									T	***		1			
Advanced Technical Mechanics	5	6	3	2	0															
Piston Engines	6	6				3	1	2												
Dynamics of Machines	5	6				3	2	0												
Conveying Technology	5	6							2	2	1									
Advanced Fluid Machines	6	6							3	2	1			T			Γ			
The German Legal System and Product Liability	4	6							3	1	0									
Integrated Product Development	5	6										3	2	0						
Management Skills – Organisation and Leadership	5	6													3	2	0			
Machine Tools	6	6													3	1	2			
Compulsory elective engineering modules		12																		
Compulsory elective engineering module 1		6										х	x	x						
Compulsory elective engineering module 2		6													x	x	х			
Practical modules		42																		
Project Report		6				х	х	x												
Scientific Project		6										х	x	x						
Master Thesis		25																х	х	x
Colloquium		5																х	х	x
		120																		
Catalogue of compulsory elective engineer	ring mo	odules										4th	n se	em	. 5t	h se	əm.			
	HWP	СР										L	Е	Р	L	E	Ρ			
Advanced English	4	6										0	4	0						
Material Flow Seminar	4	6										1	1	2						
Polymer Engineering	5	6										3	1	1						
Technology of Mechanisms	5	6						ļ		ļ	ļ				3	2	0			
reconnology of Mechanilania	5	0		I]]]			1	13	14	10		ļ	ļ

Apart from the compulsory elective engineering modules, mentioned, students may also opt to take any of the elective or compulsory engineering modules from the other specialisations. In these cases, however, the Department of Mechanical Engineering is unable to guarantee that there will be no timetable clashes.

Master Business Administration & Engineering majoring in Mechanical Engineering

Subjects			1s	t se	m.	2n	d se	m.	3r	d se	m.	4t	h se	m.
	HWS	СР	L	E	Ρ	L	E	Ρ	L	E	Ρ	L	E	Ρ
Compulsory economics modules, see ITB		49	х	х	х	х	х	х	х	х	х			
Compulsory elective economics modules, see ITB		20	х	х	х	х	х	х	х	х	х			
Compulsory elective engineering modules		20	х	х	х	х	х	х	х	х	х			
Practical modules		31												
Project Report		5										х	х	х
Master-Thesis		23										Х	х	х
Colloquium		3										х	x	х
		120												
Catalogue of compulsory elective engineering mod	dules			ç		S	SuS	e	۱	NiS	e			
	HWS	СР				L	E	Ρ	L	E	Ρ			
Agricultural Process Technology	5	6			ļ	3	1	1		ļ			ļ	
Plant Design	4	6			ļ	3	1	0		ļ			L	
Application of Numerical Software	5	7		ļ	ļ	2	1	2		ļ			L	
Fatigue strength and durability	5	6		ļ	ļ	3	1	1		ļ			ļ	ļ
Developments in Computer Science	4	6				2	1	1						
Material Flow Seminar	4	6			ļ	1	1	2		ļ			L	
Integrated Product Development	5	6				3	2	0						
Knowledge Based Engineering	5	6				2	1	2						
Piston Engines	6	6				3	1	2						
Polymer Engineering	5	6				3	1	1						
Agricultural Engineering 2	5	6				3	1	1						
Dynamics of Machines	5	6				3	2	0						
Automotive Engineering	5	6		ļ	ļ		ļ	ļ	3	1	1		ļ	ļ
Conveying Technology	5	6							2	2	1			
Technology of Mechanisms	5	7							3	2	0			
Advanced Finite Element Methods	5	6							2	1	2			
Agricultural Engineering 1	5	6							3	1	1			
Operations Research	5	6							3	1	1			
Renewable Resources	5	7							3	1	1			
Robotics	5	7							2	1	2			
Machine Tools	6	6							3	1	2			

Master – module descriptions

Advanced English

1.1 Title of module (GER / ENG) Advanced English / Advand	ced English (B2/C	:1)	1.2 Short descrip	tion (optional)		1.3 Mod HIO) MB.2.	ule code (from 0005
2.1 Cycle of module: Every summer semester Every Other cycle, namely:	winter semester		2.2 Duration of m				
3.1 Module offered in the following de	egree programme(s):		3.2 Compulsory (elective (E)	C), compulsory elect	ive (CE),	3.3 Reco semeste	mmended r:
Master's programmes:							
Mechanical Engineering							
- Specialisation Agricultural E	Engineering			CE		2+3 (FT)/ 4+5 (PT)
Mechanical Engineering				05		2.24	
- Specialisation Computation	al Engineering			CE		2+3 (FT)/ 4+5 (PT
Mechanical Engineering				CE		2.21	
- Specialisation Product Deve	elopment			CE		2+3 (FT)/ 4+5 (PT)
Master Business Administrat	tion & Engineering	majoring in					
Mechanical Engineering							
Workload					1		
		- L				Total wo	
	Method of teaching	Hours per week p (SWS) for each m	ethod of teaching	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workloa hours Total cont non-conta	act and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Seminar	· · · · · · · · · · · · · · · · · · ·	4	60			
	Total	Total contact hours i	in SWS	Total contact hours in hours 60			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			120	1	80	6
	Total			Total non-contact hours 120			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to express engineering issues, both verbally and in writing, in English. They will be able to solve specialist communicative tasks such as graphically displayed data, technical explanations and project descriptions with a view to scientific publications in an international professional field. In addition, students will be able to maintain professional contacts in the foreign language correctly and confidently in terms of language and style.

5.2 Course content

Students systematically develop their ability to write texts and to give oral presentations of technical issues. They will tackle sample texts and create texts related to their own practical experience. They will simulate professional communication situations. The course prepares students for an internationally recognised external examination. In this context, grammatical structures will be specifically refreshed. Special attention is paid to achieving intercultural understanding.

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

You continue to develop your English skills and solve technical/communication tasks. Examples include technical documentation or project descriptions for international use, and scientific publications.

6.1 Prerequisites (*formal*: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

Recommended: English (Level B2)

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) **Written examination or presentation**

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the lecture

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module: ☐ German ⊠ English ☐ Other, namely:

7.2 Module Contact Person: H. Ermen M.A., J.-C. A. Gockel M.A., Dr. A. Hövener M.A.

7.3 Professors (optional):

H. Ermen M.A., J.-C. A. Gockel M.A., Dr. A. Hövener M.A.

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Advanced Finite Element Methods

1 1.1 Title of module (GER / ENG) Höhere FEM / Advanced Finite Element N	lethods		1.2 Short	description (optiona		odule code (from HIO) 2.0022
2 2.1 Cycle of module: DEVERY summer semester DEVERY wint Other cycle, namely:	ter semester			on of module: ester 🗌 2 semesters	s	
3 3.1 Module offered in the following degree	e programme(s):			ulsory (C), compulso CE), elective (E)	ry 3.3 Re	ecommended semester:
Master's programmes:						
Mechanical Engineering						
- Specialisation Agricultural Eng	ineering					
Mechanical Engineering				CE		3 (FT) / 5 (PT)
- Specialisation Computational I	Engineering			CL		3(FI)/ 3(FI)
Mechanical Engineering				CE		3 (FT) / 5 (PT)
- Specialisation Product Develop	oment			CL		3(FI)/ 3(FI)
Master Business Administration Mechanical Engineering	n & Engineering majoring	g in		CE		3
4 Workload					T . 1 .	da se d la sed
		1				al workload
	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	2	2	30		
	Exercise	1	L	15		
	Practical course	2	2	30	-	
	Total	Total contac SWS	t hours in	Total contact hours in hours 75	-	
(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	180	6
	Total			Total non-contact hours 105	-	

5 5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to describe static and dynamic finite element analysis simulations for single components and assemblies by means of linear algebra, create them using the NX software program, and assess their results. This approach is one of the key steps in designing mechanical components in companies, and is therefore an important aspect of product development.

During lectures and the practical course, students will be enabled to classify challenging issues from the technical area for FEM simulations, and to generate corresponding models. They will be able to differentiate between different groups of nonlinearities in FEM, and to describe and assess the resulting numerical problems. They will be able to develop, analyse and assess manually created FEM calculations on the topics of heat conduction, convection, natural oscillations, buckling, contact and dynamics. They will use different algorithms to model contact, and will be able to assess them and

apply them to new issues. They will be able to incorporate classifiable material nonlinearities into existing and self-developed FEM models. They will be able to independently create the structure, content, etc. of the element stiffness matrices, heat conduction matrices, convection matrices, mass matrices, damping matrices, geometric stiffness matrices, overall stiffness matrices and load vectors necessary for FEM calculations, also using the functional approach. Students will also be able to analyse and assess boundary conditions and FEM meshes, and to create appropriate meshes and boundary conditions for new issues. They will be able to understand and illustrate the algorithms required to solve nonlinear systems, and to control them. They will also be able to detect and assess explicit and implicit solver algorithms, and to select solver algorithms on the basis of complex issues. In addition, students will be able to apply the Ritz method, which is relevant to FEM, as well as the Galerkin method. The practical course enables students to develop and apply solution strategies for the set tasks that build on the specialist knowledge gained in the lectures, and to formulate and present the results to suit the target group. Students will be able to use the Siemens NX program package, comprising the pre- and post-processor and the NASTRAN, ADINA or ABAQUS solvers, to construct models for given issues, and to conduct simulations with appropriate linkages. Students will be able to analyse, assess and explain the simulation results. They will also be able to draw conclusions for construction design. 5.2 Course content Field problems (e.g. heat conduction) • **Dynamics** • Nonlinear phenomena (contact, material nonlinearities, geometric nonlinearities) • Speeding up simulations . Numerical aspects • **Ritz method** . Application of the software package, comprising the pre- and post-processor NX and the . NASTRAN/ADINA or ABAQUS solvers, to issues related to the presented topics Details available in the university calendar, course timetable, etc 5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms Using an established FEM software program, you carry out static and dynamic simulations. This is important for the design of mechanical components, preparing you for your future career in production and with companies. 6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acauired:) None 6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination 6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages) 6.4 Requirements for admission to examination See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work 6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhnuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2.7 7.1 Languages used in the module: German English Other, namely: 7.2 Module Contact Person: Professor Dr. rer. nat. E. Finke 7.3 Professors (optional): Professor Dr. rer. nat. E. Finke 7.4 Maximum number of participants (optional) 7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Lecture and practical course notes P. Steinke, Finite-Elemente-Methode (Rechnergestützte Einführung), Springer

Advanced Fluid Machines

1.1 Title of module (GER / ENG) Höhere Strömungsmaschir Advanced Fluid Machines	nen /	:	L.2 Short	description (optiona		dule code (from HIO) 2.0025
2.1 Cycle of module: Every summer semester Every wint Other cycle, namely:	ter semester			ion of module: ester 🗌 2 semester:	5	
3.1 Module offered in the following degree	e programme(s):			ulsory (C), compulso CE), elective (E)	ry 3.3 Red	commended semester:
Master's programmes:						
Mechanical Engineering				6		4 (FT) / 2 (DT)
- Specialisation Agricultural Eng	ineering			С		1 (FT) / 3 (PT)
Mechanical Engineering						
- Specialisation Computational I	Engineering					
Mechanical Engineering	<u> </u>					
- Specialisation Product Develop	oment			С		1 (FT) / 3 (PT)
Master Business Administration		z in				
Mechanical Engineering		5 '''				
Workload						
					Total	workload
	Method of teaching	Hours per v	veek per	Hours per	Workload in	ECTS (credit points)
		semester (S each metho teaching	1	semester for each method of teaching (usually the number of hours per week multiplied by 15)	hours Total contact and non-contact hours	30 hrs usually correspor to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	3		45		
period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	2		30		
	Practical course	1		15		
	Total	Total contact SWS	hours in	Total contact hours in hours 90		
(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			90	180	6
	Total			Total non-contact hours		

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to express the basic relationships of energy conversion for key turbomachines such as gas, steam and wind turbines, and to independently conduct energy analyses. They will be able to undertake the geometric and fluid flow design of impellers and volutes using selected examples, and to illustrate the principles of the main control methods.

The practical course enables students to independently conduct experiments, to adjust experimental setups according to parameters, and to operate and calibrate electronic measuring instruments. They will also be able to conclusively follow up experiments. This includes mathematical data preparation, the extraction of important variables and, in particular, the complete and clearly structured documentation and presentation of experiments.

5.2 Course content

Fluid flow design and the calculation of impellers, cascades, nozzles and diffusors; water turbines; steam and gas turbines; hydrodynamic couplings and transmissions; wind turbines; use and conditions of the main regulatory procedures; use of conversion processes, similarity laws and characteristic diagrams

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

You recognise the key relationships of energy conversion in the most commonly used turbo machinery. You also design impellers and volute casings from a fluidic perspective.

6.1 Prerequisites (*formal*: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. H.-A. Jantzen

7.3 Professors (optional):

Professor Dr.-Ing. H.-A. Jantzen

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Advanced Mathematics

Höhere Mathematik / Adva	nced Mathematics			description (optiona	1)	1.3 Mod MB.2.	ule code (from HIO) 0024
2.1 Cycle of module: Every summer semester Every wir Other cycle, namely:	nter semester			ester 🗌 2 semester	5		
3.1 Module offered in the following degree	ee programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semester:
Master's programmes:							
Mechanical Engineering				С		1	(FT) / 1 (PT)
 Specialisation Agricultural Eng 	gineering			C		-	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Mechanical Engineering				С		1	(FT) / 1 (PT)
- Specialisation Computational	Engineering			_			(
Mechanical Engineering				С		1	(FT) / 1 (PT)
- Specialisation Product Develo							
Master Business Administration	n & Engineering majoring	gin					
Mechanical Engineering							
workiddu						Total w	orkload
	Method of teaching	Hours per semester each meth teaching	(SWS) for	Hours per semester for each method of teaching (usually the number of hours per used	Workloa hours Total cont non-conta	act and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
				of hours per week multiplied by 15)			
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture		4	60			
period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise		2	30	-		
	Total	Total contac SWS	ct hours in	Total contact hours in hours 90	-		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			90	1	80	6
	Total			Total non-contact hours 90			

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	5.2 Course content
	Linear algebra:
	LU decomposition, abstract vector spaces, representation of coordinates, coordinate transformations,
	decomposition of ZAS, homomorphisms, equivalence transformation, endomorphisms, similarity transform,
	diagonalisation, Markov processes, decoupling of linear systems of equations
	Analysis:
	Nonlinear transformations, functional determinants, integral transformation, integral theorems,
	Fourier series, Fourier transform, applications
	ightarrow Details available in the university calendar, course timetable, etc.
	5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. Based upon the basic knowledge of various areas of mathematics in the bachelor program, this module deepens
6	knowledge in some specific sub-areas of applied mathematics. 6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have
0	been acquired:)
	None
	6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
	Students must pass the examination
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
	The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term
	paper (approx. 10 pages)
	6.4 Requirements for admission to examination
	See current version of the Examination Regulations / special examination rules and regulations
	6.5 Module mark weighting for calculating final grade
	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module:
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module:
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module:
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module:
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtiliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module:
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module:
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: German
7	6.5 Module mark weighting for calculating final grade See Examination Regulations of al degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: See Eran Serie Section 3).* Section
7	6.5 Module mark weighting for calculating final grade See Examination Regulations of above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtiche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: See France Section 3).*
7	6.5 Module mark weighting for calculating final grade See Examination Regulations of al degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: See Eran Serie Section 3).* Section
7	6.5 Module mark weighting for calculating final grade See Examination Regulations of above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtiche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: See France Section 3).*
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *'ou will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module:
7	6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *'vou will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: ☑ German ☐ English ☐ Other, namely: 7.2 Module Contact Person: Professor Dr. rer. nat. L. Göllmann 7.3 Professors (optional): Professor Dr. rer. nat. L. Göllmann 7.4 Maximum number of participants (optional) 7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Recommended reading: BARTSCH, H. J., Taschenbuch mathematischer Formeln. Fachbuchverlag Leipzig/Hanser BRONSTEIN et al., Taschenbuch der Mathematik. Verlag Harri Deutsch GÖLLMANN, L., Lineare Algebra – Im algebraischen Kontext, Springer Verlag GÖLLMANN, L., Henig Ch., Arbeitsbuch zur Linearen Algebra, Springer Verlag
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Advanced Technical Mechanics

1.1 Title of module (GER / ENG) Höhere Technische Mecha Advanced Technical Mech			1.2 Short	description (optiona		1.3 Mod MB.2.	ule code (from HIO) 0027
2.1 Cycle of module: Devery summer semester Devery win Other cycle, namely:	nter semester			ion of module: ester 🗌 2 semesters	5		
3.1 Module offered in the following degre	ee programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semester:
Master's programmes:							
Mechanical Engineering				6		1	(FT) / 1 (PT)
- Specialisation Agricultural Eng	gineering			C		1	(FT) / 1 (PT)
Mechanical Engineering							
- Specialisation Computational	Engineering						
Mechanical Engineering				6			
- Specialisation Product Develo	pment			С		1	(FT) / 1 (PT)
Master Business Administration	•	z in					
Mechanical Engineering		5					
Workload							
						Total w	vorkload
	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week	Workload hours Total contac non-contac	ct and	ECTS (credit points) 30 hrs usually correspon to 1 credit point; whole numbers only
				multiplied by 15)			
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture		3	45			
period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise		2	30			
	Total	Total contac SWS	t hours in	Total contact hours in hours	-		
				75	_		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	18	80	6
	Total			Total non-contact	-		
	- Cul			hours 105			

5 5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to reproduce methods of analytical mechanics, i.e. advanced strength of materials in continuum, and to relate principles of mechanics, complementing their knowledge of classical mechanics. In addition, the analytical nature of the module will enable students to increase their capacity for abstract and lateral thinking by encouraging them to independently apply the specialist knowledge gained to technical problems. Students will be able to identify frequently occurring problems encountered in mechanics, and to calculate them using the solution methods they have learned. Besides being conversant with methods from the area of continuum mechanics and numerical mechanics, students who complete this module will be able to decide independently on the appropriate use of these methods.

 Mechanical principles: The principle of virtual displacements, the principle of virtual forces, the Lagrangian version of d'Alembert's principle, Lagrangian equations of motion. Stability of mechanical systems (potential analysis) Advanced strength of materials: Material laws in continuum, Airy stress function Numerical methods: Approximation methods in mechanics (difference quotients and matrices, modal analysis) A petalls available in the university calendar, course timetable, etc. 3 Short information about module (this section (max. 250 characters) will be published on the FH Minister website to help people interested in studying at FH Munister to choose in eight degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course study and the labour market. Please write whole senteres, address you (prospective) sublends of methy and avoid technical terms. Studiling on classical mechanics, which you are familiar with, you now focus on methods of analytical mechanics. <i>You</i> identify frequently occurring problems from this field, and calculate solution variants using methods you have earned. A Prerequisites (formal: examination of module XY has to be passed or similar <u>content-wise</u>, module XY should have been attended, the following knowledge and skills should have been attended, the following knowledge and skills should have been attended. Therequisites (formal: examination, oral examination, sex successful completion of assignments in the course of study, regular active participation) tudents must pass the examination and examination, term paper, presentation, portfolio, length of examination in minutes) The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages) 4 Requirements for admission to examin	
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.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- nuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 1.1 Languages used in the module: German English Other, namely: .2 Module Contact Person: Professor DrIng. J. Hartleb .3 Professors (optional):	
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See Examination Regulations for above-mentioned degree programmes (Section 3).* You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- You will find the Examination Regulations of the module: You will find the Examination Regulations of the module: You will find the Examination Regulations of the module: You degree Contact Person: Professor DrIng. J. Hartleb .3 Professors (optional):	
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Auenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.	See Examination Regulations for above-mentioned degree programmes (Section 3).*
.1 Languages used in the module: German English Other, namely: .2 Module Contact Person: Professor DrIng. J. Hartleb .3 Professors (optional):	*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
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.2 Module Contact Person: Professor DrIng. J. Hartleb .3 Professors (optional):	
Professor DrIng. J. Hartleb .3 Professors (optional):	7.2 Module Contact Person:
.3 Professors (optional):	Professor DrIng. J. Hartleb
/ Maximum number of participants (optional)	7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Agricultural Engineering 1

1.1 Title of module (GER / ENG) Landmaschinentechnik 1 / Agricultural Engineering 1			1.2 Short	description (optiona		Module code (from HIO) 3.2.0037
2.1 Cycle of module: DEvery summer semester Every wint Other cycle, namely:	ter semester			ion of module: ester 🗌 2 semester	s	
3.1 Module offered in the following degree	e programme(s):			ulsory (C), compulso CE), elective (E)	ory 3.3 I	Recommended semester
Master's programmes:						
Mechanical Engineering				C		1 /FT) / 2 /DT)
- Specialisation Agricultural Eng	ineering			C		1 (FT) / 3 (PT)
Mechanical Engineering						
- Specialisation Computational	Engineering					
Mechanical Engineering						
- Specialisation Product Develop	oment					
Master Business Administration		in		07		2
Mechanical Engineering				CE		3
Workload						
					To	tal workload
	Method of teaching	Hours per semester each meth teaching	(SWS) for ood of	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact an non-contact hou	
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	3	3	45		
period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	:	L	15		
(more rows can be added)	Practical course	:	L	15	-	
	Total	Total contac SWS	t hours in	Total contact hours in hours 75		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	180	6
	Total			Total non- contact hours 105		

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to formulate the requirements regarding equipment and machinery with the intended use in mind, taking into account the different agronomic conditions and work objectives, and, on this basis, to substantiate the selection and settings of appropriate equipment and equipment combinations. They will be able to thoroughly assess the potential and application limits.

Thanks to their understanding of the structure and functioning of the equipment under consideration, students will be able to independently formulate suggestions for the further development and optimisation of machinery in their future career.

The practical courses enable students to expand on the basic and broader possibilities offered by

setting the equipment and machinery accordingly, using a selection of examples. In this way, their independent working style and their capacity for teamwork are actively promoted. 5.2 Course content Agricultural soils and their properties . Fundamentals of tractor engineering and connection of devices • Precision farming, parallel guidance systems, basics of ISOBUS . Machines for tillage . . Crop sequences and integrated plant cultivation → Details available in the university calendar, course timetable, etc. 5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms What requirements do agricultural equipment and machinery have to meet? You take a close look at the specific purposes, select adequate equipment and equipment combinations, and make task-specific adjustments. 6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) None 6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination 6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages) 6.4 Requirements for admission to examination See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work 6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhnuenster.de/hochschule/aktuelles/amtliche bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: 🛛 German 🗌 English 🗌 Other, namely: 7.2 Module Contact Person: Professor Dr.-Ing. M. Große Gehling 7.3 Professors (optional): Professor Dr.-Ing. M. Große Gehling 7.4 Maximum number of participants (optional) 7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Agricultural Engineering 2

1.1 Title of module (GER / ENG) Landmaschinentechnik 2 / Agricultural Engineering 2			1.2 Short	description (optiona	-	dule code (from HIO) .0038
2.1 Cycle of module: Every summer semester Every wint Other cycle, namely:	ter semester			ion of module: ester 🗌 2 semester	s	
3.1 Module offered in the following degree	e programme(s):			ulsory (C), compulso CE), elective (E)	ory 3.3 Rec	ommended semester
Master's programmes:						
Mechanical Engineering				C		
- Specialisation Agricultural Eng	ineering			C		2 (FT) / 4 (PT)
Mechanical Engineering						
- Specialisation Computational I	Engineering					
Mechanical Engineering	-					
- Specialisation Product Develop	oment					
Master Business Administration	& Engineering majoring	in		CE		2
Mechanical Engineering				CE		Z
Workload						
		-			Total	workload
	Method of teaching	Hours per semester (each meth teaching	SWS) for od of	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	3	8	45		
period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	1	L	15		
(more rows can be added)	Practical course	1	L	15		
	Total	Total contac SWS	t hours in	Total contact hours in hours 75		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	180	6
	Total			Total non- contact hours		

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to formulate the requirements regarding equipment and machinery with the intended use in mind, taking into account the different agronomic conditions and work objectives, and, on this basis, to substantiate the selection and settings of appropriate equipment and equipment combinations. They will be able to thoroughly assess the potential and application limits.

Thanks to their understanding of the structure and functioning of the equipment under consideration, students will be able to independently formulate suggestions for the further development and optimisation of machinery in their future career.

The practical courses enable students to expand on the basic and broader possibilities offered by

setting the equipment and machinery accordingly, using a selection of examples. In this way, their independent working style and their capacity for teamwork are actively promoted.

5.2 Course content

- Machinery for the production of cereals (drilling machines, field sprayers, self-propelled harvesters)
- Machinery for the production of maize and sugar beet (precision seed drills and forage harvesters)
- Fertilisation
- Selected chapters on tractor engineering
- Selected chapters on machinery for the production of potatoes
- Selected chapters on forage harvesting

 \rightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

Building on the previous module "Agricultural Machinery Technology 1", you deepen your knowledge in this subject area until you are able to independently draw up proposals for the further development and optimisation of agricultural machinery.

6.1 Prerequisites (*formal*: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-

muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2, 7.1 Languages used in the module:

German English Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. M. Große Gehling

7.3 Professors (optional):

Professor Dr.-Ing. M. Große Gehling

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Agricultural Process Technology

1.1 Title of module (GER / ENG) Agrarverfahrenstechnik / Agricultural Process Techr	nology		1.2 Short descrip	tion (optional)		1.3 Mod HIO) MB.2.	lule code (from .0006
2.1 Cycle of module: Every summer semester Every Other cycle, namely:	winter semester		2.2 Duration of n				
3.1 Module offered in the following de	egree programme(s):		3.2 Compulsory (elective (E)	C), compulsory electi	ive (CE) ,	3.3 Reco semeste	ommended er:
Master's programmes:							
Mechanical Engineering				6		21	
- Specialisation Agricultural E	Engineering			C		2(FT) / 2 (PT)
Mechanical Engineering							
- Specialisation Computatior	al Engineering						
Mechanical Engineering							
 Specialisation Product Deve 	elopment						
Master Business Administrat	ion & Engineering	majoring in		CE		2	
Mechanical Engineering				CL			
Workload					<u> </u>	T I	al la cal
	Method of teaching	Hours per week per semester		Hours per Work		Total workload oad in ECTS (credit	
			ethod of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and non-contact hours		points) 30 hrs usually correspond to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course,	Lecture		3	45			
practical period/internship, group work, project work, case study, simulation game,	Exercise		1	15			
credited tutorial (more rows can be added)	Practical course		1	15	-		
	Total	Total contact hours	in SWS	Total contact hours in hours 75	180		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105			6
	Total			Total non-contact hours 105			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to describe, analyse and assess various unit operations of agricultural process engineering for post-harvesting processes such as drying, storage or milling. They will also be able to develop related processes in agricultural machines such as spraying and separating or in farm operation processes such as heat transfer or conveying. Students will be able to independently generate, analyse, assess and present experimental data. The topics of the module enable students to analyse and assess agricultural machines and processes from a different perspective to that of constructional mechanical engineering.

The practical courses enable students to understand the implementation and assessment of agricultural process engineering applications. To achieve this, selected unit operations are conducted

independently in small groups as experiments, including the relevant methods of analysis, which are evaluated and assessed by them, and presented in the form of a report. Compulsory attendance is required to achieve this goal.

5.2 Course content

- Characterisation of disperse and fluid agricultural materials
- Processes for preparation and storage of agricultural products (purification, drying, milling, silo technology)
- Conveying of liquid and bulk solid materials
- Special processes in mobile and stationary agricultural applications

 \rightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

Enginering processes like drying or storage have the same importance in agronomy like analytical methods for characterization of products, soils and crops. You assess and optimize appropriate processes and machines.

6.1 Prerequisites (*formal*: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

Fundamentals of fluid dynamics and thermodynamics are required

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module: ☑ German □ English □ Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. J. Scholz

7.3 Professors (optional):

Professor Dr.-Ing. J. Scholz / Dipl.-Ing. M. Mangelmann

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Application of Numerical Software

1 1.1 Title of module (GER / ENG) Anwendung Numerische Application of Numerical			1.2 Short	description (optional)	1.3 Module code MB.2.0009	(from HIO)	
2 2.1 Cycle of module: Every summer semester Every w Other cycle, namely:	Every summer semester Every winter semester 2 sem						
3 3.1 Module offered in the following deg	ree programme(s):			ulsory (C), compulsory CE), elective (E)	3.3 Recommende	d semester:	
Master's programmes:							
Mechanical Engineering							
- Specialisation Agricultural E	ngineering						
Mechanical Engineering				•	a / FT		
- Specialisation Computationa	- Specialisation Computational Engineering			C	2 (FT) / 4 (PT)		
Mechanical Engineering							
- Specialisation Product Deve	lopment						
Master Business Administrati Mechanical Engineering	on & Engineering majori	ng in		CE		2	
4 Workload			1		Total workload		
	Method of teaching	Hours per semester (each meth teaching	(SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only	
Contact hours (e.g. lecture, seminar, practical course,	Lecture		2	30			
practical period/internship, group work,	Exercise	:	1	15			
project work, case study, simulation game, credited tutorial (more rows can be added)	Practical course		2	30			
	Total	Total contac SWS	ct hours in	Total contact hours in hours 75	- 180	6	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	100	0	
	Catch-up of technical content (MaBA&E only)		(30)		MaBA&E (210)	MaBA&E (7)	
	Total			Total non-contact hours 105			
				MaBA&E (135)			

	1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)
	technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?) After successful completion of the module, students will be able to
	 Apply different methods for solving differential equation systems, classify those systems,
	and select an appropriate numerical solution method. Course participants will be able to
	assess each of the methods with regard to aspects such as stability. In addition, students
	will be able to plan the implementation of algorithms in a numerical software program,
	and develop the corresponding programs.
	classify those methods, and to select an appropriate numerical solution method. Students will be able to
	assess each of the methods with regard to their numerical advantages. Moreover, students will be able to
	structure the implementation of the methods, and develop corresponding programs.
	Classify signal processing methods (acoustic signals and image signals), interpret
	important theorems such as the sampling theorem, and formulate the resulting
	hypotheses for signal filters. In addition, students will be able to develop small
	executable signal processing programs.
	Illustrate nonlinear optimisation methods with and without constraints. They will be able to formulate
	necessary and adequate optimality conditions, and to solve optimisation problems using numerical
	methods.
	Characterise methods for formulating optimal control processes, for discretisation and for setting relevant
	high-dimensional, nonlinear optimisation problems. They will be able to numerically treat discretised
	optimal control problems using powerful software packages, and to critically assess the solutions obtained.
	The individual processes and methods described above are implemented in executable
	computer programs in the practical course.
	2 Course content
	······································
•	 Nonlinear optimisation with constraints, Karush–Kuhn–Tucker conditions
	 Optimisation of dynamic systems, discretisation of optimal control processes
	Details available in the university calendar, course timetable, etc. 3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose
th	e right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course
	study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
	lumerical methods are the basis for the mathematical solution of complex mechanical problems. You plan the
	nplementation of algorithms in a numerical software program, and develop small executable programs.
66.	
ho	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have
	1 Prerequisites (<i>formal</i> : examination of module XY has to be passed or similar <u>content-wise</u> ; module XY should have been attended, the following knowledge and skills should have been acquired:)
N	1 Prerequisites (<i>formal</i> : examination of module XY has to be passed or similar <u>content-wise</u> ; module XY should have been attended, the following knowledge and skills should have sen acquired:)
N 6.	 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) Ione 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
6. S	 1 Prerequisites (<i>formal</i>: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:) 1 Prerequisites (<i>formal</i>: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:) 1 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination
6. S 6.	Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
N 6. 6. T	 1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have een acquired:) 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term
О 6. 6. Т	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have een acquired:) 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) 4 he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages)
N 6. 5 6. T 6.	 1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) 2 Requirements must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination
N 6. 5 6. 7 6. 5	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination Regulations / special examination rules and regulations
0. 6. 7 9 6. 8 8	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations eegular participation in the practical course and recognition of associated work
N 6. 5 6. 7 6. 8 6.	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) 1000 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations eegular participation in the practical course and recognition of associated work 5 Module mark weighting for calculating final grade
N 6. 5 6. 7 8 6. 8 8 8	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations eegular participation in the practical course and recognition of associated work
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N 6. 6. 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 7 7 7	1 Prerequisites (<u>formal</u> : examination of module XY has to be passed or similar <u>content-wise</u> ; module XY should have been attended, the following knowledge and skills should have been acquired:) Ione 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations tegular participation in the practical course and recognition of associated work 5 Module mark weighting for calculating final grade ee Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- uenster.de/hochschule/aktuelles/amtine_bekanntmachungen/index.php?p=2,7. 1 Languages used in the module:
N 6. 5 6. T p 6. 5 8 R 6. 5 8 m 7.	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) Ione 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations (segular participation in the practical course and recognition of associated work 5 Module mark weighting for calculating final grade ee Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-uenster.et.et.ebekantite.eb
N 6. 6. 7 0 6. 7 7. 7 7. 7 7.	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have een acquired:) Ione 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations (segular participation in the practical course and recognition of associated work 5 Module mark weighting for calculating final grade ee Examination Regulations of above-mentioned degree programmes (Section 3).* You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-uenster.de/hochschule/aktuelles/amtliche_bekantmachungen/index.php?p=2,7. 1 Languages used in the module: German [English] Other, namely: 2 Module Contact Person:
N 6. 5 6. 7 8 8 8 8 8 8 8 8 7 7 7. 2 7. 2 7. 2	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) Ione 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations (segular participation in the practical course and recognition of associated work 5 Module mark weighting for calculating final grade ee Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-uenster.et.et.ebekantite.eb
N 6. S 6. T P 6. S R 6. S 8 *YY 7 7. 7 7. 7 7. 7 7. 7 7. 7 7.	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) Ione 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations (egular participation in the practical course and recognition of associated work 5 Module mark weighting for calculating final grade ee Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-uenster.de/hochschule/aktuelles/amtliche_bekantmachungen/index.php?p=2,7. 1 Languages used in the module: 3 German [_English [_Other, namely: 2 Module Contact Person: rofessor Dr. rer. nat. E. Finke, Professor Dr. rer. nat. L. Göllmann 3 Professors (optional):
N 6. 5 6. 7 0 6. 8 8 8 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:) Ione 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination 3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations egular participation in the practical course and recognition of associated work 5 Module mark weighting for calculating final grade ee Examination Regulations of al degree programmes in the official announcements of FH Münster: https://www.fh- uenster.de/hochschule/aktueles/amtlich_bekantmachungen/index.php?p=2,7. 1 Languages used in the module: 3 German _ English _ Other, namely: 2 Module Contact Person: rofessor Dr. rer. nat. L. Göllmann
N 6. 5 6. 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended, the following knowledge and skills should have been actended. 2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) tudents must pass the examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) he module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination ection (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term aper (approx. 10 pages) 4 Requirements for admission to examination Regulations of special examination rules and regulations (20 - 45 minutes) or a term aper (approx. 10 pages) 5 Module mark weighting for calculating final grade examination Regu
N 6. 5 6. 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have en acquired:

Automotive Engineering

1.1 Title of module (GER / ENG) Fahrzeugtechnik / Automoti	ve Engineering		1.2 Short	description (optiona	,	1.3 Moo MB.2	dule code (from HIO) .0013
2.1 Cycle of module: Every summer semester Every winte Other cycle, namely:	er semester			ion of module: ester 🗌 2 semester:	5		
3.1 Module offered in the following degree	programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Rec	ommended semester
Master's programmes:							
Mechanical Engineering				CF		2	
- Specialisation Agricultural Engi	neering			CE		3	5 (FT) / 5 (PT)
Mechanical Engineering							
- Specialisation Computational E	ngineering						
Mechanical Engineering							
- Specialisation Product Develop	ment						
Master Business Administration	& Engineering majoring	in		CE			3
Mechanical Engineering				CE			5
Workload					1		
				1			vorkload
	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload hours Total conta non-contad	act and	ECTS (credit points 30 hrs usually correspond to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	:	3	45	-		
period/internship, group work, project work, case	Exercise		1	15			
study, simulation game, credited tutorial (more rows can be added)	Practical course		1	15			
	Total	Total contac SWS	t hours in	Total contact hours in hours 75			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	18	80	6
	Total			Total non- contact hours 105			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to discuss different vehicle designs, taking into account the relevant economic, legal and technical frameworks. They will be able to use the knowledge gained in their future career in order to understand the relevant vehicle design in terms of considering factors concerning cost, weight and structural properties, and to be able to develop and assess alternatives.

The practical courses provide students with an in-depth insight into the technical contexts, as well as specifically promoting their critical reflection of the results obtained, their independent work, and their capacity for teamwork.

5.2 Course content	
Complete vehicle and overview of ca	ar body designs
Wheels and tyres	
Chassis	
• Driving performance and driving res	istance
Vehicle dynamics	
• Venicie dynamics	
ightarrow Details available in the university calendar, course timetable, e	tc.
the right degree. Please focus on the main intended learning outco	characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose omes and course content, ideally also comprising information about the relevance of the module for the further course dress your (prospective) students directly and avoid technical terms.
You focus on the design of vehicles within	n economically, legally and technically specified framework conditions.
You practise thinking in terms of alternat	ives and developing them.
	passed or similar <u>content-wise</u> ; module XY should have been attended, the following knowledge and skills should have
None	
6.2 Requirements for awarding credit points (e.g. final example a second	nination pass, successful completion of assignments in the course of study, regular active participation)
Students must pass the examination	
•	n, oral examination, term paper, presentation, portfolio, length of examination in minutes)
The module is regularly completed with a	written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term
paper (approx. 10 pages)	
6.4 Requirements for admission to examination	
See current version of the Examination R	egulations / special examination rules and regulations
Regular participation in the practical cour	se and recognition of associated work
6.5 Module mark weighting for calculating final grade	
	nentioned degree programmes (Section 3).*
*You will find the Examination Regulations of all degree programm muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/	
 7 7.1 Languages used in the module: 	inuex.pnp: p=2,7.
German English Other, namely:	
7.2 Module Contact Person:	
Professor DrIng. M. Große Gehling	
7.3 Professors (optional):	
Professor DrIng. M. Große Gehling	

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7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Conveying Technology

1.1 Title of module (GER / ENG) Fördertechnik / Conveying	g Technology		1.2 Short	description (optiona	1)	1.3 Mod MB.2.	ule code (from HIO) 0014
2.1 Cycle of module: Every summer semester Every wir Other cycle, namely:	nter semester			ion of module: ester 🗌 2 semesters	5		
3.1 Module offered in the following degree	ee programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semester:
Master's programmes:							
Mechanical Engineering				CE		2	(FT) / 5 (PT)
 Specialisation Agricultural Eng 	gineering			CL		,	
Mechanical Engineering							
 Specialisation Computational 	Engineering						
Mechanical Engineering				с		1	(FT) / 3 (PT)
 Specialisation Product Develo 	•			-			(,)
Master Business Administratio Mechanical Engineering	n & Engineering majoring	g in		CE			3
Workload					1		
							vorkload
	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload hours Total conta non-contad	act and	ECTS (credit points) 30 hrs usually correspon to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture		2 30				
period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise		2	30			
(more rows can be added)	Practical course	:	1	15	-		
	Total	Total contac SWS	t hours in	Total contact hours in hours 75			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	18	30	6
	Total			Total non-contact hours 105	-		

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to develop appropriate materials handling equipment for conveying packaged and bulk goods. Students will be able to independently design the necessary documents for project planning, and to implement them following construction design and calculation. As a result, students will be able, in their future career, to initiate and accompany the development process of a materials handling plant.

The practical course enables students to develop and apply solution strategies for set tasks, building on the specialist knowledge gained during the lectures. By linking the content of the practical course to field trips to representative plants for handling packaged and bulk goods, students will be able to identify and express the industrial significance of the processes taught. 5.2 Course content

Movement analysis, foundations of drives, assemblies and elements of materials handling, calculation standards, handling properties of goods, continuous and intermittent handling equipment, interaction of different materials handling equipment

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

You develop appropriate conveyor systems to ensure that materials get to where they are needed. As a result, you will be able, in your future career, to initiate and accompany the development process of a materials-handling plant.

6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

German English Other, namely:

7.2 Module Contact Person: Professor Dr.-Ing. J. Hartleb

7.3 Professors (optional):

Representation in WiSe 23/24

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Developments in Computer Science

I.1 Title of module (GER / ENG) Developments in Computer 3	Science		1.2 Short	description (optiona		1.3 Modι MB.2.0	Ile code (from HIO)
2.1 Cycle of module: Every summer semester Every winter Dther cycle, namely:				ion of module: ester 🗌 2 semester			
3.1 Module offered in the following degree p	programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Recor	nmended semeste
Master's programmes:							
Mechanical Engineering							
 Specialisation Agricultural Engin 	eering						
Mechanical Engineering				С		21	(FT) / 2 (PT)
 Specialisation Computational Er 	ngineering			C		2	(11)/2(F1)
Mechanical Engineering							
 Specialisation Product Developr 							
Master Business Administration &	& Engineering majoring i	in		CE			2
Mechanical Engineering				-			_
Norkload						Total wo	orkload
	Method of teaching	Hours per	er week per Hours per W		Workload	orkload in hours ECTS (credit	
		semester (each meth teaching	SWS) for	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Total contact	ct and	30 hrs usually correspond to 1 cred point; whole number only
Contact hours e.g. lecture, seminar, practical course, practical	Lecture		2	30			
period/internship, group work, project work, case	Exercise	:	L	15			
tudy, simulation game, credited tutorial (more ows can be added)	Practical course	1	L	15			
	Total	Total contac SWS	t hours in	hours in Total contact hours in hours 60			
e.g. tutorial, preparation, follow-up work, oreparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			120	18	0	6
	Total			Total non- contact hours			

After successful completion of the module, students will be able to evaluate the latest developments in computer science. In addition, they will be able to describe the methods for evaluating computer systems, and to use these appropriately, particularly with respect to projects. They will also be able to evaluate the consequences of using new computing methods. By attending the integrated practical course and by writing a term paper, students learn how to develop and apply solution strategies to the set tasks, building on the specialist knowledge gained. This skill is further promoted by providing intensive support, owing to the up-to-dateness and complexity of the innovations in computer science addressed. In addition, besides acquiring the capability to procure information, students will practice the associated ability to transfer the knowledge to the relevant task. They will be able to formulate and present the results in a media-friendly format to suit the target group.

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	5.2 Course content
	In groups of 2 to 4, students will address current issues of computer science and applications of computer science
	in the field of engineering.
	Tania way and from the fallenting and a
	Topics may come from the following areas:
	Data acquisition
	Data representation
	Information backup
	Information transmission
	Information storage
	Information processing
	The topics addressed reflect progress made in computer science each year, and will change accordingly from year
	to year.
	ightarrow Details available in the university calendar, course timetable, etc.
5	5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose
	the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
	In small groups, you address current issues of computer science and their application in the field of engineering.
_	Besides learning to procure information, you practise transferring your knowledge to relevant tasks.
6	6.1 Prerequisites (<i>formal</i> : examination of module XY has to be passed or similar <u>content-wise</u> ; module XY should have been attended, the following knowledge and skills should have been acquired:)
	None
	None
	6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
	Students must pass the examination
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
	Presentation, video presentation
	6.4 Requirements for admission to examination
	See current version of the Examination Regulations / special examination rules and regulations
	Regular participation in the practical course and recognition of associated work
	6.5 Module mark weighting for calculating final grade
	See Examination Regulations for above-mentioned degree programmes (Section 3).*
	*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
	muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7	7.1 Languages used in the module:
	🗌 German 🖾 English 🗌 Other, namely:
	7.2 Module Contact Person:
	Professor DrIng. M. Thiel
	7.3 Professors (optional):
	Professor DrIng. M. Thiel
I	7.4 Maximum number of participants (optional)
I	
I	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
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Drive Systems

1.1 Title of module (GER / ENG) Antriebssysteme / Drive Sy	ystems		1.2 Short	description (optiona	-	1.3 Modu MB.2.0	ule code (from HIO) DOO8		
- /				2.2 Duration of module: 1 semester 2 semesters					
3.1 Module offered in the following degre	3.1 Module offered in the following degree programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semester:		
Master's programmes:									
Mechanical Engineering				С		1	(FT) / 1 (PT)		
 Specialisation Agricultural Eng 	gineering			C		-	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Mechanical Engineering - Specialisation Computational	Engineering			С		1 (FT) / 1 (PT) 1 (FT) / 1 (PT)			
Mechanical Engineering - Specialisation Product Develo	pment			С					
Master Business Administration Mechanical Engineering	•	g in							
Workload					I	Tatal	orkload		
	Method of teaching	Hours per (semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload Total conta non-contad	ct and	ECTS (credit points) 30 hrs usually correspon to 1 credit point; whole numbers only		
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	3	3	45					
period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	2	2	30					
(more rows can be added)	Practical course	1	L	15	-				
	Total	Total contac SWS	t hours in	Total contact hours in hours 90					
on-contact hours .g. tutorial, preparation, follow-up work, reparation for assignments and homework, isearch, etc.) Preparation for assignments, follow-up work, preparation for examination				90	18	80	6		
	Total			Total non-contact hours 90					

to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to select and design an appropriate drive system for mechanical engineering tasks. In the process, they will be able to recognise new technological developments (e.g. electric mobility) as well as the potential to minimise energy consumption and carbon emissions, and to transfer them to the selected system.

The practical course enables students to expand on and consolidate the specialist knowledge gained in the lectures by applying the knowledge to real systems. In particular, students will be able to conduct, evaluate and interpret series of measurements from a scientific perspective. In the process, the group work will enhance students' team, leadership and communication skills. By independently writing practical course reports, students will be able to prepare experimental results, as well as formulate and visualise the results in a media-friendly format to suit the target group.

5.2 Course content	
Lecture:	
Requirements applying to a drive system	
Criteria for the selection of drive technology	
Hydraulic drive systems: proportional and servo hydraulics, calculation of stationary and dynamic behavior	iour.
application examples	,
Electric drive systems: functional principles, construction, performance data, calculation of stationary an	d
dynamic behaviour, application examples	-
 Drive/load coupling: direct drives, gearbox types, calculation methods 	
 Sensing devices for drive technology 	
 Controlled drive systems 	
Energy efficiency of drive systems	
Exercise class:	
Calculation and design of drive systems on the basis of application examples	
Practical course:	
Independent group-based execution of experiments on drive systems	
 → Details available in the university calendar, course timetable, etc. 	
5 5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster	
the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the furth of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.	er course
To get machinery and plants running, you select suitable drive systems or develop such systems yourself, usin	g new
technological developments (e.g. electromobility) and minimising energy consumption in the process.	Ū
6 6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills shou	ld have
been acquired:)	
None	
6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination	
6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)	
The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a ter	m
paper (approx. 10 pages)	
6.4 Requirements for admission to examination	
See current version of the Examination Regulations / special examination rules and regulations	
Regular participation in the practical course and recognition of associated work	
6.5 Module mark weighting for calculating final grade	
See Examination Regulations for above-mentioned degree programmes (Section 3).*	
*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.	
7 7.1 Languages used in the module:	
German 🗌 English 🗍 Other, namely:	
7.2 Module Contact Person:	
Professor DrIng. D. Scholz	
7.3 Professors (optional):	
Professor DrIng. D. Scholz	
7.4 Maximum number of participants (optional)	
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)	

Dynamics of Machines

	T			r				
1	1.1 Title of module (GER / ENG) Maschinendynamik / Dyna	mics of Machines		1.2 Short	description (optiona	1)	1.3 Mod MB.2.	ule code (from HIO) 0042
2	2.1 Cycle of module:			2.2 Durati	ion of module:		.1	
	Every summer semester Every win Other cycle, namely:	iter semester		🛛 1 sem	ester 🗌 2 semesters	5		
3	3.1 Module offered in the following degre	e programme(s):		3.2 Comp	ulsory (C) , compulso	ry	3.3 Reco	mmended semester:
				elective (CE), elective (E)			
	Master's programmes:							
	Mechanical Engineering							
	- Specialisation Agricultural Eng	gineering						
	Mechanical Engineering							
	- Specialisation Computational	Engineering						
	Mechanical Engineering				С		2	(FT) / 2 (PT)
	- Specialisation Product Develo	pment			C		2	(F1) / 2 (F1)
	Master Business Administration	n & Engineering majoring	g in		CE			2
	Mechanical Engineering				CE			2
4	Workload					1	Tatal	
								vorkload
		Method of teaching	Hours per semester		Hours per semester for each	Workloa hours	din	ECTS (credit points) 30 hrs usually correspond
			each meth	, ,	method of	Total cont		to 1 credit point; whole numbers only
			teaching		teaching (usually the number	11011-001116	centours	numbers only
					of hours per week multiplied by 15)			
	Contact hours	Lecture		3	45			
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work,	Exercise		2	30			
	case study, simulation game, credited tutorial (more rows can be added)			-		-		
	(
		Total	Total contac SWS	t hours in	Total contact hours in hours			
					75			
	Non-contact hours (e.g. tutorial, preparation, follow-up work,	Preparation for			105	1	80	6
	preparation for assignments and homework,	assignments, follow-up						
	research, etc.)	work, preparation for						
		examination						
		Total			Total non-contact			
					hours 105			
5	5.1 Intended learning outcomes (What shou	uld students be able to do after baying	completed th	e module? [e the oppor	tunity to ac	quire soft skills in addition
í	to technical skills? For which other modules and					e the oppoi	tunity to ac	
		بالمعادمة والمام والمراجع	.:	la ta dai	(:	اربوامو ا		i -
	After successful completion of effects in machines. They will I						-	
	influence dynamically oriented	•	-				-	cally
		a mechanical processes i		uture pi	olessional env	nonine		
	5.2 Course content Foundations:							
	Representation of real machin	es on a calculation mod	el (mode	lling). d	etermination o	of parar	neters	for the
	calculation model; dynamic sy					-		

well as with any random external excitation; vibration measurement technology; nonlinear effects.	
Machine installation:	
Active and passive vibration isolation; foundations with shock load	
Rotor dynamics:	
Rigid and flexible rotors, critical rotational speeds, impact of gyroscopic effects, natural frequencies depende rotational speed, balancing technology	nt on
Numerical methods for frequency limits based on Dunkerley, Southwell, Rayleigh, etc.	
ightarrow Details available in the university calendar, course timetable, etc.	
5 5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the furt of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.	
You recognise dynamic effects in machines, and can assess and calculate them. This enables you to professio	nally
and methodologically analyse and influence dynamically oriented mechanical processes in your future profes	sional
environment.	
6 6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills sho	uld have
been acquired:)	
To be able to understand the course, students require knowledge of the "Advanced Technical Mechanics" me	odule
or a comparative module from the area of Analytical Mechanics.	
6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)	
Students must pass the examination	
6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)	
The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a te	rm
paper (approx. 10 pages)	
6.4 Requirements for admission to examination	
See current version of the Examination Regulations / special examination rules and regulations	
6.5 Module mark weighting for calculating final grade	
See Examination Regulations for above-mentioned degree programmes (Section 3).*	
*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/antliche_bekanntmachungen/index.php?p=2,7.	
7 7.1 Languages used in the module: German English Other, namely:	
7.2 Module Contact Person:	
Professor DrIng. J. Hartleb	
7.3 Professors (optional):	
Professor DrIng. J. Hartleb	
7.4 Maximum number of participants (optional)	
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)	

Fatigue Strength and Durability

1.1 Title of module (GER / ENG) Betriebsfestigkeit / Fatigue Strength and Dura	bility	1.2	Short o	description (optiona		3 Mod //B.2.	ule code (from HIO) 0010
2.1 Cycle of module: Every summer semester Every win Other cycle, namely:	ter semester			on of module: ester 🗌 2 semesters	;		
3.1 Module offered in the following degre	e programme(s):			ulsory (C), compulso CE), elective (E)	ry 3	.3 Reco	mmended semester:
Master's programmes:							
Mechanical Engineering				CF		2	
- Specialisation Agricultural Eng	ineering			CE		2	(FT) / 4 (PT)
Mechanical Engineering							
- Specialisation Computational	Engineering						
Mechanical Engineering							
- Specialisation Product Develo	pment						
Master Business Administration	N& Engineering majoring	g in					_
Mechanical Engineering	0 0 , 0			CE			2
Workload							
						Total w	vorkload
	Method of teaching	Hours per wee semester (SWS each method o teaching	s) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload i hours Total contact non-contact	t and	ECTS (credit points) 30 hrs usually correspor to 1 credit point; whole numbers only
Contact hours	Lecture	3		45			
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	1		15			
	Practical course	1		15			
	Total	Total contact hou SWS	urs in	Total contact hours in hours 75			
on-contact hours .g. tutorial, preparation, follow-up work, reparation for assignments and homework, search, etc.) Preparation for assignments, follow-up work, preparation for examination				105	180	D	6
	Total			Total non-contact hours			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to analyse problems related to the fatigue strength of metallic materials and components. They will be able to assess the concepts and limitations of lifetime assessment, and select them accordingly. In their future professional careers, students will be able to discuss the possible causes of material fatigue, and to propose and assess technical solutions for lifetime improvement.

In the practical courses, students will address in depth specialist interconnections, and present them to suit the target group. In addition, students will practice working independently and as part of a team.

5.2 Course content

- Fatigue of metallic materials and failure mechanisms
- Wöhler curve (S-N-curve) for materials and components, life characteristics
- Parameters and parameter functions of strength, statistical analysis
- Analysis of load-time functions, load collectives
- Factors influencing endurance limit
- Concepts for calculation of fatigue strength
- Determination of working loads of components and resulting stresses
- Estimation of fatigue strength of structural components

 \rightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

Vibrations in metallic materials and components cause fatigue. You learn about concepts that can be used to estimate service life (and their limitations), and develop technical solutions for improvement.

6.1 Prerequisites (*formal*: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

German English Other, namely: 7.2 Module Contact Person:

Professor Dr.-Ing. M. Große Gehling

7.3 Professors (optional):

Professor Dr.-Ing. M. Große Gehling

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Integrated Product Development

1	1.1 Title of module (GER / ENG) Integrierte Produktentwick Integrated Product Develo			1.2 Short	description (optiona	-	1odule code (from HIO) .2.0030
2	2.1 Cycle of module: Every summer semester Every win Other cycle, namely:	ter semester			on of module: ester 🗌 2 semester	5	
3	3.1 Module offered in the following degre	e programme(s):			ulsory (C), compulso CE), elective (E)	ry 3.3 R	ecommended semester:
	Master's programmes:						
	Mechanical Engineering						
	- Specialisation Agricultural Eng	gineering					
	Mechanical Engineering						
	- Specialisation Computational Engineering						
	Mechanical Engineering				•		2 (57) / 4 (57)
	- Specialisation Product Develo	pment			С		2 (FT) / 4 (PT)
	Master Business Administration	n & Engineering majoring	g in		CE		2
-	Mechanical Engineering				-		
	Workload					Tot	al workload
		Mathed of too shing	Llours nor	weekner	Llouve nor		
		Method of teaching	Hours per semester each meth teaching	(SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and non-contact hour	
	Contact hours	Lecture		3	45		
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise		2	30	-	
		Total	Total contac SWS	t hours in	Total contact hours in hours 75		
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	180	6
		Total			Total non-contact hours 105		

to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to express elements of the product creation process that are relevant to success. The individual aspects, see point 8, constitute the basis for high-quality design and development.

	5.2 Course content
	Planning, conception, design and elaboration as the fundamental building blocks of systematic product creation;
	methods of idea and innovation generation such as TRIZ and computer-aided invention;
	Important elements of day-to-day design work such as patents, value analysis, product series, modular design,
	FMEA, QFD, risk management; process-oriented methods such as quality gates and simultaneous engineering;
	computer-aided design: CAx, PDM, PLM, CSCW; configuration management; virtualisation of product
	development; costs; quality
	ightarrow Details available in the university calendar, course timetable, etc.
	5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
	How are innovative product ideas developed? How are new products created? How are they designed? In this
	module, you learn the basic processes and tools required to systematically drive forward new developments.
6	6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have
	been acquired:)
	None
	6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
	Students must pass the examination
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
	The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term
	paper (approx. 10 pages)
	6.4 Requirements for admission to examination
	See current version of the Examination Regulations / special examination rules and regulations
	6.5 Module mark weighting for calculating final grade
	See Examination Regulations for above-mentioned degree programmes (Section 3).*
	*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
	muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7	7.1 Languages used in the module:
	German English Other, namely:
	Prof. DrIng. M. Brockmann
	7.3 Professors (optional):
	Prof. DrIng. M. Brockmann
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Knowledge Based Engineering

1.1 Title of module (GER / ENG) Knowledge Based Enginee	erina		1.2 Short	description (optiona	1)	1.3 Mod MB.2.	ule code (from HIO)
2.1 Cycle of module: Every summer semester Every win Other cycle, namely:	•			ion of module: ester 🗌 2 semesters	5	יציפואון	0031
3.1 Module offered in the following degre	ee programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	ommended semester:
Master's programmes:							
Mechanical Engineering - Specialisation Agricultural Eng	gineering						
Mechanical Engineering - Specialisation Computational	Engineering			CE		2	(FT) / 4 (PT)
Mechanical Engineering - Specialisation Product Development							
Master Business Administration & Engineering majoring in Mechanical Engineering			CE		2		
Workload					Γ	Total v	vorkload
	Method of teaching	Hours per (semester (each metho teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload hours Total conta non-conta	act and	ECTS (credit points) 30 hrs usually correspon to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	2	2	30			
period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	1		15	1		
(more rows can be added)	Practical course	2		30			
	Total	Total contact SWS	: hours in	Total contact hours in hours 75			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	180		6
	Total			Total non-contact	-		
	lotal			hours 105			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to recognised knowledge of components, assemblies and other documents in the development process. The determination of the resulting rules, dependencies and relationships provides the basis for designing formalised and therefore reusable knowledge. This knowledge is used in both CAD models and simulation models to create software modules. Consequently, students will apply the basic principle of knowledge-based engineering (KBE) in projects to reduce the time required to develop new products. These methods are an integral part of contemporary product development strategies, which can be used strategically.

Group-based project work will hone students' capacity for teamwork, forms of communication and conflict management. Students will be able to express the KBE development process, and formulate and present it to suit the target group.

_	
	5.2 Course content
	Lecture/exercise class:
	 Foundations of virtual product development
	- KBE in design
	- CAD modelling techniques
	- Knowledge-based design
	- Engineering data management
	- Knowledge management
	- Knowledge-based engineering data management
	Practical course:
	 Use of the KBE method in design and simulation → Details available in the university calendar, course timetable, etc.
5	5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
	Reinventing the wheel is an unnecessary waste of resources, which is why you analyse components and assemblies
	for reusable knowledge. You use this knowledge in CAD and simulation models to reduce the development time for
	new products in projects.
6	6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have
	been acquired:)
	None
	6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
	Students must pass the examination
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
	The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term
	paper (approx. 10 pages)
	6.4 Requirements for admission to examination
	See current version of the Examination Regulations / special examination rules and regulations
	6.5 Module mark weighting for calculating final grade
	See Examination Regulations for above-mentioned degree programmes (Section 3).*
	*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
_	muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
1	7.1 Languages used in the module:
	7.2 Module Contact Person:
	Professor DrIng. A. Komainda
	7.3 Professors (optional):
	Professor DrIng. A. Komainda
	7.4 Maximum number of participants (optional)
	7 E Further information (antional) (a succession data at the structure includes to)
1	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Literature Study Currently no offer for MaMB (full-time)

			4 9 91 1 1				
1 1.1 Title of module (GER / ENG) Literatur-Hausarbeit / Literature	e Study		1.2 Short d	escription (optional)		1.3 Modu MB.2.0	ile code (from HIO)
2 2.1 Cycle of module:	· · · · · ,		2.2 Duratio	n of module:			
Svery summer semester Severy winter ser	nester			ster 🗌 2 semesters			
Other cycle, namely:							
3.1 Module offered in the following degree programme(s):			3.2 Compute (CE), elective (CE), ele	lsory (C), compulsory	elective	3.3 Recor	nmended semester:
			(CL), election	/e (L)			
Master's programmes:							
Mechanical Engineering				CE			or 3 (FT)/
- Specialisation Agricultural Enginee	ring			CL			l or 5 (PT)
Mechanical Engineering				CE		2	or 3 (FT)/
- Specialisation Computational Engir	neering			CL		4	l or 5 (PT)
Mechanical Engineering				CT.		2	or 3 (FT)/
- Specialisation Product Development	nt			CE		4	l or 5 (PT)
Master Business Administration & E	ngineering majorii	ng in					
Mechanical Engineering		0					
4 Workload							
						Total wo	rkload
	Method of teaching	Hours per v	veek per	Hours per		l in hours	ECTS (credit points)
		semester (S each metho		semester for each method of	Total conta non-conta		30 hrs usually correspond to 1 credit
		teaching	000	teaching			point; whole numbers
		Ū		(usually the number of			only
				hours per week multiplied by 15)			
Contact hours							
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study,							
simulation game, credited tutorial (more rows can be							
added)							
	Total	Total contact	hours in SWS	Total contact			
				hours in hours			
					1	30	6
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation	Search, written						
for assignments and homework, research, etc.)	elaboration						
	Total			Total non-contact			
				hours			
5 5.1 Intended learning outcomes (What should stud to technical skills? For which other modules and prospec		0 1		1	he opportu	nity to acqu	ire soft skills in addition
to teermean skins: For which other modules and prospec			ieu kilowieug				
After successful completion, studer	nts will be able to	independ	ently sea	rch for and ass	ess scie	ntific	
literature for a given topic, and to p	present the finding	gs from sc	ientific p	erspectives, cit	ing corr	ectly. A	s a

result, students will have the ability and skills required to undertake an interdisciplinary analysis of scientific literature.

The module content prepares students for the Master's thesis, a key element of which involves carrying out a systematic analysis of the literature. The professional use of literature, enabling access to a new task, is also a major advantage in day-to-day engineering.

5.2 Course content

- Preparation of an overview of the relevant specialist literature and scientific publications on a particular set of issues
- Working out the fundamentals of scientific work and of the structure of scientific texts
- Establishment of a basis for searching for and assessing specialist literature
- Assessment of the investigated theories, concepts and solutions

Structuring and preparation of the insights gained and the conclusions drawn in the form of a seminar paper

 \rightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

You practise producing scientific work by independently researching and evaluating specialist literature on a particular topic. You summarise your findings according to the rules of science (e.g. correct citation).

6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

Written elaboration (main body of text usually 20-30 pages) covering at least 10 to 20 relevant and different academic sources, taking international sources into account

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. H.-A. Jantzen, Professor Dr.-Ing. J. Scholz

7.3 Professors (optional):

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Machine Tools

1.1 Title of module (GER / ENG) Werkzeugmaschinen / Mac	thine Tools		1.2 Short	description (optiona	1)	1.3 Mod MB.2.	ule code (from HIO)	
2.1 Cycle of module: Every summer semester Every win Other cycle, namely:				ion of module: ester 🗌 2 semesters	5	IVID.2.	0001	
3.1 Module offered in the following degre			3.2 Compulsory (C) , compulsory elective (CE) , elective (E)		ry	3.3 Recommended semester		
Master's programmes:								
Mechanical Engineering								
 Specialisation Agricultural Eng 	gineering							
Mechanical Engineering		c				2	(FT) / 5 (PT)	
- Specialisation Computational	Engineering		C			3 (F1) / 5 (P1)		
Mechanical Engineering				С		3 (FT) / 5 (PT)		
 Specialisation Product Develo 	pment			C				
Master Business Administration	n & Engineering majoring	g in		CE			3	
Mechanical Engineering					_			
Workload					Total workload			
	Method of teaching	Hours per week per		r Hours per Worklo			ECTS (credit points)	
	Wiethod of teaching	semester (each meth teaching	SWS) for	semester for each method of teaching (usually the number of hours per week multiplied by 15)	hours Total conta	act and	30 hrs usually correspondents) 1 credit point; whole numbers only	
Contact hours	Lecture	3	3	45				
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work,	Exercise	1	L	15				
case study, simulation game, credited tutorial (more rows can be added)	Practical course	1	2	30				
	Total	Total contac SWS	t hours in	Total contact hours in hours 90	-			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			90	1	80	6	
	Total			Total non-contact hours 90				

5 5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

Students will be able to confidently design a machine tool with regard to the necessary static and dynamic rigidity. They will also have the experience to confidently assess the thermal, geometric and kinematic behaviour of a machine tool during the design process. Students will also be able to plan the right drive and feed design, and to undertake the optimal management and storage of machine tool components. The objective is to ensure that students will be able to meet the real-life demands of working life in the area of production processes.

The practical courses enable students to develop and apply solution strategies for the design of machine tools, building on the specialist knowledge gained in the lectures, and to formulate and present the results to suit the target group. To do this, students will expand on their practical experience, enabling them to implement the handling of the appropriate measuring technology for

modal analysis, for thermography, and for determining positioning accuracy using a laser interferometer. They will also be able to design a CNC program on a CNC turn-mill centre.

5.2 Course content

For one thing, students will identify the four main properties of machine tools, such as sufficient geometric and kinematic accuracy, and sufficient static, dynamic and thermal rigidity. For another, light will be shed on key aspects related to machine tools such as NC programming, main drives (synchronous and asynchronous motors), feed drives, guide tracks and spindle-bearing systems.

In the exercise classes, students will go over the main content again and carry out calculations accordingly. Laboratory class experiments involve small groups of students determining static and dynamic flexibility (including modal analysis), practised on models of machine tools, as well as trying out and evaluating the use of laser interferometers, thermal cameras and NC programs on machine tools.

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

Building on your Bachelor's degree, you broaden your knowledge of manufacturing processes. By the end of the module, you will be able to design machine tools according to the specified properties and to select appropriate drive and feed concepts.

6.1 Prerequisites (<u>formal</u>: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. H. Apmann

7.3 Professors (optional):

Professor Dr.-Ing. H. Apmann

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Recommended reading:

Manfred Weck, Christian Brecher: Werkzeugmaschinen Band 1-5 (the latest edition, in each case); Springer-Verlag Beurteilung (6th edition); Springer-Verlag

Management Skills – Organisation and Leadership

1.1 Title of module (GER / ENG) Managementkompetenz – O Management Skills – Organi			1.2 Short	description (optiona	al)	1.3 Mod MB.2.	lule code (from HIO) 0041
2.1 Cycle of module: Every summer semester Every winte Other cycle, namely:				on of module: ester 🗌 2 semester	rs		
3.1 Module offered in the following degree	programme(s):			ulsory (C), compulso CE), elective (E)	ory	3.3 Reco	ommended semester
Master's programmes:							
Mechanical Engineering				6		,	
- Specialisation Agricultural Engir	neering			C		5	(FT) / 5 (PT)
Mechanical Engineering				C		2	
- Specialisation Computational Er		C		3 (FT) / 5 (PT)			
Mechanical Engineering				6		_	
- Specialisation Product Develop	ment			C		3	(FT) / 5 (PT)
Master Business Administration	& Engineering majoring ir	า					
Mechanical Engineering							
Workload							
						Total w	orkload
	Method of teaching	Hours per semester (each meth teaching	(SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workloa hours Total cont non-conta	act and	ECTS (credit points 30 hrs usually correspond to 1 credi point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture		3	45			
period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise	:	2	30			
	Total	Total contac SWS	t hours in	Total contact hours in hours 75			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	1	80	6
	Total			Total non- contact hours 105 s the module provide th			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to

- Situationally analyse the social and methodological aspects of managerial tasks in a company.
- Analyse and correctly apply strategic instruments.
- Examine and assess strategic decisions in local, national and global markets.
- Formulate alternative strategies and systematically select appropriate alternative strategies.
- Orientate themselves in the various dimensions of managerial tasks, and differentiate their functions in the areas of leadership, communication, presentation, planning, analysis and reflection.

•	Give speeches and presentations to suit the target group, and give and receive
	feedback.

Systematically apply personal work practices.

5.2 Course content

This module covers the following aspects of management competence:

- Basic concepts, the context and shaping of management
- Ideas of man, and leadership and organisation in companies in various periods
- Models for strategic corporate governance (e.g. stakeholder analysis)
- Market field strategies and portfolio planning as a key component of strategy formation
- Strategic significance of the formal and informal organisation
- Corporate culture as a soft factor of corporate governance with severe consequences
- Management of the product development process

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

Using case studies, you learn – and then apply – the basics of management. You draw up a business plan for your own creative product, and then present it – the ideal opportunity to practise giving presentations to a target audience.

6.1 Prerequisites (*formal*: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

Talk/presentation or term paper

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-

muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7 7.1 Languages used in the module:

German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person:

Professor Dr. phil. F. Striewe

7.3 Professors (optional):

Professor Dr. phil. F. Striewe

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Material Flow Seminar

1.1 Title of module (GER / ENG) Fördertechnisches Seminar Material Flow Seminar	1		1.2 Short	description (optiona	1)	1.3 Modu MB.2.0	Ile code (from HIO) 0016
2.1 Cycle of module: Every summer semester Every winte Other cycle, namely:	r semester			ion of module: ester 🗌 2 semesters	5		
3.1 Module offered in the following degree	programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Recor	nmended semester
Master's programmes:							
Mechanical Engineering							
- Specialisation Agricultural Engin	neering						
Mechanical Engineering							
- Specialisation Computational E	ngineering						
Mechanical Engineering			1				
- Specialisation Product Develop	ment			CE		2	(FT) / 4 (PT)
Master Business Administration		in		05			
Mechanical Engineering				CE			2
Workload					-		
						Total wo	orkload
	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Total conta	act and	ECTS (credit points 30 hrs usually correspond to 1 credi point; whole number: only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	:	1	15			
	Exercise	:	1	15			
rows can be added)	Practical course	:	2	30			
	Total	Total contac SWS	t hours in	Total contact hours in hours 60			
(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			120	18	30	6
	Total			Total non- contact hours 120			

5 5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the seminar, students will be conversant with handling an industrial project from the broad field of material flow. By taking the initiative to cooperate with an industrial client, they will gain the skills required to communicate with people in the business community and will therefore prepare very intensively for their future professional practice. The module also teaches students the social and personal skills relevant in the professional context to successfully lead a project.

5.2 C	iourse content
•	Introduction to a current problem by representatives of a company involved in materials handling or logistics
	activities
•	Project generation on the basis of the presented problem
•	Kick-off meeting
	Choice of a project leader / moderator; minutes
•	Milestone planning
•	Handling of the entire project according to plan, including
	- Feasibility study
	 Alternative concepts and solutions (morphological box)
	- Team discussions
	- Prototyping
	- Preparation and presentation of the results
	· ·
$\rightarrow \mathrm{De}$	etails available in the university calendar, course timetable, etc.
	hort information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose
	ght degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course dy and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
	work independently on an industrial project from the broad spectrum of material flow. You independently
	anise a cooperative project with an industrial client and exchange ideas with people from the world of business.
	rerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have
	acquired:)
Nor	16
6 2 R	equirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
	dents must pass the examination
	ype and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
	sentation
_	
	lequirements for admission to examination
	current version of the Examination Regulations / special examination rules and regulations
Reg	ular participation in the practical course and recognition of associated work
6.5 N	Adule mark weighting for calculating final grade
	Examination Regulations for above-mentioned degree programmes (Section 3).*
	will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
	ster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
	anguages used in the module:
	ierman 🗌 English 🗌 Other, namely:
	Adule Contact Person:
	fessor DrIng. J. Hartleb rofessors (optional):
	fessor DrIng. J. Hartleb
7.4 N	Aaximum number of participants (optional)
755	urther information (optional) (e.g. recommended reading, other persons involved, etc.)
7.3 F	and a mornation topatonal (e.g. recommended reading, other persons involved, etc.)

Modern Programming Concepts

1.1 Title of module (GER / ENG) Moderne Konzepte der Pro Modern Programming Con			1.2 Short	description (optiona	I) 1.3 Mod MB.2.	dule code (from HIO) .0044
2.1 Cycle of module: Every summer semester Every win Other cycle, namely:				ion of module: ester 🗌 2 semesters	5	
3.1 Module offered in the following degre	ee programme(s):			ulsory (C), compulso CE), elective (E)	ry 3.3 Reco	ommended semester:
Master's programmes:						
Mechanical Engineering						
- Specialisation Agricultural Eng	gineering					
Mechanica	l Engineering			С		2 (FT) / 2 (PT)
- Specialisation Com	putational Engineering			C	2	- (F1) / 2 (F1)
Mechanical Engineering - Specialisation Product Develo	pment					
Master Business Administration	n & Engineering majoring	g in				
Mechanical Engineering						
Workload						
	1	1				workload
	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hour Total contact and non-contact hours	S ECTS (credit points) 30 hrs usually correspon to 1 credit point; whole numbers only
Contact hours	Lecture	:	2	30		
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work,	Exercise		1	15		
case study, simulation game, credited tutorial (more rows can be added)	Practical course		2	30	-	
	Total	Total contac SWS	t hours in	Total contact hours in hours 75		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	180	6
	Total			Total non-contact hours 105		

5 5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in adto technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to design and implement individual software using advanced software development paradigms. They will also be able to develop applications on the basis of image processing algorithms. Knowledge of these algorithms will enable students to assess an important aspect of their later professional life, given that they represent a key industrial application area of computer science.

5.2 Course content
Software engineering, UML
Design patterns
Distributed applications
Mobile computing
● Image processing → Details available in the university calendar, course timetable, etc.
5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
Since image processing plays an important role in a digitalised industry, we focus on it in this module. You design and develop your own programs and applications on the basis of image processing algorithms.
6.1 Prerequisites (formal: examination of module XY has to be passed or similar <u>content-wise</u> ; module XY should have been attended, the following knowledge and skills should have been acquired:) None
6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination
6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)
6.4 Requirements for admission to examination See current version of the Examination Regulations / special examination rules and regulations Recognition of the related work
6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7.1 Languages used in the module: German English Other, namely:
7.2 Module Contact Person: Professor DrIng. S. Behr
7.3 Professors (optional):
Professor DrIng. S. Behr
7.4 Maximum number of participants (optional)

1

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Set of slides used in the lecture

Multibody Simulation

1.1 Title of module (GER / ENG) Mehrkörpersimulation / Mu	Iltibody Simulation		1.2 Short	description (optiona	1)	1.3 Mod MB.2.	lule code (from HIO) 0043
2.1 Cycle of module: ☐ Every summer semester ⊠ Every win Other cycle, namely:	iter semester			on of module: ester 🗌 2 semester	s		
3.1 Module offered in the following degre	e programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	ommended semester:
Master's programmes:							
Mechanical Engineering							
- Specialisation Agricultural Eng	gineering						
Mechanical Engineering	•			•			
- Specialisation Computational Engineering				C		1 (FT) / 1 (PT)	
Mechanical Engineering							
- Specialisation Product Develo	pment						
Master Business Administration	,	in					
Mechanical Engineering							
Workload							
						Total v	vorkload
	Method of teaching	Hours per semester each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload hours Total conta non-conta	act and	ECTS (credit points) 30 hrs usually correspo to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture		2	30			
period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	:	L	15			
(more rows can be added)	Practical course	:	2	30			
	Total	Total contac SWS	t hours in	Total contact hours in hours 75	_		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	18	80	6
	Total			Total non-contact hours 105	-		

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to analyse real multibody systems and determine the basic relations of kinematic chains. Expedient abstraction of the real-world system in joints and bodies represents an important element. To achieve this, students will be able to determine linkages, pivot points, masses, and moments of inertia, and to map them in a simulation tool. The corresponding representation of the simulation results will enable students to develop optimisation variants, and to assess and select optimal solutions. This fundamental knowledge in the area of multibody systems is essential for when students come to design mechanical systems in their professional environment.

The aim of the practical course is to enable students to transfer their theoretical knowledge to practical implementation in the form of computer-aided multibody simulations. Students will be able to handle a

specific simulation software program, and to develop and apply solution strategies to the set tasks. Group-based project work will hone students' capacity for teamwork, forms of communication and conflict management. Students will be able to describe, formulate and present to the relevant target group the development process of a dynamic multibody simulation.

5.2 Course content

Lecture/exercise class:

- Coordinate systems
- Single body kinematics
- Mechanical systems with linkages
- Foundations of kinematic chains
- Single-loop kinematics
- Kinematics of multi-loop mechanisms
- Foundations of dynamics
- Computer-aided setup of equations of motion
- Practical course:

- Dynamic simulation of technical systems using the MBS software program ADAMS

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

You analyse real multibody systems and determine the basic relations of kinematic chains. Using simulations, you develop optimisation variants, evaluate them, and choose the optimal solution.

6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

🛛 German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. A. Komainda

7.3 Professors (optional):

Professor Dr.-Ing. A. Komainda

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Operations Research

1.1 Title of module (GER / ENG) Operations Research		1.2 Shor	t description (optiona	-	Nodule code (from HIO) .2.0047		
2.1 Cycle of module: Every summer semester 🛛 Every win Other cycle, namely:	ter semester		tion of module: nester 🗌 2 semester	5			
3.1 Module offered in the following degre			3.2 Compulsory (C), compulsory elective (CE), elective (E)		ecommended semester:		
Master's programmes:							
Mechanical Engineering							
- Specialisation Agricultural Eng	gineering						
Mechanical Engineering			С		4 (FT) / 2 (DT)		
- Specialisation Computational	Engineering		C		1 (FT) / 3 (PT)		
Mechanical Engineering							
 Specialisation Product Develo 	,						
Master Business Administration & Engineering majoring in			CE		3		
Mechanical Engineering			02		5		
Workload			Tot	al workload			
	Method of teaching	Hours per week per Hours per		Workload in	ECTS (credit points		
	Wethou of teaching	semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	hours Total contact and non-contact hour	30 hrs usually correspondent to 1 credit point; who		
Contact hours	Lecture	3	45				
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work,	Exercise	1	15				
case study, simulation game, credited tutorial (more rows can be added)	Practical course	1	15	1			
	Total	Total contact hours in SWS	Total contact hours in hours 75				
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination		105	180	6		
	Total		Total non-contact hours 105				

After successful completion of the module, students will be able to select current operations research methods, and to transfer and apply them to their own issues. These skills play an important role in the area of business management because economic decisions in companies are subordinated to a rational process. In addition, students will also be able to apply the decision algorithms learned to other issues of optimisation. Students will be able to discuss and assess the methods from the fields of applied mathematics, economics and computer science used in the module.

Students will specifically gain the following skills during lectures and the practical course: Students will be able to...

- ... generate linear optimisation models, and to solve them using the simplex algorithm. In particular, students will be able to recognise and characterise special cases, and apply solution strategies. In addition, they will be able to transfer the simplex method to new issues.
- ... present and assess decision criteria under uncertainty and under risk, and to select the "right one" for specific decision situations, enabling them to plan decision-making

Т		and here
		paths.
	•	describe important concepts of game theory, calculate different types of equilibrium,
		assess the importance of equilibria and derive options for action accordingly.
	•	develop dynamic models and solve them using Bellman's principle of optimality.
	•	select and apply graph theory algorithms, and to assess the results with regard to
	•	
		the question under analysis.
	•	use nonlinear optimisation to analyse models, assess the results, and further
		develop existing algorithms.
	•	illustrate and apply integer and combinatorial optimisation strategies, and to
		develop models that can be solved using these methods.
	•	apply stochastic simulation methods, and to develop associated models.
	•	select and confidently use software for the individual model types, and to assess the
		simulation results.
1	The I	nodule's practical course enables students develop and apply solution strategies for
1	the s	et tasks, building on the specialist knowledge gained in lectures, and to work in an
li	inter	disciplinary manner.
-		urse content
	•	Linear optimisation: simplex algorithm, including special cases
	•	Decisions under uncertainty or risk
	•	Game theory: Nash equilibrium, normal form, Pareto efficiency, dominant strategies, mixed strategies, trembling
		hand perfection, dynamic games, extensive form games
	•	Graph theory: foundations, special graphs, isomorphism, matrix form, directed and valued graphs, shortest paths,
		minimum spanning tree, Eulerian and Hamiltonian graphs
	•	Dynamic optimisation: classification, Bellman's principle of optimality, recursive functional equation, storage
	•	
	•	Nonlinear optimisation: relegation methods, comparison with dynamic optimisation
	•	Integer and combinatorial optimisation
	•	Stochastic models, methods and simulations
	\rightarrow Det	ails available in the university calendar, course timetable, etc.
5 !	5.3 Sh	ort information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose
5 ! t	5.3 Sh the righ	ort information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose It degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course
5 ! t	5.3 Sh the righ	ort information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose It degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
5 ! t	5.3 Sh the righ of study	ort information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose It degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course y and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. plex and practical problems are analysed within the framework of a planning process. The real decision-making
5 ! t	5.3 Sh the righ of study Com prob	ort information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose at degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. plex and practical problems are analysed within the framework of a planning process. The real decision-making lem is represented by an optimisation or simulation model. With the help of the application of mathematical
5 ! t	5.3 Sh the righ of study Com prob meth	ort information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose at degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. plex and practical problems are analysed within the framework of a planning process. The real decision-making lem is represented by an optimisation or simulation model. With the help of the application of mathematical mods, a basis for the best possible decisions is created.
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Piston Engines

1.1 Title of module (GER / ENG) Kolbenmaschinen / Piston	Engines		1.2 Short	description (optiona	il)	1.3 Mod MB.2.	lule code (from HIO) 0032
2.1 Cycle of module: Every summer semester Every wir Other cycle, namely:	nter semester			ion of module: ester 🗌 2 semester	s	_	
3.1 Module offered in the following degree			3.2 Compulsory (C), compulsory elective (CE), elective (E)		ry	3.3 Recommended semester:	
Master's programmes:							
Mechanical Engineering				С		2 (FT) / 2 (PT)	
 Specialisation Agricultural Eng 	gineering		C		2 (FT) / 2 (PT)		
Mechanical Engineering				С		2 (FT) / 2 (DT)	
- Specialisation Computational	Engineering		L L			2 (FT) / 2 (PT)	
Mechanical Engineering							
 Specialisation Product Development 	,						
Master Business Administratio Mechanical Engineering	on & Engineering majoring in		CE			2	
Workload							
						Total v	workload
	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workloa hours Total cont non-conta	act and	ECTS (credit points) 30 hrs usually correspor to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture		3	45			
period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	:	1	15			
(more rows can be added)	Practical course		2	30			
	Total	Total contac SWS	t hours in	Total contact hours in hours 90			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			90	1	80	6
	Total			Total non-contact hours 90	-		

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to understand problems arising from the basics of reciprocating engines, and to transfer them to practical engineering applications. Students will be able to analyse and assess reciprocating engines (engines) and piston machines (pumps and compressors), as well as their use and technology. They will be able to describe and assess the design concepts, mechanisms of action and energy conversion processes in reciprocating engines. Students will also be able to solve special tasks related to the dynamics of reciprocating engines, including mass balancing.

The practical course enables students to transfer the specialist knowledge gained to tasks related to the experimental investigation of reciprocating engines. Working in small groups will promote students' communication skills and their ability to work in a team. By writing experiment evaluations,

students practice their solution-oriented thinking and the presentation of experiment results to suit the target group.

5.2 Course content

- Concepts, classification and basics of reciprocating engines
- Machine dynamics of reciprocating engines and balancing conditions
- Reciprocating pumps: structure, mechanism of action, and design
- Reciprocating compressors: structure, mechanism of action, and design
- Reciprocating engines: structure and mechanism of action
- Turbocharging combustion engines
- Exhaust technology and the problem of exhaust gases
- Engine components
- Alternative drives and technological consequences
- Technical designs and design principles
- Practical experiments using engine test rigs

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

You explore flow phenonena and the conversion of the different kinds of energy in piston engines. You gain a basic understanding of thermodynamics and mechanics of reciprocating engines.

6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

🛛 German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. habil. S. aus der Wiesche

7.3 Professors (optional): Professor Dr.-Ing. habil. S. aus der Wiesche

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Plant Design

Anlagenplanung / Plant De	esign			description (optiona	1)	1.3 Mod MB.2.	ule code (from HIO) 0007		
2.1 Cycle of module: Every summer semester Every win Other cycle, namely:	nter semester			on of module: ester 🗌 2 semesters	5				
3.1 Module offered in the following degree programme(s):				3.2 Compulsory (C), compulsory elective (CE), elective (E)			3.3 Recommended semester:		
Master's programmes:									
Mechanical Engineering									
 Specialisation Agricultural En 									
Mechanical Engineering		CE		2	(FT) / 4 (PT)				
- Specialisation Computational Engineering				-					
Mechanical Engineering									
 Specialisation Product Develor Master Business Administratio 	,	Tin							
Mechanical Engineering	in & Engineering majoring	igineering majoring in		CE		2			
Workload									
					Total w	vorkload			
	Method of teaching	Hours per semester (each meth teaching	(SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload hours Total conta non-conta	act and	ECTS (credit points) 30 hrs usually correspon to 1 credit point; whole numbers only		
Contact hours (e.g. lecture, seminar, practical course, practical	Lecture	3	3	45					
period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise	:	1	15					
	Total	Total contac SWS	t hours in	Total contact hours in hours 60					
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			120	18	30	6		
	Total			Total non-contact	-				
				hours 120					

legal or external frameworks and the technical implementation of plant and apparatus, demonstrating a frequently occurring issue in engineering.

_						
	5.2 Course content					
	 Structure and dimensioning of apparatus and apparatus components 					
	• Special aspects of plant design (e.g. safety technology, legal frameworks, hygienic design,)					
	 Systematic approach to plant design, from the idea and cost estimate to initial operation 					
	e of stemate approach to plant design, nom the lace and cost estimate to initial operation					
	ightarrow Details available in the university calendar, course timetable, etc.					
5	5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.					
	Plants and machines have to meet technical and legal requirements. You design plants considerng technical and					
	economical aspects and assess their legal conformity.					
6	6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have					
	been acquired:)					
	None					
	6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)					
	Students must pass the examination					
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)					
	The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term					
	paper (approx. 10 pages)					
	6.4 Requirements for admission to examination					
	See current version of the Examination Regulations / special examination rules and regulations					
	6.5 Module mark weighting for calculating final grade					
	See Examination Regulations for above-mentioned degree programmes (Section 3).*					
	*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.					
7	7.1 Languages used in the module:					
	German English Other, namely:					
	7.2 Module Contact Person:					
Professor DrIng. J. Scholz						
7.3 Professors (optional):						
Professor DrIng. J. Scholz						
	7.4 Maximum number of participants (optional)					
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)					
	Recommended reading:					
	W. Wagner: "Planung im Anlagenbau", Vogel Fachbuch, 2nd edition, 2003					
	D. Gleich, R. Weyl: "Apparateelemente – Praxis der sicheren Auslegung", Springer VDI Verlag, 2006					
	K. Sattler, W. Kasper: "Verfahrenstechnische Anlagen – Planung, Bau, Betrieb", Wiley-VCH Verlag, 2000					
	H.G. Hirschberg: "Handbuch Verfahrenstechnik und Anlagenbau", Springer Verlag, 1999					
	Lecture notes					

Polymer Engineering

1.1 Title of module (GER / ENG) Konstruieren mit Kunststo Polymer Engineering	ffen /		1.2 Short	description (optiona	I) 1.3 Mod MB.2	lule code (from HIO) .0036		
1 Cycle of module: S Every summer semester Every winter semester ther cycle, namely:			2.2 Duration of module: 1 semester 2 semesters					
3.1 Module offered in the following degree	e programme(s):			ulsory (C), compulso CE), elective (E)	ry 3.3 Rec	ommended semester:		
Master's programmes:								
Mechanical Engineering								
- Specialisation Agricultural Eng								
Mechanical Engineering								
- Specialisation Computational	Engineering							
Mechanical Engineering				CE				
	Specialisation Product Development					2(FT) / 4 (PT)		
Master Business Administration & Engineering majoring in Mechanical Engineering				CE		2		
Workload								
					Total	vorkload		
	Method of teaching	Hours per week pe semester (SWS) fo each method of teaching		Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hour Total contact and non-contact hours	s ECTS (credit points) 30 hrs usually correspor to 1 credit point; whole numbers only		
Contact hours	Lecture	3		45				
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise	1		15				
	Practical course	1		15				
	Total	Total contact SWS	hours in	urs in Total contact hours in hours 75				
(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			105	180	6		
	Total			Total non-contact hours				

5 5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to identify the engineering polymers used, as well as reproduce their properties and the key production processes. They will be able to inspect material properties and use them to specifically select methods, taking into account economic aspects. Supported by the practical class, students will apply typical functional elements to learn how to use polymer-specific dimensioning methods for material-, production-, load- and practice-oriented component design, and how to apply relevant methods of calculation.

Structure of polymers
Properties and design parameters
Production processes for polymer parts
 Production impacts on material properties and component design
Design and dimensioning of polymer parts
ightarrow Details available in the university calendar, course timetable, etc.
5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to chout the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further court of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
What are special properties of polymer materials and how can they be used in technical appliations? You learn
about structures of polymers and component design and dimensioning of polymer parts.
6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)
None
6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
Students must pass the examination
6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)
6.4 Requirements for admission to examination
See current version of the Examination Regulations / special examination rules and regulations
6.5 Module mark weighting for calculating final grade
See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7.1 Languages used in the module:
7.2 Module Contact Person:
DrIng. M. Laubrock
7.3 Professors (optional):
DrIng. M. Laubrock
7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

5.2 Course content

Renewable Resources

1.1 Title of module (GER / ENG) Nachwachsende Rohstof Renewable Resources	ffe /		1.2 Short	description (optional)		1.3 Modu MB.2.0	ile code (from HIO) 1045	
1 Cycle of module: Every summer semester Every winter semester ther cycle, namely:			2.2 Duration of module:					
3.1 Module offered in the following de	gree programme(s):		3.2 Comp (CE), elect	ulsory (C), compulsory (ive (E)	elective	3.3 Recor	nmended semester	
Master's programmes:								
Mechanical Engineering - Specialisation Agricultural Engineering			с			3 (FT) / 5 (PT)		
Mechanical Engineering - Specialisation Computational Engineering								
Mechanical Engineering - Specialisation Product Deve	lopment							
Master Business Administration & Engineering majoring in Mechanical Engineering			CE			3		
Workload						Total wo	rkload	
	Method of teaching		· (SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload Total contac contact hour	t and non-	ECTS (credit point 30 hrs usually correspond to 1 crec point; whole numbe only	
Contact hours (e.g. lecture, seminar, practical course,	Lecture		3	45				
practical period/internship, group work, project work, case study, simulation game,	Exercise		1 15					
credited tutorial (more rows can be added)	Practical course		1	15	-			
	Total	Total conta SWS	act hours in	Total contact hours in hours 75	-			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow- up work, preparation for examination			105	- 180		6	
	Catch-up of technical content (MaBA&E only)			(30)	MaB. (21		MaBA&E (7)	
	Total			Total non-contact hours 105	-			
				MaBA&E (135)				

addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion, students will be able to analyse and assess technical processes associated with the use of renewable resources and in the provision of bioenergy. Alongside technical assessment, aspects of sustainability also play a role. Students will be able to analyse the possibilities for material use of renewable resources, and to assess the processes accordingly. They will also be able to assess selected ecological impacts of using renewable resources.

Being able to analyse and assess processes for using renewable resources and

bioenergy is an important basis for discussions concerning climate change and sustainability.

The practical courses enable students to understand the implementation and assessment of processes for converting and using renewable resources. To achieve this, selected processes are conducted independently in small groups as experiments, including the relevant methods of analysis, evaluated and assessed by them, and presented in the form of a report.

5.2 Course content

- Technical fundamentals of the processes for energy use of renewable resources (e.g. wood, biogas, biofuel)
- Possibilities for material use of renewable resources
- Ecological and social aspects of using renewable resources

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

Which role can renewable resources play in energy supply? You analyze processes for allocation of bioenergy as well as material use of renewable resources and assess their sustainability.

6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)

To be able to understand the course, students require basic knowledge of fluid mechanics and thermodynamics

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.2 Module Contact Person:

Professor Dr.-Ing. J. Scholz

7.3 Professors (optional):

Professor Dr.-Ing. J. Scholz / Dipl.-Ing. M. Mangelmann

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Recommended reading:

M. Kaltschmitt, H. Hartmann: "Energie aus Biomasse – Grundlagen, Techniken und Verfahren", Springer Verlag, 2001

W. Diepenbrock: "Nachwachsende Rohstoffe", Ulmer Verlag, 2014

Lecture notes and documentation relating to the practical course

Robotics

1.1 Title of module (GER / ENG) Robotertechnik / Robotic	S		1.2 Short	description (optional)		1.3 Modu MB.2.0	ile code (from HIO) 0057		
2.1 Cycle of module: Every summer semester Every winter semester Dther cycle, namely:				2.2 Duration of module: ∑ 1 semester ☐ 2 semesters					
3.1 Module offered in the following degree programme(s):			3.2 Compulsory (C), compulsory ele (CE), elective (E)		elective 3.3 Recommended se		nmended semester		
Master's programmes:									
Mechanical Engineering									
- Specialisation Agricultural E	ngineering								
Mechanical Engineering			с			1 (FT) / 3 (PT)			
 Specialisation Computational Engineering 									
Mechanical Engineering									
- Specialisation Product Deve	•								
Master Business Administrati	ion & Engineering majo	ring in							
Mechanical Engineering									
Workload					r	Total wo	orkload		
	Method of teaching	Hours pe	r week ner	Hours per semester	Workload		ECTS (credit point:		
	Wethou of teaching	Hours per week p semester (SWS) fo each method of teaching		for each method of teaching (usually the number of hours per week multiplied by 15)	Total contact and non- 30 contact hours cor poi		30 hrs usually correspond to 1 cred point; whole number only		
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game,	Lecture		2	30					
	Exercise		1	15					
credited tutorial (more rows can be added)	Practical course		2	30					
	Total	Total conta SWS	act hours in	Total contact hours in hours 75	-				
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow- up work, preparation for examination			105	180 MaBA&E (210)		6		
	Catch-up of technical content (MaBA&E only)			(30)			MaBA&E (7)		
	Total			Total non-contact hours 105					
5.1 Intended learning outcomes (What s				MaBA&E (135)					

addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion of the module, students will be able to evaluate and design appropriate robotic systems in a practice-oriented manner on the basis of mathematical robotics basics, and to adapt them for specific issues.

The practical course and the integrated project practical enable students to develop and apply solution strategies for the set tasks that build on the specialist knowledge gained in the lectures. Besides acquiring the capability to procure information, students will practice the associated ability to transfer the knowledge to the relevant issue. They will also be able to formulate and present the results to suit the target group.

5.2 Course content

Lecture:

Basic types and designs of robots, articulated robots, mobile robots, industrial robots, robot kinematics, drives and sensors, motion control, detection/avoidance of unwanted movements, robot control, programming robotic systems, offline programming tools, communication via handheld terminals, tools and interfaces, modelling the robot environment, simulation of robotic systems, online continuous path control

Exercise class:

Calculation of the motion dynamics of robots, calculation of cycle times, coordinate transformations, robot programming, simulations

Project practical:

On the basis of the above or a task of their own choice from the field of robotics, students are expected to tackle part of an area independently and in depth, and prepare, document and present the findings conceptually with the task in mind. During face-to-face classes, students will be introduced to robot programming and robot simulation.

 \rightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

After studying the theory of robot programming, you work in groups on modern industrial robots. You implement a variety of tasks in a simulation program, and then transfer them to a real robot.

6.1 Prerequisites (*formal*: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

🛛 German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. S. Behr, Professor Dr.-Ing. A. Komainda

7.3 Professors (optional):

Professor Dr.-Ing. S. Behr, Professor Dr.-Ing. A. Komainda

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Recommended reading:

Siciliano, Khatib: Springer Handbook of Robotics, Springer, Berlin, Heidelberg, 2nd edition, 2008

Science & Fiction

1.1 Title of module (GER / ENG) Science & Fiction			1.2 Short	description (optiona	1)	1.3 Mod MB.2.	ule code (from HIO) 0066
2.1 Cycle of module: X Every summer semester Every wir Other cycle, namely:	nter semester			ion of module: ester 🗌 2 semester:	S		
3.1 Module offered in the following degree	ee programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semester:
Master's programmes:							
Mechanical Engineering				CE		2	(FT) / 4 (PT)
 Specialisation Agricultural Eng 	gineering			CL			(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Mechanical Engineering				CE		2	(FT) / 4 (PT)
- Specialisation Computational	Engineering						
Mechanical Engineering				CE		2	(FT) / 4 (PT)
- Specialisation Product Develo	,	a : a					
Master Business Administratio	n & Engineering majorin	gin					
Mechanical Engineering							
						Total w	vorkload
	Method of teaching	Hours per semester each meth teaching	(SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload hours Total conta non-conta	act and	ECTS (credit points) 30 hrs usually correspo to 1 credit point; whole numbers only
Contact hours	Seminaristic Lecture		2	30			
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work,	with case studies						
case study, simulation game, credited tutorial (more rows can be added)	Exercise						
	Practical course						
	Total	Total contae SWS	ct hours in	Total contact hours in hours 30	1	80	6
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			150			
	Total			Total non-contact hours	_		

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person: Prof. Dr.-Ing. Samir Salameh, Prof. Dr.-Ing. Jürgen Scholz

7.3 Professors (optional):

Prof. Dr.-Ing. Samir Salameh, Prof. Dr.-Ing. Jürgen Scholz

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Technology of Mechanisms (Tribology)

1	1.1 Title of module (GER / ENG) Getriebetechnik / Techno	ology of Mechanisms	5	1.2 Short	description (optional)		1.3 Modu MB.2.0	le code (from HIO) 019
2	2.1 Cycle of module: Every summer semester I Every v Other cycle, namely:	vinter semester			ion of module: ester 🗌 2 semesters			
3	3.1 Module offered in the following de	gree programme(s):		3.2 Comp (CE), elect	ulsory (C) , compulsory e tive (E)	lective	3.3 Recon	nmended semester:
	Master's programmes:							
	Mechanical Engineering							
	- Specialisation Agricultural E	ngineering						
	Mechanical Engineering - Specialisation Computations	al Engineering						
	Mechanical Engineering							
	- Specialisation Product Deve	lopment			CE		3	(FT) / 5 (PT)
	Master Business Administrati		ring in		CE			3
	Mechanical Engineering				CE			3
4	Workload						Total wo	rkload
		Method of teaching		(SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload Total contac contact hou	t and non-	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
	Contact hours (e.g. lecture, seminar, practical course,	Lecture	:	3	45			
	practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise	:	2	30			
		Total	Total conta SWS	ct hours in	Total contact hours in hours 75	18	20	6
	(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow- up work, preparation for examination			105		50	U
		Catch-up of technical content (MaBA&E only)			(30)	MaB (21		MaBA&E (7)
		Total			Total non-contact hours 105			
-	F 4 latended logging a strength of the				MaBA&E (135)			
5	5.1 Intended learning outcomes (What s to technical skills? For which other modules a After successful completion friction, wear and lubrication optimize friction. In addition	nd prospective tasks in the labour ma of the module, student n and assess the mecha	s will be nisms o	acquired known able to faction	owledge and skills relevant? apply the basic k required to reduc	nowledg ce wear a	ge of and	urre sott skills in addition

optimization of motion systems.

	5.2 Course content
	System properties
	Friction
	Wear and tear
	Lubrication Technology
	Surface and measurement technology
	Tribometry
	 Failure analysis of tribological systems
	→ Details available in the university calendar, course timetable, etc.
	5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. Many machines have transmissions. You classify different types of transmissions and determine their relevant
	parameters. Equipped with this knowledge, you can design your own transmissions and select appropriate ones for
	different applications. 6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have
	been acquired:)
	None
	6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
	Students must pass the examination
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
	The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term
	paper (approx. 10 pages)
	6.4 Requirements for admission to examination
	See current version of the Examination Regulations / special examination rules and regulations
	6.5 Module mark weighting for calculating final grade
	See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7	7.1 Languages used in the module:
	German English Other, namely:
	7.2 Module Contact Person:
	Professor DrIng. C. Spura
	7.3 Professors (optional):
	Professor DrIng. C. Spura
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

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The German Legal System and Product Liability

I.1 Title of module (GER / ENG) Recht und Produkthaftung /			1.2 Short	description (optiona		3 Mod MB.2.	ule code (from HIO) 0055
The German Legal System a	nd Product Liability						
2.1 Cycle of module:	ter semester			ion of module: ester 🗌 2 semesters	5		
3.1 Module offered in the following degre	e programme(s):			ulsory (C), compulso CE), elective (E)	ry 3	3.3 Reco	ommended semester:
Master's programmes:							
Mechanical Engineering				С		2	(FT) / 3 (PT)
Specialisation Agricultural Eng	gineering			Ľ		3	(FI)/ 3 (FI)
Mechanical Engineering				с		3	(FT) / 3 (PT)
Specialisation Computational	Engineering			Ľ		3	(F1)/3(F1)
Mechanical Engineering				с		2	(FT) / 3 (PT)
Specialisation Product Develo				C			
Master Business Administration	n & Engineering majoring	g in					
Mechanical Engineering							
Norkload					1	Total v	vorkload
	Method of teaching	Hours per v	veek ner	Hours per	Workload		ECTS (credit points
		semester (S each metho teaching	WS) for	semester for each method of teaching (usually the number of hours per week	hours Total contac non-contact	t and	30 hrs usually corresp to 1 credit point; whol numbers only
Contact hours	Lecture	3		multiplied by 15) 45			
e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial more rows can be added)	Exercise	1		15			
	Total	Total contact SWS	hours in	Total contact hours in hours 60			
Non-contact hours e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, esearch, etc.)	Preparation for assignments, follow-up work, preparation for examination			120	18	D	6
	Total			Total non-contact hours 120			

to grips with contracts containing material or legal defects, since they will be able to transfer specific terms from legislation related to default in performance. In addition, they will be able to point out terms and interrelations from contracts for work and services in general and, in the special part, also from product liability. Students will also be able to cite and illustrate general and special law of obligations, as well as enrichment and tort. In addition, they will be able to recognise recurring

argumentation. The specialist knowledge gained will help students to be able to analyse, assess and

problems arising from the German Commercial Code (HGB), and to deal with them using

solve semi-realistic issues and case scenarios, also with regard to challenges in their later everyday engineering life.

5.2 Course content

Structure of the German legal system; distinction between the areas of law; typification of norms, laws and rules of law; foundations of the German Civil Code (BGB); the structure of the BGB; the books of the BGB; legal entities of civil law; legal capacity; capacity to contract; declaration of intent; contract; foundations of contract law; representation; material defects; defects of title; contract of sale; absence of intent; contract for services; public sector employment contract; product liability and producers' liability: contractual reasoning; tortious reasoning (duty to design and warn, product monitoring obligation, liability in the case of ineffective products, onus of proof); product liability

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

You may encounter contracts or product liability cases in your professional life. This module prepares you for these tasks. You acquire the necessary knowledge and apply it to various situations on the basis of case studies.

6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

The module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh muenster.de/hochschule/aktuelles/amtliche bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

German 🗌 English 🗌 Other, namely:

7.2 Module Contact Person:

Dean Professor Dr. rer. nat. E. Finke

7.3 Professors (optional):

Lecturer Solicitor C. Ihm

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Master's – description of practical modules

Project Report

1 Title of module (GER / ENG) Projektarbeit (Master) / Proj	ject Report		1.2 Short	description (optiona	-	1.3 Modι MB.2.(ule code (from HIO) 0049
1 Cycle of module: Serry summer semester Devery winter ther cycle, namely:	-			ion of module: ester 🗌 2 semester:			
1 Module offered in the following degree	e programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semeste
laster's programmes:							
Aechanical Engineering				с		2	(FT) / 2 (PT)
Specialisation Agricultural Engi	neering			C		2	(FI) / 2 (PI)
Nechanical Engineering				С		2	(FT) / 2 (PT)
Specialisation Computational E	ngineering						. ,, , ,
1echanical Engineering Specialisation Product Develop	mont			С		2	(FT) / 2 (PT)
Aaster Business Administration		in	1				
Aechanical Engineering				С			<mark>4</mark>
/orkload							
	1	T		1		Total wo	
ontact hours	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Total conta	ct and	ECTS (credit point 30 hrs usually correspond to 1 cree point; whole numbe only
se, lecture, seminar, practical course, practical riod/internship, group work, project work, case udy, simulation game, credited tutorial (more ws can be added)							
	Total	Total contac SWS	t hours in	Total contact hours in hours			
on-contact hours .g. tutorial, preparation, follow-up work, eparation for assignments and homework, search, etc.)	Preparation for assignments, follow-up work, preparation for examination			180	18	80	6
	Total			Total non- contact hours			
				180			

assignment. Another aim is for students to comprehensibly document, plausibly present, and explain the approaches, the path taken, and the results of the solution to the problem. The module content prepares students for the scientific project and the Master's thesis, which also involve

tackling an engineering or scientific assignment, and documenting and presenting the results.

The module is of great practical relevance for professional life as an engineer, given

that project execution in a team is a core task and engineers must be able to

document and present technical issues with confidence.

5.2 Course content

Cross-module assignment from the subject areas of the degree programme. Final presentation in the presence of the supervisor(s).

ightarrow Details available in the university calendar, course timetable, etc.

5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.

As part of a project team, you work on a scientific assignment or a practice-oriented task. You summarise your results in a term paper and hold a presentation.

6.1 Prerequisites (*formal*: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been acquired:)

None

6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)

Students must pass the examination

6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)

Written elaboration by the examination candidate (main body of text usually 10-15 pages); presentation followed by questions, lasting a maximum of 30 minutes per examination candidate.

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations

6.5 Module mark weighting for calculating final grade

See Examination Regulations for above-mentioned degree programmes (Section 3).*

*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module: German English Other, namely:

7.2 Module Contact Person:

Professor Dr.-Ing. H.-A. Jantzen, Professor Dr.-Ing. J. Scholz

7.3 Professors (optional):

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Scientific Project

1.1 Title of module (GER / ENG) Wissenschaftliches Projekt	/ Scientific Project		1.2 Short	description (optiona		1.3 Mod MB.2.	ule code (from HIO) 0062
2.1 Cycle of module: Every summer semester Every winte Other cycle, namely:	er semester			on of module: ester 🗌 2 semester	S		
3.1 Module offered in the following degree	programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semester
Master's programmes:							
Mechanical Engineering				С		2	
- Specialisation Agricultural Engi	neering			Ľ		5	(FT) / 4 (PT)
Mechanical Engineering				C		2	
- Specialisation Computational E	ngineering			C		5	(FT) / 4 (PT)
Mechanical Engineering				С		2	(FT) / 4 (PT)
 Specialisation Product Develop 	ment			C		5	(11)/ 4(P1)
Master Business Administration	& Engineering majoring i	in					
Mechanical Engineering							
Workload					I	Table	- dite - d
	T	T		1		Total w	
	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload Total conta non-contad	act and	ECTS (credit points 30 hrs usually correspond to 1 credi point; whole numbers only
Contact hours							
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)							
	Total	Total contac SWS	t hours in	Total contact hours in hours			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			180	18	30	6
	Total			Total non- contact hours 180			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful completion, students will be able to independently tackle a scientific assignment within the time allowed, using cross-module approaches and therefore applying the basics and skills acquired thus far on the programme, and transferring them to the given problem. One key aspect is to complete the task on the basis of producing scientific work, encompassing not only a systematic analysis of the literature, but also a critical discussion of the results. Another aim is for students to comprehensibly document and plausibly explain the approaches, the path taken, and the results of the solution to the problem, and to present and discuss the findings before a specialist audience.

The module content builds on the project work and prepares students for the Master's thesis, which also involves tackling an engineering or scientific assignment, and documenting and presenting the results. The module is of great practical relevance for professional life as an engineer, given that project execution is a core task and engineers must be able to document and confidently present technical

	issues.
	Preparatory work for the scientific project should be undertaken at the university, but may also be performed at a company.
	5.2 Course content
	A scientifically oriented question from the subject area of the degree programme
1	
	ightarrow Details available in the university calendar, course timetable, etc.
5	5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
	The project involves independently tackling a scientific task. You summarise your results in a term paper and hold a
	presentation about your work.
6	6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)
	See current version of the Examination Regulations / special examination rules and regulations
	6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
	Students must pass the examination
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
	Written elaboration (main body of text usually 10-15 pages) and a presentation followed by a
	discussion/questions, lasting a maximum of 30 minutes
	6.4 Requirements for admission to examination See current version of the Examination Regulations / special examination rules and regulations
	see current version of the Examination Regulations / special examination rules and regulations
	6.5 Module mark weighting for calculating final grade
	See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
	muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7	7.1 Languages used in the module:
	7.2 Module Contact Person:
	Professor DrIng. HA. Jantzen, Professor DrIng. J. Scholz
	7.3 Professors (optional):
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Master's Thesis

I 1.1 Title of module (GER / ENG) Masterarbeit / Master's Thes	sis			description (optiona	1)	1.3 Mod MB.2. MB.2.	
2 2.1 Cycle of module: ⊠ Every summer semester □ Every winte Other cycle, namely:	er semester			on of module: ester 🗌 2 semesters	5		
3.1 Module offered in the following degree	programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semester:
Master's programmes:							
Mechanical Engineering				С		4	(FT) / 6 (PT)
- Specialisation Agricultural Engin	neering						
Mechanical Engineering - Specialisation Computational E	ngineering			С		4	(FT) / 6 (PT)
Mechanical Engineering - Specialisation Product Develop				С		4	(FT) / 6 (PT)
Master Business Administration Mechanical Engineering		in		С			4
Workload						Total w	orkload
Contact hours	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload Total conta non-contad	act and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Total	Total contac	t hours in	Total contact			
	Total	SWS		hours in hours			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			750	7!	50	25
	Total			Total non- contact hours 750			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

After successful preparation, students will be able to independently tackle a scientific question from the subject area of mechanical engineering, both as regards technical details and interdisciplinary contexts, within a set time. Students will be able to structure the problem and plan how to tackle it. They will be able to assess their results in the light of scientific literature, and to draw conclusions accordingly. Students will be able to present the approach, the results and the ensuing critical analysis in a structured manner in a written text.

The skills gained whilst completing the Master's thesis prepare students for a career in industry or for a doctorate.

5.2 Course content

Scientifically oriented task from the subject area of the degree programme. Students may complete their Master's thesis in an external establishment such as a company or a research institution, or at the university. This is made easier by the numerous research projects undertaken at FH Münster. → Details available in the university calendar, course timetable, etc. 5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. By completing a Master's thesis, you demonstrate your ability to apply the knowledge gained during the degree programme to current engineering and practice-oriented tasks from the subject area of your programme. 6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired: See current version of the Examination Regulations / special examination rules and regulations 6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Students must pass the examination 6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) Written elaboration (main body of text approx. 30-120 pages) 6.4 Requirements for admission to examination See current version of the Examination Regulations / special examination rules and regulations 6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).* *You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7 7.1 Languages used in the module: German 🗌 English 🗌 Other, namely: 7.2 Module Contact Person: Professor Dr.-Ing. H.-A. Jantzen, Professor Dr.-Ing. J. Scholz 7.3 Professors (optional): 7.4 Maximum number of participants (optional) 7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Colloquium

1.1 Title of module (GER / ENG) Kolloquium / Colloquium 2.1 Cycle of module:				description (optiona	-	1.3 Modu MB.2.0 MB.2.0	
Every summer semester Every winte Other cycle, namely:	er semester			ester 🗌 2 semesters	5		
3.1 Module offered in the following degree	programme(s):			ulsory (C), compulso CE), elective (E)	ry	3.3 Reco	mmended semester:
Master's programmes:							
Mechanical Engineering				С		л	(FT) / 6 (PT)
- Specialisation Agricultural Engi	neering			C		4	(F1)/0(F1)
Mechanical Engineering				С		л	(FT) / 6 (PT)
- Specialisation Computational E	ngineering			C			
Mechanical Engineering - Specialisation Product Develop	ment			С		4	(FT) / 6 (PT)
Master Business Administration Mechanical Engineering	& Engineering majoring	in		С			4
Workload					1	Total wo	a al al a a al
Contact hours	Method of teaching	Hours per semester (each meth teaching	SWS) for	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Total conta	act and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)							
	Total	Total contac SWS	t hours in	Total contact hours in hours			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation for assignments, follow-up work, preparation for examination			150	15	50	5
	Total			Total non- contact hours 150			

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to acquire soft skills in addition to technical skills? For which other modules and prospective tasks in the labour market are the acquired knowledge and skills relevant?)

In the colloquium, students demonstrate their ability to present, orally explain and independently substantiate before a specialist audience the results of their Master's thesis, its specialist and methodological basis, interdisciplinary contexts and wider references. Students also show that they are able to assess the significance of their findings for practice or science. In particular, students will hone their presentation and argumentation skills.

5.2 Course content

 → Details available in the university calendar, course timetable, etc. 5.3 Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. During the colloquium, you present the key aspects of your Master's thesis to a specialist audience. You show that you can orally explain and argue the objectives, and the practical and scientific relevance of your final thesis. 6.1 Prerequisites (<i>formal</i>: examination of module XY has to be passed or similar <u>content-wise</u>; module XY should have been attended, the following knowledge and skills should have been actended. The following knowledge and skills should have been actended to regulations.
the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the module for the further cour of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. During the colloquium, you present the key aspects of your Master's thesis to a specialist audience. You show that you can orally explain and argue the objectives, and the practical and scientific relevance of your final thesis. 6.1 Prerequisites (<i>formal</i> : examination of module XY has to be passed or similar <u>content-wise</u> ; module XY should have been attended, the following knowledge and skills should have been acquired:)
you can orally explain and argue the objectives, and the practical and scientific relevance of your final thesis. 6.1 Prerequisites (<i>formal</i> : examination of module XY has to be passed or similar <u>content-wise</u> ; module XY should have been attended, the following knowledge and skills should have been acquired:)
6.1 Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skills should have been acquired:)
been acquired:)
See current version of the Evamination Regulations / special evamination rules and regulations
see current version of the Examination negatations / special examination rules and regulations
6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation)
Students must pass the examination
6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
Presentation followed by an oral examination, with a total duration of around 30 minutes
6.4 Requirements for admission to examination
See current version of the Examination Regulations / special examination rules and regulations
6.5 Module mark weighting for calculating final grade
See Examination Regulations for above-mentioned degree programmes (Section 3).*
*You will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7.1 Languages used in the module:
7.2 Module Contact Person:
Professor DrIng. HA. Jantzen, Professor DrIng. J. Scholz
7.3 Professors (optional):
7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)