

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

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Course timetables for Bachelor's degree programmes

Degree programmes and specialisations	Valid from enrolment in
Bachelor International Engineering – Mechanical Engineering	WiSe 21 / 22
Bachelor Mechanical Engineering	
Bachelor Mechanical Engineering, Specialisation in Construction and Manufacturing Technology	WiSe 21 / 22
Bachelor Mechanical Engineering, Specialisation in Plant Engineering	
Bachelor Mechanical Engineering, Specialisation in Automotive and Drive Engineering	
Bachelor Computer Science in Mechanical Engineering	WiSe 21 / 22
Bachelor Business Administration & Engineering majoring in Mechanical Engineering	WiSe 21 / 22
Bachelor Mechanical Engineering - Dual	WiSe 21 / 22

Note:

Course timetables are governed by the <u>Examination Regulations applicable at the time of</u> <u>enrolment</u>.

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

Abbreviations:

HPW	= hours per week per semester	L	= lecture
СР	= credit points	S	= seminar
ΕT	= examination type	SL	= seminaristic lecture
SuSe	e = summer semester	Е	= exercise (exercise class)
WiSe	= winter semester	Ρ	= practical course (laboratory class)

GS = guest semester

Bachelor International Engineering – Mechanical Engineering (Outgoings FH Münster)



Compulsory engineering modules



Practical modules

Modules at Partner University

Practical modules at Partner University

1st - 7th Semester Bachelor International Engineering - Mechanical Engineering (Outgoings)

1st sem.	Mathematics 1	Physics		Sta	tics	Basics	of Construction Design	М	laterials Engineering 1	
2nd sem.	Mathematics 2 / Statistics	Machine Elements	Strength	n of Materials	Basics of Con Desig		Programming Ba	asics	Materials Engineering 2	
3rd sem.	Introduction to Electrical Engineering	Thermodynamics	Fluid	Mechanics	Design Engir CAD		Basics of Busin Administratio		Spanish for Engineering and Latin American Culture 1	
4th sem.	Dynamics	Production Engineering 1		ction to Finite ent Method	Design Engir CAD 2		Hydraulics		Spanish for Engineering and Latin American Culture 2	
5th sem.		Study	in Latin A	merica at Part	ner University ((UPB / US	SACH)			
6th sem.		Study	in Latin A	merica at Part	ner University ((UPB / US	SACH)			
7th sem.	Study in Latin America at Partner University (UPB / USACH) Practical Project (UPB) Bachelor Thesis (UPB / USACH) Colloquium (UPB)									

- Outgoings (FH Münster) 1st – 4th Semester

Abbreviations:		
HWS = Hours per Week per Semester	L = Lecture	ET = Examination Type
CP = Credit Points	SL = Seminaristic Lecture	SE = Standard Examination
	E = Excercise Class	UT = Unit Test
	S = Seminar	PT 1 = Part 1 of the Unit Test
	P = Laboratory Class	PT 2 = Part 2 of the Unit Test

Studies in Münster		1	st S	em	este	r			2	nd S	Sem	este	ər			3	rd S	Sem	este	ər			4t	th S	em	este	er		5th - 7th Semester					,	Tot	al	
		ł	HWS							HWS							HWS							IWS							-W						
Type of Course	L	S	Ρ	Е	SL	CP	ΕT	Ц	S	Ρ	Е	SL	CP	ΕT	Ц	S	Ρ	Е	SL	CP	ΕT	L	S	Ρ	Е	SL	CP	ΕT	L	S	Ρ	Е	SL	CP	ΕT	HWS	СР
Modules at FH Münster																																					
Mathematics 1	4	0	0	2	0	8	UT																													6	8
Statics	2	0	0	2	0	5	UT																													4	5
Physics	3	0	0	2	0	6	UT																													5	6
Materials Engineering 1	2	0	1	1	0	5	UT																													4	5
Basics of Construction Design	2	0	2	0	0	6		0	0	2	0	0	3	UT																						6	9
Mathematics 2 / Statistics								6	0	0	3	0	7	UT																						9	7
Strength of Materials								2	0	0	2	0	5	UT																						4	5
Machine Elements								3	0	0	1	0	5	UT																						4	5
Materials Engineering 2								3	0	1	0	0	5	UT																						4	5
Programming Basics								3	0	1	1	0	5	UT																						5	5
Introduction to Electrical Engineering															3	0	1	1	0	5	UT															5	5
Thermodynamics															3	0	0	1	0	5	UT															4	5
Fluid Mechanics															3	0	1	1	0	5	UT															5	5
Design Engineering / CAD 1															2	0	2	1	0	5	UT															5	5
Basics of Business Administration															2	0	0	2	0	5	UT															4	5
Spanish for Engineering and Latin																																				4	-
American Culture 1															0	0	0	2	2	5	UT															4	5
Spanish for Engineering and Latin																																				4	5
American Culture 2																						0	0	0	2	2	5	UT								4	5
Dynamics																						2	0	0	2	0	5	UT								4	5
Production Engineering 1																						2	0	1	1	0	5	UT								4	5
Introduction to Finite Element Methods																						3	0	1	1	0	5	UT								5	5
Design Engineering / CAD 2																						0	0	2	1	0	-	UT								3	5
Hydraulics																						2	0	1	1	0	5	UT								4	5
Modules at Partner University																																					
Modules, incl. Internship (UPB)																																					
Bachelor Thesis (UPB / USACH)																																		90	MΡ	0	90
Colloquium (UPB)																																					
TOTAL	13	0	3	7	0	30	0	17	0	4	7	0	30	0	13	0	4	8	2	30	0	9		5	8	2	30	0	0	0	0	0	0	90	0	102	210
			23			50				28			50				27			00	0			24			50	0			0			30		102	210

- Outgoings (UPB) 5th – 7th Semester

Abbreviations:		
HWS = Hours per Week per Semester	L = Lecture	ET = Examination Type
CP = Credit Points	SL = Seminaristic Lecture	SE = Standard Examination
	E = Excercise Class	UT = Unit Test
	S = Seminar	PT 1 = Part 1 of the Unit Test
	P = Laboratory Class	PT 2 = Part 2 of the Unit Test

Studies in Medellín		1s	t - 4	4th \$	Sem	ester			5	5th \$	Sem	este	ər			6	th S	em	este	r			7	th S	em	este	ər			Total	
			ΗW	/S						HW	s					H	IWS	3					ŀ	HWS	3						
Type of Course	L	S	Ρ	E	SL	CP	ET	L	S	Ρ	Е	SL	CCI	ET	L	S	Ρ	Е	SL	CCF	ΕT	L	S	Ρ	Е	SL	CCF	ΕT	HWS	СР	ССР
Modules at FH Münster																															
Modules in total						120)																						-	120	-
Modules at UPB																															
Mechanical Design								2	0	0	2	0	3	SE															4	-	3
Project Management								3	0	0	1	0	3	SE															4	-	3
Maintainance Management								3	0	0	1	0	3	SE															4	-	3
Materials Selection								3	0	0	1	0	2	SE															4	-	2
Thermal and Hydraulic Machines								3	0	0	1	0	2	SE															4	-	2
Laboratory Thermal and Hydraulic Machines								0	0	2	0	0	1	SE															2	-	1
Professional optative 1								Х	Х	Х	Х	Х	3	SE														\square	-	-	3
Elective Humanistic Education Course 2															4	0	0	0	0	2	SE								4	-	2
Professional Context															2	0	0	0	0	1	SE								2	-	1
Industrial Management															3	0	0	1	0	3	SE								4	-	3
Control Engineering															3	0	0	1	0	2	SE							\square	4	-	2
Laboratory Control Engineering															0	0	2	0	0	1	SE								2	-	1
Research Methodology															2	0	0	0	0	1	SE								2	-	1
Applied Engineering Subject 4															0	0	0	4	0	3	SE								4	-	3
Professional optative 2															Х	Х	Х	Х	Х	3	SE								I	-	3
Elective																						Х	Х	Х	Х	Х	3	SE	I	-	3
Professional Practice (incl. Internship, Bachelor Thesis and Kolloquium)																						х	х	Х	х	х	11	SE	-	-	11
TOTAL																														90*	47*
(* The CCPs earned at UPB			_																												
will be recognized as 90 CPs at FH Münster)	0	0	0 0	_	0	120	0	14	0	2 22	6	0	17	0	14	0	2 22	6	0	16	0	0	0	0 0	0	0	14	0	44	210	

5th – 7th Semester - Outgoings (USACH) Abbreviations: HWS = Hours per Week per Semester ET = Examination Type L = LectureCP = Credit Points SL = Seminaristic Lecture SE = Standard Examination E = Excercise Class UT = Unit Test S = Seminar PT 1 = Part 1 of the Unit Test P = Laboratory Class PT 2 = Part 2 of the Unit Test Studies in Santiago de Chile 1st - 4th Semester **6th Semester** 7th Semester 5th Semester Total HWS HWS HWS HWS Type of Course L S P E SL CP ET HWS CP Modules at FH Münster Modules in total Modules at USACH 8 UT Thermical and Hydraulic Systems Manufacturing Processes 2 5 UT 5 UT Heat Transmission 5 UT Motors and Machines UT Maintainance Procedures 3 UT Finance and Microeconomics 5 UT Machines with Numerical Control UT Automatization **Applicated Computer Sciences** UT Elective UT Market Investigation UT Business Administration and 2 UT Entrepreneurship 5 UT Thesis Preparation

26 0

4 0

30 0

2 0 2 0 0 4 UT

0 0

6 0

20 0 11 2

30 0

0 0 22

0 0

0 4 UT

Energy and Environment

Thesis

TOTAL

Production Planning and Control

0 0

0 0

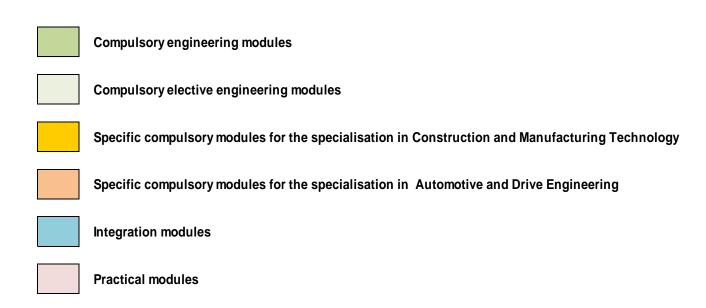
Bachelor International Engineering – Mechanical Engineering (Incomings UPB)

1st – 6th Semester

- Incomings (UPB)

120 CPs at FH Münster)

Abbreviations HWS = Hours per Week per Semester L = Lecture ET = Examination Type CP = Credit Points SE = Standard Examination SL = Seminaristic Lecture E = Excercise Class UT = Unit Test S = Seminar PT 1 = Part 1 of the Unit Test P = Laboratory Class PT 2 = Part 2 of the Unit Test Studies in Medellín 1st Semester 2nd Semester 3rd Semester 4th Semester 5th Semester 6th Semester 7th - 9th Semester Total HWS HWS HWS CP ET HWS HWS HWS HWS S P E SC CCP L S P E SC CCP S P E SC CCP E S P E SC CCF S P E SC CCF L S P E SC CCP LSPESC Type of Course HWS СР CCP Modules at UPB Humanism and Civic Culture 4 0 0 0 0 2 SE 4 2 Language and Culture 4 0 0 0 0 2 SE 4 2 Differential Calculus 3 0 0 1 0 3 SE 4 3 -3 0 0 1 0 3 SE 3 Analytic Geometry 4 -Fundamentals of Chemistry 3 0 0 1 0 3 SE 3 4 -1 0 0 1 0 1 SE Introduction to Mechanical Engineering 2 1 -Module of Applied Engineering 1 0 0 0 3 0 2 SE 2 3 General Ethics 2 0 0 0 0 1 SE 2 -1 Integral Calculus 3 0 0 1 0 3 SE 4 3 -3 0 0 1 0 3 SE 4 3 Linear Algebra -3 0 0 1 0 3 SE 4 3 Measurement and Instrumentation 3 0 0 1 0 3 SE 3 Mechanical Drawing and CAD 4 Materials Science 3 0 0 1 0 3 SE 3 4 Laboratory of Materials 0 0 2 0 0 1 SE 2 1 Christology 4 0 0 0 0 2 SE 4 2 -Vector Calculus 3 0 0 1 0 3 SE 4 3 Differential Equations 3 0 0 1 0 3 SE 4 3 -Programming and Numerical Methods 3 0 0 1 0 3 SE 4 3 Applied Statics 3 0 0 1 0 3 SE 4 -3 0 0 0 3 0 2 SE 3 2 Module of Applied Engineering 2 -Electricity and Magnetism 3 0 0 1 0 3 SE 4 -3 Experimetal Methods in Physics 0 0 2 0 0 2 SE 2 2 3 Optative course in Basic Sciences X X X X X 3 SE 0 -Fundamentals of Mechanics of Materials 3 0 0 1 0 2 SE 4 2 0 0 2 0 0 1 SE 1 Laboratory of Mechanics of Materials 2 -Applied Dynamics 3 0 0 1 0 3 SE 4 . 3 3 0 0 1 0 3 SE 4 -3 Thermodynamics Elective Humanistic Education Course 1 X X X X X 2 SE 0 -2 Entrepreneurship and Social 0 0 0 4 0 2 SE 2 4 . Responsibility 0 1 0 Statistics and Design of Experiments 3 0 3 SE 4 3 -Applications of Mechanics of Materials 3 0 0 1 0 3 SE 4 3 -Mechanisms 2 0 1 1 0 3 SE 4 3 -Fluid Mechanics 3 0 0 1 0 3 SE 3 4 Manufacturing Processes 4 0 0 0 0 1 SE 4 1 -0 0 4 0 0 2 SE Manufacturing Processes Workshop 4 2 3 0 0 1 0 3 SE Machine Elements 4 3 -Heat Transfer 3 0 0 1 0 3 SE 3 4 -3 0 0 1 0 3 SE Management for Engineers 4 -3 Module of Applied Engineering 3 0 0 4 0 0 2 SE 4 -2 Elective X X X X X 3 SE 0 3 Modules at FH Münster Modules incl. Bachelor Thesis 90 0 90 TOTAL 120 99 (* The CCPs earned at UPB 18 0 0 7 0 17 0 2 5 0 16 0 0 7 0 12 0 4 4 0 15 0 1 4 0 13 0 8 3 0 0 0 0 0 0 90 will be recognized as 17 16 136 210 16 16 17 17 0 25 24 23 20 20 24 0



1st - 6th Semester Bachelor International Engineering - Mechanical Engineering (Incomings UPB)

1st - 6th sem.	Study in Latin America at Partner University (UPB)

7th - 9th Semester - Specialisation in Construction and Manufacturing Technology

7th sem.	Fluid Machir	nes and CFD	Introduction to Fini	te Element Metho	d Hydraulics	Compulsory elective engineering module 1 *		sory elective			
8th sem.	Combustion Engines	Energy and Resource Efficiency	Digital Manufacturing	Production Engineering 2	Technical English	Compulsory elective engineering module 3 *		sory elective ing module 4 *			
9th sem.	Practical Project Bachelor Thesis										

7th - 9th Semester - Specialisation in Automotive and Drive Engineering

7th sem.	Fluid Machir	nes and CFD	Introduction to Finit	te Element Metho	d Automotive Development and Interconnection	Compulsory elective engineering module 1 *	sory elective ng module 2 *
8th sem.	Combustion Engines	Energy and Resource Efficiency	Car Body Engineering	Automotive Systems	Technical English	Compulsory elective engineering module 3 *	sory elective ng module 4 *
9th sem.		Practical P	roject		Ba	chelor Thesis	Colloquium

* One of the compulsory elective engineering modules of guest semester 1 and 2 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

Abbreviations:			Specialisations:
HWS = Hours per Week per Semester	L = Lecture	ET = Examination Type	AD = Automotive and Drive Engineering
CP = Credit Points	SL = Seminaristic Lecture	SE = Standard Examination	CM = Construction and Manufacturing Technology
	E = Excercise Class	UT = Unit Test	
	S = Seminar	PT 1 = Part 1 of the Unit Test	
	P = Laboratory Class	PT 2 = Part 2 of the Unit Test	

Studies in Münster		1s	t - 6t	h Se	emes	ter			7tł	n Se	em. ((SuS	Se)			8t	h Se	em.	(WiS	Se)			9tl	n Se	m. (SuS	e)		Tota	al
		I	HWS							-WS	-						HW	-					ŀ	HWS						
Type of Course	L	S	Ρ	Е	SL	CP	ΕT	L	S	Ρ	Ε	SL	СР	ΕT	L	S	Ρ	Ε	SL	CP	ET	L	S	Ρ	Е	SL	CP E	T HV	NS	СР
Modules at UPB																														
Modules in total						120																								120
Modules at FH Münster																														
Fluid Machines and Computational Fluid Dynamics								2	0	1	1	0	5	UT															4	5
Compulsory Elective Engineering Module 1								0	0	1	1	3	5	UT															5	5
Compulsory Elective Engineering Module 2								0	0	1	1	3	5	UT															5	5
Introduction to Finite Element Methods								3	0	1	1	0	5	UT														(5	5
Automotive Development and Interconnection (AD)								2	0	1	1	0	5	UT																5
Hydraulics (CM)								2	0	1	1	0	5	UT															•	5
Energy and Resource Efficiency															0	0	1	1	2	5	UT								4	5
Technical English															0	4	0	0	0	5	UT								4	5
Combustion Engines															2	0	1	1	0	5	UT								4	5
Compulsory Elective Engineering Module 3															0	0	1	1	3	5	UT							(5	5
Compulsory Elective Engineering Module 3															0	0	1	1	3	5	UT								5	5
Car Body Engineering (AD)															3	0	1	1	0	5	UT									5
Digital Manufacturing (CM)															2	0	1	1	0	5	UT								-	5
Automotive Systems (AD)															2	0	1	1	0	5	UT									5
Production Engineering 2 (CM)															2	0	1	1	0	5	UT								-	5
Internship																						Х	Х	Х	Х	Х	15		-	15
Bachelor Thesis																						Х	Х	Х	Х	Х	12		-	12
Oral Examination / Colloquium																						Х	Х	Х	Х	Х	3 L	Л	-	3
TOTAL	0	0	0 0	0	0	120	0	9	0	6 27	6	6	25	0	11	4	8 39	8	8	35	0	0	0	0 0	0	0	30 (6	66	210

Catalogue of Compulsory elective engineering modules A (UPB)	1	st g	ues	t se	m. (SuSe	e)	2n	nd g	ues	t se	m. (WiS	ie)
		ł	HWS	5					I	HWS	3			
Type of Course	L	S	Ρ	Е	SL	CP	ΕT	L	S	Ρ	Е	SL	СР	ET
Modules at FH Münster														
Digitalisation in Mechanical Engineering								0	0	0	2	3	5	UT
Production Engineering 2								2	0	1	1	0	5	UT
Joining Technology								0	0	1	0	3	5	UT
Fundamentals of Agricultural Engineering	0	0	1	1	3	5	UT							
Energy Technology II - Hydrogen	3	0	0	1	0	5	UT							
Innovative Materials	0	0	1	1	3	5	UT							
Car Body Engineering								3	0	1	1	0	5	UT
Measurement Technology								0	0	2	1	2	5	UT
Basics in Operations Management								2	0	1	1	0	5	UT
Project Management	0	0	1	1	2	5	UT							
Quality Management	0	0	0	1	4	5	UT							
Closed Loop Control								2	0	1	1	0	5	UT
Programmable Logic Control	2	0	1	1	0	5	UT							
Computational Fluid Dynamics	2	0	2	1	0	5	UT							
Technical Project 1	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Technical Project 2	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Process Technology 1	0	0	1	1	3	5	UT							
Process Technology 2								0	0	1	1	3	5	UT
Heat and Mass Transfer	0	0	2	1	2	5	UT							
Catalogue of Compulsory elective engineering modules B														
Applied Computer Science								3	0	1	1	0	5	UT
Database Systems								0	0	2	1	2	5	UT
Introduction to Computer Science	2	0	0	2	0	5	UT							
Introduction to Digital Electronics	2	0	2	1	0	5	UT							
IT-Project Management								0	0	0	1	2	5	UT
Modeling and Simulation								0	0	2	1	2	5	UT
Numerical Software								0	0	2	0	2	5	UT
Object-oriented programming								0	0	3	0	2	5	UT
Virtual Reality in the factory planning	0	0	2	1	1	5	UT							
Total	11	0	13	13	18	70	0	12	0	18	12	21	80	0
			55			70	0			63			80	0

One of the compulsory elective engineering modules of guest semester 1 and 2 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

Bachelor International Engineering – Mechanical Engineering (Incomings USACH)

- Incomings (USACH) 1st – 5th Semester

Abbreviations:			
HWS = Hours per Week per Semester	L = Lecture	ET = Examination Type	
CP = Credit Points	SL = Seminaristic Lecture	UT = Unit Test	
	E = Excercise Class	PT 1 = Part 1 of the Unit Test	
	S = Seminar	PT 2 = Part 2 of the Unit Test	
	P = Laboratory Class		

Studies in Santiago de Chile		1	1st S	Sem	este	er			2	nd S	Sem	este	er			3r	d S	eme	este	r			4t	h Se	eme	ste	r			5th	n Se	eme	este	r		6	ith -	8th	Ser	nes	ster	То	tal
			HW							HWS							IWS							WS							WS							WS					
Type of Course	L	S	Ρ	Е	SL	CP	ET	L	S	Ρ	Е	SL	CP	ET	L	S	Ρ	Е	SL	CP	ΕT	L	S	Ρ	E	SL	CP	ΕT	L	S	Р	Е	SL	CP	ΕT	L	S	Ρ	ES	SL (CP E1	HWS	CP
Modules at USACH			-																																								
Calculus 1 (Analysis)	6	0	0	2	-		UT																																			8	7
Calculus 1 (Algebra)	6	0	0	2			UT																																			8	7
Physics 1	4	0	1	2			UT																																			7	7
Introduction to Engineering	0	0	2	0	0	2	UT																																			2	2
Calculus 2 (Analysis)								6	0	0	2	0	7	UT																												8	7
Calculus 2 (Algebra)								4	0	0	2	0	6	UT																												6	6
Physics 2								4	0	1	2	0	7	UT																												7	7
Basics of Programming								4	0	2	0	0	•	UT																												6	5
Chemistry								4	0	0	2	0	5	UT																												6	5
Electricity and Magnetism															4	0	1	2	0	7	UT																					7	7
Communication															2	0	0	0	0	2	UT																					2	2
English 1															0	0	2	0	0	3	UT																					2	3
Statistics															4	0	0	2	0	5	UT																					6	5
(Engineering) Mechanics															4	0	0	2	0	7	UT																					6	7
Differential Educations and Numeric															4	0	0	2	0	6	ιт																					6	6
Methods														_	-	0	0	2	0	0	01																					_	_
Mechanics of Materials																						4	-		2		7	-														8	7
Basics of Economics																						4	-		2		5															6	5
English 2																						0	0		0		3															2	3
Electrical Engineering and Electronics																						4	-		0		5															5	5
Technical Drawing / CAD																						2	0	2	0	0	7	UT														4	7
Material Science in Mechanical																						4	0	1	0	0	5	UΤ														5	5
Engineering		-			-									_	_								-		-	_	-	-	_	_	_	-	_	-					_	_			
Technical Drawing		-	-											_	_					_				_								0	-	4	-							4	4
Manufacturing Processes			-											_	_									_								0	-	6	-							6	6
Fluid Mechanics	-		-											_	_									_						-		2	-	6	-				_			7	6
Englisch 3	-													_															-			0	-	3	-							2	3
Risk Prevention / Work Security	-													_																0		0	-	4	-							4	4
Thermodynamics														_														_	4	0	1	2	0	6	UT							7	6
Modules at FH Münster			_		_				1	1														-	-						_					_			-	-			
Modules in total incl. Bachelor Thesis																																								1	90	0	90
TOTAL	16	0	3 25		0	23	0	22	0	3 33		0	30	0	18		3 29	8	0	30	0	18	0	8 30	4	0	32	0	18		8 30	4	0	29	0	0	0	0 0	0	0	90 0	147	234

- Incomings (FH Münster) 6th – 8th Semester

Compulsory engineering modules
Compulsory elective engineering modules
Specific compulsory modules for the specialisation in Construction and Manufacturing Technology
Specific compulsory modules for the specialisation in Plant Engineering
Specific compulsory modules for the specialisation in Automotive and Drive Engineering
Integration modules
Practical modules

1st - 5th Semester Bachelor International Engineering - Mechanical Engineering (Incomings USACH)



Study in Latin America at Partner University (USACH)

6th - 8th Semester - Specialisation in Construction and Manufacturing Technology

6th sem.	Dynamics	Production Engineering 1	Introduction to Finite Element Method	Hydraulics	Compulsory elective engineering module 1 *	sory elective ng module 2 *
7th sem.	Combustion Engines	Production Engineering 2	Digital Manufacturing	Technical English	Compulsory elective engineering module 3 *	sory elective ng module 4 *
8th sem.		Practical Project		Ba	chelor Thesis	Colloquium

6th - 8th Semester - Specialisation in Plant Engineering

6th sem.	Dynamics	Production Engineering 1	Process Technology 1	Heat and Mass Transfer	Compulsory elective engineering module 1 *	 sory elective ng module 2 *
7th sem.	Energy and Resource Efficiency	Apparatus and Plant Engineering	Process Technology 2	Technical English	Compulsory elective engineering module 3 *	sory elective ng module 4 *
8th sem.		Practical Project		Ba	chelor Thesis	Colloquium

6th - 8th Semester -

- Specialisation in Automotive and Drive Engineering

6th sem.	Dynamics	Production Engineering 1	Introduction to Finite Element Method	Automotive Development and Interconnection	Compulsory elective engineering module 1 *	sory elective ng module 2 *
7th sem.	Combustion Engines	Automotive Systems	Car Body Engineering	Technical English	Compulsory elective engineering module 3 *	sory elective ng module 4 *
8th sem.		Practical Project		Ba	chelor Thesis	Colloquium

* One of the compulsory elective engineering modules of guest semester 1 and 2 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

Abbreviations:																		satio											
HWS = Hours per Week per Semester		= Leo							= Ex			on T	ype									ve Eng							
CP = Credit Points						ectur	е	UT														/lanufa	cturi	ng Te	echn	olog	y		
	_	= Exc			Class	6							e Unit			PL =	: Pla	nt Er	ngin	eeri	ng								
		= Se						PT	2 = I	Part	2 of	f the	e Unit	Tes	st														
	P :	= Lał	oora	tory	Clas	S																							
Studies in Münster	1	4 -						1	041			(<u></u>	0-1			70	0	. //	1:0						0		—	Tai	(a)
Studies in Munster			π - 5 HW3		eme	ester				1 5e 1WS	em. ((Su:	Se)				Ser WS	n. (V	VISe	<i>?)</i>		8	HW	em. (<u>,</u> 5u5	se)		Tot	ai
Type of Course				-	SI	СР	FT					SI	CP	FT	1		-	FIS	SI (СP	гт	1 5			SI	CP	FT	нws	CP
Modules at USACH	_	1-			10-	0.	1	_	-		. –					•	·	- 1					<u> </u>	<u> </u>			Ē		.
Modules in total		T	1	1		120	1					[T				T	T					120
Modules at FH Münster		-																											
Production Engineering 1		1		1	1	1	1	2	0	1	1	0	5	UT			Т						T	T				4	5
Dynamics								2	0	0	2	0		UT									-	-				4	5
Compulsory Elective Engineering Module 1								0	0	1	1	3		UT									1					5	5
Compulsory Elective Engineering Module 2								0	0	1	1	3	5	UT									1					5	5
Introduction to Finite Element Methods (AD + CM)								3	0	1	1	0	-	UT															-
Process Technology 1 (PL)								0	0	1	1	3	5	UT														-	5
Automotive Development and Interconnection (AD)								2	0	1	1	0		UT															
Hydraulics (CM)								2	0	1	1	0	5	UT														-	5
Heat and Mass Transfer (PL)								0	0	2	1	2		UT															
Technical English															0	4	0	0	0	5	UT							4	5
Compulsory Elective Engineering Module 3															0	0	1			5	UT							5	5
Compulsory Elective Engineering Module 4															0	0	1	1	3	5	UT							5	5
Combustion Engines (AD + CM)															2	0	1		0	5	UT								5
Energy and Resource Efficiency (PL)															0	0	1	1	2	э	UT							-	Э
Car Body Engineering (AD)															3	0	1	1	0		UT								
Digital Manufacturing (CM)															2	0	1	1	0	5	UT							-	5
Process Technology 2 (PL)															0	0	1	1	3		UT								
Automotive Systems (AD)															2	0	1	1	0		UT								
Production Engineering 2 (CM)															2	0	1	1	0	5	UT		Ι					-	5
Apparatus and Plant Engineering (PL)															3	0	1	1	0		UT								
Internship																						ХХ						-	15
Bachelor Thesis																						ХХ				12		-	12
Oral Examination / Colloquium																						ХХ			Х	3	UT	-	3
TOTAL	0	0	0 0	0	0	120	0	11	0	9 41	10	11	30	0	14		10 49	10 1	11	30	0	0 0	0		0	30	0	9 0	210

Catalogue of Compulsory elective engineering modules A (USACH)	1	st g	ues	t se	m. (SuSe	?)	2r	nd g	ues	t sei	m. (WiS	ie)
		ł	HWS	5		СР	ΕT		I	HWS	3		СР	ΕT
Type of Course	L	S	Ρ	Е	SL			L	S	Ρ	Е	SL		
Modules at FH Münster														
Process Engineering Project								Х	Х	Х	Х	Х	5	MP
Digitalisation in Mechanical Engineering								0	0	0	2	3	5	UT
Energy and Resource Efficiency								0	0	1	1	2	5	UT
Production Engineering 2								2	0	1	1	0	5	UT
Joining Technology								0	0	1	0	3	5	UT
Fundamentals of Agricultural Engineering	0	0	1	1	3	5	UT							
Energy Technology II - Hydrogen	3	0	0	1	0	5	UT							
Innovative Materials	0	0	1	1	3	5	UT							
Car Body Engineering								3	0	1	1	0	5	UT
Measurement Technology								0	0	2	1	2	5	UT
Basics in Operations Management								2	0	1	1	0	5	UT
Project Management	0	0	1	1	2	5	UT							
Quality Management	0	0	0	1	4	5	UT							
Closed Loop Control								2	0	1	1	0	5	UT
Programmable Logic Control	2	0	1	1	0	5	UT							
Fluid Machines and Computational Fluid Dynamics (CFD)	2	0	1	1	0	5	UT							
Computational Fluid Dynamics	2	0	2	1	0	5	UT							
Technical Project 1	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Technical Project 2	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Process Technology 1	0	0	1	1	3	5	UT							
Process Technology 2								0	0	1	1	3	5	UT
Heat and Mass Transfer	0	0	2	1	2	5	UT							
Catalogue of Compulsory elective engineering modules B														
Applied Computer Science								3	0	1	1	0	5	UT
Database Systems								0	0	2	1	2	5	UT
Introduction to Computer Science	2	0	0	2	0	5	UT							
Introduction to Digital Electronics	2	0	2	1	0	5	UT							
IT-Project Management								0	0	0	1	2	5	UT
Modeling and Simulation								0	0	2	1	2	5	UT
Numerical Software								0	0	2	0	2	5	UT
Object-oriented programming								0	0	3	0	2	5	UT
Virtual Reality in the factory planning	0	0	2	1	1	5	UT							
Total	13	0	14	14	18	75	0	12	0	19	13	23	90	0
			59			75	0			67			90	0

One of the compulsory elective engineering modules of guest semester 1 and 2 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

Bachelor Mechanical Engineering

Compulsory engineering modules
Compulsory elective engineering modules
Specific compulsory modules for the specialisation in Construction and Manufacturing Technology
Specific compulsory modules for the specialisation in Plant Engineering
Specific compulsory modules for the specialisation in Automotive and Drive Engineering
Integration modules
Practical modules

1st - 3rd Semester

1st sem.	Mathematics 1	Phy	sics	Sta	tics	Basics	of Construction Design	Materials Engineering 1
2nd sem.	Mathematics 2 / Statistics	Machine Element	s Strength	n of Materials		Construction esign	Programming Bas	Materials Engineering 2
3. Sem.	Communication (Prerequisite to Practicle Project)	Introduction to Electrical Engineering	Thermodynam	nics Fluid Me	echanics D	Design Enginee / CAD 1	ering Basics of Busin Administration	

4th - 6th Semester - Specialisation in Construction and Manufacturing Technology

4th sem.	Dynamics	Production Engineering 1	Introduction to Finite Element Method	Design Engineering / CAD 2	Hydraulics	sory elective ng module 2 *
5th sem.	Closed Loop Control	Production Engineering 2	Digital Manufacturing	Combustion Engines	Technical English	sory elective ng module 3 *
6th sem.		Practical Project		Bac	chelor Thesis	Colloquium

4th - 6th Semester - Specialisation in Plant Engineering

4th sem.	Dynamics	Production Engineering 1	Process Technology 1	Fluid Machines and CFD	Heat and Mass Transfer	sory elective ng module 2 *
5th sem.	Closed Loop Control	Apparatus and Plant Engineering	Energy and Resource Efficiency	Process Technology 2	Technical English	sory elective ng module 3 *
6th sem.		Practical Project		Ba	chelor Thesis	Colloquium

4th - 6th Semester - Specialisation in Automotive and Drive Engineering

4th sem.	Dynamics	Production Engineering 1	Introduction to Finite Element Method	Fluid Machines and CFD	Automotive Development and Interconnection	lsory elective ing module 2 *
5th sem.	Closed Loop Control	Car Body Engineering	Automotive Systems	Combustion Engines	Technical English	lsory elective ing module 3 *
6th sem.		Practical Project		Bad	chelor Thesis	Colloquium

* One of the compulsory elective engineering modules of semesters 3 to 5 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

Bachelor Mechanical Engineering /

1st – 3rd Semester

Subjects		1	st S	Sem	este	er			2	nd S	Sem	este	ər			3	rd S	Sem	este	er			4th	- 6t	h Se	eme	ster		Tot	al
			HWS	S					ŀ	IWS	3					ŀ	HWS	S					ł	HWS	S					
Type of Course	L	S	Р	Е	SL	СР	ET	L	S	Ρ	Е	SL	СР	ΕT	L	S	Ρ	Ε	SL	СР	ΕT	L	S	Ρ	Ε	SL	СР	ET	HWS	СР
Compulsory engineering modules																														
Mathematics 1	4	0	0	2	0	8	UT																						6	8
Statics	2	0	0	2	0	5	UT																						4	5
Physics	3	0	0	2	0	6	UT																						5	6
Material Engineering 1	2	0	1	1	0	5	UT																						4	5
Basics of Construction Design	2	0	2	0	0	6	-	0	0	2	0	0	3	UT															6	9
Mathematics 2 / Statistics								6	0	0	3	0	7	UT															9	7
Strength of Materials								2	0	0	2	0	5	UT															4	5
Machine Elements								3	0	0	1	0	5	UT															4	5
Material Engineering 2								3	0	1	0	0	5	UT															4	5
Programming Basics								3	0	1	1	0	5	UT															5	5
Communication															0	0	0	2	0	-	UT								2	0
Introduction to Electrical Engineering															3	0	1	1	0	5	UT								5	5
Thermodynamics															3	0	0	1	0	5	UT								4	5
Fluid Mechanics															3	0	1	1	0	5	UT								5	5
Design Engineering / CAD 1															2	0	2	1	0	5	UT								5	5
Integration modules																														
Basics of Business Administration															2	0	0	2	0	5	UT								4	5
Compulsory elective engineering module	s																													
Compulsory elective engineering module 1 *															0	0	1	1	3	5	UT								5	5
	13	0	3	7	0	20	0	17	0	4	7	0	20	0	13	0	5	9	3	20									01	00
TOTAL (1 3.)			23	•		30	0			28			30	0			30	•		30	0								81	90

* One of the compulsory elective engineering modules of semesters 3 to 5 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

- Specialisation in Construction and Manufactoring Technology /

4th – 6th Semester

Subjects		1st	- 3r	d Se	emes	ter				4th \$	Sem	este	er			5	5th S	Sem	este	r			6	th S	eme	ster	r		Tot	al
		ŀ	-IWS	6						HWS							-WS							łWS						
Type of Course	L	S	Ρ	Ε	SL	СР	ET	L	S	Ρ	Е	SL	СР	ΕT	L	S	Ρ	Е	SL	CP	ET	V	S	Ρ	Ü	SU	LP	PE	HWS	СР
Compulsory engineering modules (CM)																														
Dynamics								2	0	0	2	0	5	UT															4	5
Production Engineering 1								2	0	1	1	0	5	UT															4	5
Introduction to Finite Element Method								3	0	1	1	0	5	UT															5	5
Design Engineering / CAD 2								0	0	2	1	0	5	UT															3	5
Hydraulics								2	0	1	1	0	5	UT															4	5
Closed Loop Control															2	0	1	1	0	5	UT								4	5
Production Engineering 2															2	0	1	1	0	5	UT								4	5
Digital Manufacturing															2	0	1	1	0	5	υT								4	5
Combustion Engines															2	0	1	1	0	5	UT								4	5
Integration modules																														
Technical English															0	4	0	0	0	5	UT								4	5
Compulsory elective engineering modules											-																			
Compulsory elective engineering module 2 *								0	0	1	1	3	5	UT															5	5
Compulsory elective engineering module 3 *															0	0	1	1	3	5	UT								5	5
Practical modules																														
Practical Project																						Х	Х	Х	Х	Х	15		0	15
Bachelor Thesis																						Х	Х	Х	Х	Х	12		0	12
Colloquium																						Х	Х	Х	Х	Х	3		0	3
TOTAL (4 6.)								9	0	6	7	3	30	0	8	4	5	5	3	30	0	0	0	0	0	0	30	0	50	90
101AL (4 0.)										25			30	0			25			30	0			0			30	0	50	90
TOTAL (1 3.)	43	0	13 82	23	3	90	0																						82	90
TOTAL	43	0	13 82	23	3	90	0	9	0	6 25	7	3	30	0	8	4	5 25	5	3	30	0	0	0	0 0	0	0	30	0	132	180

Catalogue of compulsory elective engineering modules A (CM)			S	SuS	е					N	NiS	е		
		ł	HWS	S					I	HWS	S			
Type of Course	L	S	Р	Е	SL	СР	ET	L	S	Р	Е	SL	СР	ΕT
Compulsory elective engineering modules														
Automotive Systems								2	0	1	1	0	5	UT
Digitalization in Mechanical Engineering								0	0	0	2	3	5	UT
Automotive Development and Interconnection	2	0	1	1	0	5	UT							
Energy and Resource Efficiency								0	0	1	1	2	5	UT
Joining Technology								0	0	1	0	3	5	UT
Fundamentals of Agricultural Engineering	0	0	1	1	3	5	UT							
Energy Technology II - Hydrogen	3	0	0	1	0	5	UT							
Think Tank	2	0	1	2	0	5	UT	2	0	1	2	0	5	UT
Innovative Materials	0	0	1	1	3	5	UT							
Car Body Engineering								3	0	1	1	0	5	UT
Measurement Technology								0	0	2	1	2	5	UT
Basics in Operations Management								2	0	1	1	0	5	UT
Project Management	0	0	1	1	2	5	UT							
Quality Management	0	0	0	1	4	5	UT							
Programmable Logic Control	2	0	1	1	0	5	UT							
Fluid Machines and														
Computational Fluid Dynamics	2	0	1	1	0	5	UT							
Computational Fluid Dynamics	2	0	2	1	0	5	UT							
Technical Project 1	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Technical Project 2	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Process Technology 1	0	0	1	1	3	5	UT							
Process Technology 2								0	0	1	1	3	5	UT
Heat and Mass Transfer	0	0	2	1	2	5	UT							
Compulsory elective engineering modules B (Computer Science)													
Applied Computer Science								3	0	1	1	0	5	UT
Database Systems								0	0	2	1	2	5	UT
Introduction to Computer Science	2	0	0	2	0	5	UT							
Introduction to Digital Electronics	2	0	2	1	0	5	UT							
IT-Project Management								0	0	0	1	2	5	UT
Modeling and Simulation								0	0	2	1	2	5	UT
Numerical Software								0	0	2	0	2	5	UT
Object-oriented programming								0	0	3	0	2	5	UT
Virtual Realitiy in the factory planning	0	0	2	1	1	5	UT							
Total	17	0	16	17	18	05		12	0	19	14	23	05	_
Total			68			85	0			68			85	0

* One of the compulsory elective engineering modules of semester 3 to 5 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

- Specialisation in Plant Engineering /

4th – 6th Semester

Subjects		1st	: - 31	rd Se	emes	ter				4th	Sen	neste	ər				5th	Sen	neste	er			6t	h Se	emes	ter		Tot	al
			HWS	S						HWS	S						HWS	3						VS					
Type of Course	L	S	Ρ	Е	SL	CP	ET	L	S	Ρ	Е	SL	СР	ΕT	L	S	Ρ	Е	SL	СР	ΕT	L	SF	ΡE	SL	CP	ΕT	HWS	СР
Compulsory engineering modules																													
Dynamics								2	0	0	2	0	5	J														4	5
Production Engineering 1								2	0	1	1	0	5	UT														4	5
Process Technology 1								0	0	1	1	3	5	UT														5	5
Fluid Machines and CFD								2	0	1	1	0	5	UT														4	5
Heat and Mass Transfer								0	0	2	1	2	5	UT														5	5
Closed Loop Control															2	0	1	1	0	5	UT							4	5
Apparatus and Plant Engineering															3	0	1	1	0	5	UT							5	5
Energy and Resource Efficiency															0	0	1	1	2	5	UT							4	5
Process Technology 2															0	0	1	1	3	5	UT							5	5
Integration modules																													
Technical English															0	4	0	0	0	5	UT							4	5
Compulsory elective engineering modules																													
Compulsory elective engineering module 2 *								0	0	1	1	3	5	UT														5	5
Compulsory elective engineering module 3 *															0	0	1	1	3	5	UT							5	5
Practical modules																													
Practical Project																						Х	XX	ĸΧ	Х	15		0	15
Bachelor Thesis																						Х	XX	ĸΧ	Х	12		0	12
Colloquium																						Х	XX	Χ	Х	3		0	3
								6	0	6	7	8	00		5	4	5	5	8	30		0	0 (0 0	0	00	0	54	
TOTAL (4 6.)										27	<u>.</u>		30	0			27			30	0			2		30	0	54	90
TOTAL (1 3.)	43	0	13 82	23	3	90	0																					82	90
ΤΟΤΑL	43	0	13 82	23	3	90	0	6	0	6 27	7	8	30	0	5	4	5 27	5	8	30	0	0	0 0	0 0	0	30	0	136	180

Catalogue of compulsory elective engineering modules A (PL)	HWS										WiS	ie 🛛		
	HWS									HW	S			
Type of Course	L	S	Ρ	Е	SL	СР	ΕT	L	S	Ρ	Е	SL	СР	ET
Compulsory elective engineering modules														
Process Engineering Project								Х	Х	Х	Х	Х	5	UT
Automotive Systems								2	0	1	1	0	5	UT
Digital Manufacturing								2	0	1	1	0	5	UT
Digitalization in Mechanical Engineering								0	0	0	2	3	5	UT
Automotive Development and Interconnection	2	0	1	1	0	5	UT							
Production Engineering 2								2	0	1	1	0	5	UT
Joining Technology								0	0	1	0	3	5	UT
Fundamentals of Agricultural Engineering	0	0	1	1	3	5	UT							
Energy Technology II - Hydrogen	3	0	0	1	0	5	UT							
Think Tank	2	0	1	2	0	5	UT	2	0	1	2	0	5	UT
Innovative Materials	0	0	1	1	3	5	UT							
Car Body Engineering								3	0	1	1	0	5	UT
Measurement Technology								0	0	2	1	2	5	UT
Basics in Operations Management								2	0	1	1	0	5	UT
Project Management	0	0	1	1	2	5	UT							
Quality Management	0	0	0	1	4	5	UT							
Programmable Logic Control	2	0	1	1	0	5	UT							
Technical Project 1	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Technical Project 2	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Combustion Engines								2	0	1	1	0	5	UT
Compulsory elective engineering modules B (Computer Science	e)													
Applied Computer Science								3	0	1	1	0	5	UT
Database Systems								0	0	2	1	2	5	UT
Introduction to Computer Science	2	0	0	2	0	5	UT							
Introduction to Digital Electronics	2	0	2	1	0	5	UT							
IT-Project Management								0	0	0	1	2	5	UT
Modeling and Simulation								0	0	2	1	2	5	UT
Numerical Software								0	0	2	0	2	5	UT
Object-oriented programming								0	0	3	0	2	5	UT
Virtual Realitiy in the factory planning	0	0	2	1	1	5	UT							
Summe	13	0	10	13	13	65	0	18	0	20	15	18	95	0
Summe			49			00	0			71			90	0

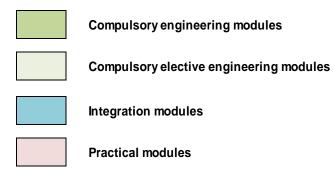
* One of the compulsory elective engineering modules of semester 3 to 5 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

Subjects		1st	: - 3r	d Se	mest	ter				4th	Sem	este	er				5th S	Sem	este	r			6th	Sei	mest	ter		Tot	al
			HWS	1						HWS	3						HWS						ΗV						
Type of Course	L	S	Ρ	E	SL (CP	ET	L	S	Ρ	Е	SL	CP	ΕT	L	S	Ρ	Е	SL	СР	ΕT	L	SF	E	SL	СР	ΕT	HWS	СР
Compulsory engineering modules																													
Dynamics								2	0	0	2	0	5	UT														4	5
Production Engineering 1								2	0	1	1	0	5	UT														4	5
Introduction to Finite Element Method								3	0	1	1	0	5	UT														5	5
Fluid Machines and CFD								2	0	1	1	0	5	UT														4	5
Automotive Development and Interconnection								2	0	1	1	0	5	UT														4	5
Closed Loop Control															2	0	1	1	0	5	UT							4	5
Car Body Engineering															3	0	1	1	0	5	UT							5	5
Automotive Systems															2	0	1	1	0	5	UT							4	5
Combustion Engines															2	0	1	1	0	5	UT							4	5
Integration modules																													
Technical English															0	4	0	0	0	5	UT							4	5
Compulsory elective engineering modules																													
Compulsory elective engineering module 2 *								0	0	1	1	3	5	UT														5	5
Compulsory elective engineering module 3 *															0	0	1	1	3	5	UT							5	5
Practical modules																													
Practical Project																						Х	ΧХ	X	Х	15		0	15
Bachelor Thesis																						Х	ΧХ	X	Х	12		0	12
Colloquium	~																					Х	ХХ	X	Х	3		0	3
								11	0	5	7	3	00		9	4	5	5	3	30		0	0 0	0	0	~	0	50	00
TOTAL (4 6.)		<u> </u>								26			30	0			26			30	0		C)		30	0	52	90
	43	0	13	23	3	00	~																					00	00
TOTAL (1 3.)			82			90	0																					82	90
TOTAL	43	0	13	23	3	90	0	11	0	5	7	3	30	0	9	4	5	5	3	30	0	0	0 0	0	0	30	0	124	100
IUTAL			82			90	0			26			30	0			26			30	0		C)		30	0	134	180

Catalogue of compulsory elective engineering modules A (AD)	HWS										WiS	e		
			HW	S		CP	ΕT			HW	S		СР	ΕT
Type of Course	L	S	Р	E	SL			L	S	Ρ	Е	SL		
Compulsory elective engineering modules														
Digital Manufacturing								2	0	1	1	0	5	MP
Digitalization in Mechanical Engineering								0	0	0	2	3	5	UT
Energy and Resource Efficiency								0	0	1	1	2	5	UT
Production Engineering 2								2	0	1	1	0	5	UT
Joining Technology								0	0	1	0	3	5	UT
Fundamentals of Agricultural Engineering	0	0	1	1	3	5	UT							
Energy Technology II - Hydrogen	3	0	0	1	0	5	UT							
Think Tank	2	0	1	2	0	5	UT	2	0	1	2	0	5	UT
Innovative Materials	0	0	1	1	3	5	UT							
Measurement Technology								0	0	2	1	2	5	UT
Basics in Operations Management								2	0	1	1	0	5	UT
Project Management	0	0	1	1	2	5	UT							
Quality Management	0	0	0	1	4	5	UT							
Programmable Logic Control	2	0	1	1	0	5	UT							
Technical Project 1	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Technical Project 2	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Process Technology 1	0	0	1	1	3	5	UT							
Process Technology 2								0	0	1	1	3	5	UT
Heat and Mass Transfer	0	0	2	1	2	5	UT							
Compulsory elective engineering modules B (Computer Scienc	e)													
Applied Computer Science								3	0	1	1	0	5	UT
Database Systems								0	0	2	1	2	5	UT
Introduction to Computer Science	2	0	0	2	0	5	UT							
Introduction to Digital Electronics	2	0	2	1	0	5	UT							
IT-Project Management								0	0	0	1	2	5	UT
Modeling and Simulation								0	0	2	1	2	5	UT
Numerical Software								0	0	2	0	2	5	UT
Object-oriented programming								0	0	3	0	2	5	UT
Virtual Realitiy in the factory planning	0	0	2	1	1	5	UT							
Tatal	11	0	12	14	18	70	0	11	0	19	14	23	05	
Total	55					70	0			67			85	0

* One of the compulsory elective engineering modules of semester 3 to 5 has to be chosen from the compulsory elective engineering module catalog B (Computer Science). The order can be freely chosen by the students.

Bachelor Computer Science in Mechanical Engineering



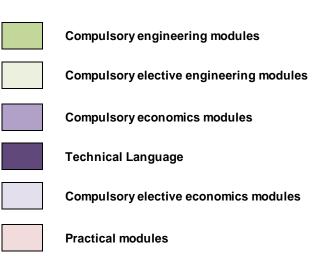
1st - 6th Semester

1st sem.	Mathematics 1	Physic	S	Sta	tics	Basics	of Construction Design	M	aterials Engineering
2nd sem.	Mathematics 2 / Statistics	Strength of Material	s Machir	e Elements	Introduc Computer		Basics of Construc Design	tion	Programming Basics
3rd sem.	Communication (Prerequisite to Practicle Project)	Introduction to Electrical Engineering	pplied Comp Science	uter IT-Pr Manag		Dbject-orient programmin		nam	Basics of Business Administration
4th sem.	Introduction to Digital Electronics	Programmable Logi Control	c Productio	n Engineering 1	Introduction Element N		Computational Flu Dynamics	uid	Compulsory elective engineering module 1
5th sem.	Closed Loop Control	Database Systems		eling and nulation	Numerical	Software	Technical Englis	sh	Compulsory elective engineering module 2
6th sem.		Practical Project				Bac	helor Thesis		Colloquium

Subjects		1s	t Se	mes	ter			2n	nd S	eme	ster			31	rd Se	me	ster			4	th S	Seme	ster			5	th S	eme	ester			6	th Se	mes	ter	Τ	Tot	al
			NS						WS						WS						łWS						WS						WS					
Type of Course	L	S	ΡE	SL	СР	ΕT	L	S	Р	E S	- CP	ΕT	L	S	ΡE	SI	- CP	ET	Ľ	S	Ρ	E S	L CP	E	L	S	PE	E S	L CI	P E	ΓL	S	ΡE	SL	СР	ET H	ws	СР
Compulsory engineering modules																																						
Mathematics 1	4	0	0 2	0	8	UT																								Τ							6	8
Statics	2	0	0 2	0	5	UT																															4	5
Physics	3	0	0 2	0	6	UT																															5	6
Materials Engineering	3	0	1 1	0	5	UT																															5	5
Basics of Construction Design	2	0	2 0	0	6	-	0	0	2	0 0	3	UT	•																								6	9
Mathematics 2 / Statistics							6	0	0	3 0	7	UT	•																								9	7
Strength of Materials							2	0	0	2 0	5	UT	•																								4	5
Machine Elements							3	0	0	1 0	5	UT	•																								4	5
Introduction to Computer Science							2	0	0	2 0	5	UT	•																								4	5
Programming Basics							3	0	1	1 0	5	UT																						1			5	5
Communication													0	0	0 2	2 0	-	UT	-																		2	0
Introduction to Electrical Engineering													3	0	1 1	0	5	UT	-																		5	5
Thermofluiddynamics													2	0	1 1	0	0	UT	-																		4	0
Applied Computer Science													3	0	1 1	0	5	UT	-																		5	5
Object-oriented programming													0	0	3 0) 2	5	UT	-																		5	5
IT-Project Management													0	0	0 1	2	5	UT	-																		3	5
Introduction to Digital Electronics																			2	0	2	1 0	5	U													5	5
Programmable Logic Control																			2	0	1	1 0	5	UΊ	·												4	5
Production Engineering 1																			2	0	1	1 0	5	UΊ	·												4	5
Introduction to Finite Element Methods																			3			-			·												5	5
Computational Fluid Dynamics																			2	0	2	1 0	5	UT													5	5
Closed Loop Control																									2	0	1	1 0) 5	U	Г						4	5
Database Systems																									0	0	2	1 2	2 5	U	Г						5	5
Modeling and Simulation																									0	0	2	1 2	2 5	U	Г						5	5
Numerical Software																									0	0	2 (0 2	2 5	U	Г						4	5
Integration modules																																						
Basics of Business Administration													2	0	0 2	2 0	5	UT	-																		4	5
Technical English																									0	4	0 0	0 0) 5	U	Г						4	5
Compulsory elective engineering modules		· · · · ·									<u> </u>					_		<u> </u>																<u> </u>				
Compulsory elective engineering module 1	1																1	1	0	0	1	1 3	5	UT	·				Т	Т				1			5	5
Compulsory elective engineering module 2	+																								0	0	1	1 3	3 5	U	г						5	5
Practical modules		<u> </u>	-	_			1								-	_				_	· · · · ·			-		-	_		_	1.5			-				-	
Practical Project										T													T	1					T	T	X	Х	хx	X	15		0	15
Bachelor Thesis	~	\vdash						+	\neg		+										\vdash		+	+					+	+	X	X	XX		12		0	12
Colloquium	-	\vdash									+												+	+					+	1			XX	X	3	-	0	3
TOTAL	14	0	3 7 4	0	30	0	16	_	3 28	9 0	- 30	0	10		68 28	4	25	0	11		8 28	6 3	- 30	0	2		8 4 27	4 9	30	0 0	0		0 0 0			0 1	-	175

Catalogue of compulsory elective engineering module			:	Su	Se					١	WiS	6e		
		ŀ	łWS	S					ł	HWS	5			
Type of Course	L	S	Ρ	Е	SL	СР	ΕT	L	S	Ρ	Е	SL	СР	ΕT
Compulsory elective engineering modules														
Algorithms and Data Structures								0	0	2	1	3	5	UT
Automotive Systems								2	0	1	1	0	5	UT
Computer Graphics								0	0	2	0	2	5	UT
Digital Manufacturing								2	0	1	1	0	5	UT
Digitalization in Mechanical Engineering								0	0	0	2	3	5	UT
Hydraulics	2	0	1	1	0	5	UT							
Think Tank	2	0	1	2	0	5	UT	2	0	1	2	0	5	UT
Artificial Intelligence	0	0	2	0	2	5	UT							
Measurement Technology								0	0	2	1	2	5	UT
Basics in Operations Management								2	0	1	1	0	5	UT
Quality Management	0	0	0	1	4	5	UT							
Technical Project 1	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Technical Project 2	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Virtual Reality in the factory planning	0	0	2	1	1	5	UT							
Tatal	4	0	6	5	7	25	0	8	0	10	9	10	50	0
Total		-	22			35	0			37	-		50	0

Bachelor Business Administration & Engineering majoring in Mechanical Engineering

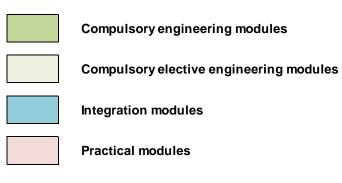


1. bis 6. Semester

1. Sem.	Mathematics 1	Physics	;	Sta	tics	Basic	s of Construction Design	M	aterials Engineering
2. Sem.	Technical English	Mathematics 2 / Statistics	Program	nming Basics	Machine Ele	ements	Basics of Construc Design	ction	Strength of Materials
3. Sem.	General Business Administration	Basics in Operations Management		duction to Il Engineering	CIM		Design Engineeri CAD 1	ng /	Thermofluiddynamics
4. Sem.	Finance and Controlling	Business English	larketing	Introduction Computer Scie		uction ering 1	Compulsory elect engineering modu		Compulsory elective economics module 1
5. Sem.	Corporate Management	Business English		Logistic	CS		Compulsory elect engineering modu		Compulsory elective economics module 2
6. Sem.		Practical Project				Ba	achelor Thesis		Colloquium

Subjects		1	st S	eme	ster			2	nd s	Sen	neste	r			3rc	d Sei	nest	ter			4	th S	eme	ster				5th	Ser	nest	er			6ť	h Se	mest	ter	Τ	То	tal
			IWS						HWS							WS						HWS						ΗV							WS		Τ	\square		
Type of Course	L	S	Ρ	ES	SL C	PE	т	L S	Р	Е	SL	CP	ЕΤ	L	S	ΡE	SL	- CF	ET	Ľ	S	Ρ	E	SL	CP E	ΞТ	L	SF	PE	SL	. CP	ЕΤ	L	S	ΡE	E SI	- CP	ΕT	нws	СР
Compulsory economics modules																																								
General Business Administration														3	0	0 3	0	6	MP																			\square	6	6
Basics in Operations Management														2	0	1 1	0	5	MP																			\square	4	5
Finance and Controlling																				3	0		3		6 N													\square	6	6
Marketing																				3	0	0	3	0	6 N	ЛР												\square	6	6
Corporate Management																											3	0 0) 3	0	6	MP						\square	6	6
Technical Language																																								
Technical English								0 4	0	0	0	5 1	ИР																									\square	4	5
Business English																				0	2	0	0	0	2	-	0	2 () (0	3	MP						\square	4	5
Compulsory elective economics modules																																								
Compulsory elective economics module 1																				1	2	0	1	0	5 N	ЛР							í T				Τ.		4	5
Compulsory elective economics module 2																											1	2 () 1	0	5	MP	1					\square	4	5
Compulsory engineering modules																												_												
Mathematics	4	0	0	2	0	8 M	IP												Τ															Т		Т	T		6	8
Statics	2	0				5 M																											1						4	5
Physics	3	0			0	6 M	IP																										1						5	6
Materials Engineering	3	0	1		0	5 M	IP																										1					\square	5	5
Basics of Construction Design	2	0	2	0	0	6 ·	- (0 0	2	0	0	3	ИР																										6	9
Mathematics 2 / Statistics								6 0	0	3	0	7	ИР																				1					\square	9	7
Strength of Materials							1	2 0	0	2	0	5 1	ИР																									\square	4	5
Machine Elements								3 0	0	1	0	5 1	ИР																									\square	4	5
Programming Basics							;	3 0	1	1	0	5	ИР																									\square	5	5
Introduction to Electrical Engineering														3	0	1 1	0	5	MP																			\square	5	5
СІМ														1	0	2 1	0		MP																			\Box	4	5
Design Engineering / CAD 1														2	0	2 1	0	5	MP																				5	5
Thermofluiddynamics														2	0	1 1	0	5	MP																				4	5
Introduction to Computer Science																				2	0	0	2																4	5
Production Engineering 1																				2	0	1	1	0	5 N	ЛР													4	5
Logistics																											3	0 0) 1	0	6	MP							4	6
Compulsory elective engineering modules																																								
Compulsory elective engineering module 1																				Х	Х	Х	Х	Х	Х	Х	0	0 1	1	3	5	MP	i l					\square	5	5
Compulsory elective engineering module 2																				Х	Х	Х	Х	Х	Х	Х	0	0 1	1	3	5	MP						\square	5	5
Practical modules																																								
Practical Project							T																										Х	Х	X	ХХ	(15	\square	0	15
Bachelor Thesis									1	1										1													Х	Х	X	ΧХ	(12	\square	0	12
Colloquium										1																							Х	Х	X	ΧХ	(3	\square	0	3
TOTAL	14	0	3 24	7	0 3	30 (0 1	4 4	3 28	7	0	30	0	13		7 8 28	0	31	0	11	4	1 26	10	0	29	0	7	4 2 2	_	6	30	0	0	0	0 (0	0 0) 	0	132	180

Catalogue of compulsory elective engineering modules			S	SuSe	е					V	ViS	е		
		ł	HWS	3		CP	ΕT		ł	HWS	3		СР	ET
Type of Course	L	S	Р	Е	SL			L	S	Р	Е	SL		
Compulsory elective engineering modules														
Applied Computer Science								3	0	1	1	0	5	MP
Automotive Systems								2	0	1	1	0	5	MP
Digital Manufacturing								2	0	1	1	0	5	MP
Energy and Resource Efficiency								0	0	1	1	2	5	MP
Production Engineering 2								2	0	1	1	0	5	MP
Joining Technology								0	0	1	0	3	5	MP
Fundamentals of Agricultural Engineering	0	0	1	1	3	5	MP							
Energy Technology II - Hydrogen	3	0	0	1	0	5	MP							
Introduction to Finite Element Method	3	0	1	1	0	5	MP							
Think Tank	2	0	1	2	0	5	MP	2	0	1	2	0	5	MP
Car Body Engineering								3	0	1	1	0	5	MP
Measurement Technology								0	0	2	1	2	5	MP
Quality Management	0	0	0	1	4	5	MP							
Fluid Machines and Computational Fluid Dynamics	2	0	1	1	0	5	MP							
Computational Fluid Dynamics	2	0	2	1	0	5	MP							
Technical Project 1	Х	Х	Х	Х	Х	5	MP	Х	Х	Х	Х	Х	5	MP
Technical Project 2	Х	Х	Х	Х	Х	5	MP	Х	Х	Х	Х	Х	5	MP
Combustion Engines								2	0	1	1	0	5	MP
Process Technology 1	0	0	1	1	3	5	MP							
Process Technology 2								0	0	1	1	3	5	MP
Total	12	0	7	9	10	50	0	16	0	12	11	10	65	0
			38			50	0			49			05	0



1st - 9th Semester

1st sem.	Mathematics 1		l	Physics		Statics	
2nd sem.	Mathematics 2 / Statistics	Strength	n of Materials	Dynamics		Communi (Prerequisite to Pr	
3rd sem.	Thermodynamics	Basics of Co	nstruction Design	Materials Engineeri	ing 1	Basics of Business	Administration
4th sem.	Programming Basics	Basics of Co	nstruction Design	Materials Engineeri	ing 2	Machine El	ements
5th sem.	Introduction to Electrical Engineering	Combus	tion Engines	Design Engineering /	CAD 1	Fluid Mec	hanics
6th sem.	Production Engineering 1	Hy	draulics	Design Engineering /	CAD 2	Technical	English
7th sem.	Production Engineering 2	Closed	Loop Control	Joining Technolo	ду	Digital Manu	facturing
8th sem.	Introduction to Finite Elemen	t Method	Compulsory election	ve engineering module 1 *	Compuls	ory elective enginee	ring module 2 *
9th sem.	Practical P	Project		Bachelo	r Thesis		Colloquium

* 7th or 8th semester

Subjects	T	1st S	Seme	ster			2nd	l Serr	nester			3r	d Serr	nester			4th	Sem	ester			5th	Seme	ester			6th	Seme	ester			7th	Semes	ster			8th	Semes	ter			9th S	Semes	ter		Total
		HWS					HW						NS				HW					HW					HV					HW					HWS			Π		HWS				
Type of Course	L S	S P	Е	SL C	P ET	L	S F	E	SL	CP E	ΤL	S	ΡE	SL	CP E1	L	S P	E	SL (CP ET	L	S P	Е	SL (CP ET	ΓL	S F	E	SL (P ET	L	S P	ES	SL CP	ET	LS	ŝΡ	E S	L CP	ET	LS	S P	E S	SL CP I	ET HV	IS CP
Compulsory engineering modules																																														
Mathematics 1	4 0	0 (2	0 8	B UT																																								f	i 8
Statics	2 0) ()	2	0 5	5 UT																																								1	5
Physik	3 0) ()	2	0 6	6 UT																																								Ę	i 6
Mathematics 2 / Statistics						6	0 0	3	0	7 U	Т																																		ę	7
Strength of Materials						2	0 0	2	0	5 U	Т																																		1	5
Dynamics						2	0 0	2	0	5 U	Т																																		1	5
Communikation						0	0 0	2	0	- U	T																																		1	2 -
Materials Engineering 1											2	0	1 1	0	5 UT	Г																													6	5
Thermodynamics											3	0	0 1	0	5 U1																														1	5
Basics of Construction Design											2	0	2 0	0	6 -	0	0 2	0	0	3 UT																									6	i 9
Machine Elements																3	0 0	1	0	5 UT																									1	5
Materials Engineering 2																3	0 1	0	0	5 UT																									6	5
Programming Basics																3	0 1	1	0	5 UT																									5	5
Combustion Engines																					2	0 1	1	0	5 UT	Г																			1	5
Fluid Mechanics																					3	0 1	1	0	5 UT	Г																			5	i 5
Design Engineering / CAD 1																					2	0 2	1	0	5 UT	Г																			5	i 5
Introduction to Electrical Engineering																					3	0 1	1	0	5 UT	Г																				i 5
Design Engineering / CAD 2																										0	0 2	1	0	5 UT															3	5
Production Engineering 1																										2	0 1	1	0	5 UT															1	5
Hydraulics																										2	0 1	1	0	5 UT															1	5
Production Engineering 2																															2	0 1	1	0 5	UT										6	5
Closed Loop Control																															2	0 1	1	0 5	UT										1	5
Joining Technology																															0	0 1	0	3 5	UT										1	5
Digital Manufacturing																															2	0 1	1	0 5	UT										1	5
Introduction to Finite Element Method																																				3 () 1	1 () 5	UT					5	i 5
Integration modules																																														
Basics of Business Administration											2	0	0 2	0	5 U1																		T				T								1	5
Technical English																										0	4 0	0	0	5 UT															1	5
Compulsory elective engineering modules																																														
Compulsory elective engineering module 1	T																									Î					Х	ΧХ	X	ΧХ	X	0 0	0 1	1 3	3 5	UT				T	!	i 5
Compulsory elective engineering module 2																															Х	х х	X	ΧХ	Х	0 (0 1	1 3	3 5	UT						i 5
Practical modules					_																													_	•							_				
Practical Project						İ																															T				Х	X X	x	X 15	1) 15
Bachelor Thesis																								Ħ													+				Х	ХХ	x	X 12	() 12
Colloquium			H			Ħ																															+			\square	Х	ХХ	x	X 3) 3
TOTAL	9 0	0 0	6	0		10	0 0	9	0		9	0	3 4	0		9	0 4	2	0		10	0 5	4	0		4	4 4	3	0		6	0 4	3	3 .		3 (0 3	3 6	ŝ .		0 (0 0	0 0	0	_	_
		15		1	9 0		19	_	-	17 0)		16		21 0		1!			18 0		19	_	- 2	20 0		1		2	20 0		16	_	20	0		15		, 15	0	<u> </u>	0		- 30	0 13	180
	200	_	_		_		_	_	_	_		_																																		

Catalogue of compulsory elective engineering modules			١	NiSe	9					ç	SuSe	e		
			HWS	6						HWS	3			
Type of Course	L	S	Р	Е	SL	СР	ΕT	L	S	Ρ	Е	SL	СР	ΕT
Compulsory elective engineering modules														
Digitalization in Mechanical Engineering	0	0	0	2	3	5	UT							
Energy and Resource Efficiency	0	0	1	1	2	5	UT							
Fundamentals of Agricultural Engineering								0	0	1	1	3	5	UT
Energy Technology II - Hydrogen								3	0	0	1	0	5	UT
Think Tank	2	0	1	2	0	5	UT	2	0	1	2	0	5	UT
Innovative Materials								0	0	1	1	3	5	UT
Car Body Engineering	3	0	1	1	0	5	UT							
Measurement Technology	0	0	2	1	2	5	UT							
Basics in Operations Management	2	0	1	1	0	5	UT							
Technical Project								Х	Х	Х	Х	Х	5	UT
Project Management								0	0	1	1	2	5	UT
Quality Management								0	0	0	1	4	5	UT
Programmable Logic Control								2	0	1	1	0	5	UT
Fluid Machines and Computational Fluid Dynamics								2	0	1	1	0	5	UT
Computational Fluid Dynamics								2	0	2	1	0	5	UT
Technical Project 1	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Technical Project 2	Х	Х	Х	Х	Х	5	UT	Х	Х	Х	Х	Х	5	UT
Process Technology 1								0	0	1	1	3	5	UT
Process Technology 2	0	0	1	1	3	5	UT							
Heat and Mass Transfer								0	0	2	1	2	5	UT
Compulsory elective engineering modules B (Computer So	ciend	ce)												
Applied Computer Science	3	0	1	1	0	5	UT							
Database Systems	0	0	2	1	2	5	UT							
Introduction to Computer Science								2	0	0	2	0	5	UT
Introduction to Digital Electronics								2	0	2	1	0	5	UT
IT-Project Management	0	0	0	1	2	5	UT							
Modeling and Simulation	0	0	2	1	2	5	UT							
Numerical Software	0	0	2	0	2	5	UT							
Object-oriented programming	0	0	3	0	2	5	UT							
Virtual Realitiy in the factory planning								0	0	2	1	1	5	UT
Total	10	0	17	13	20	75	0	15	0	15	16	18	85	0
			60			/5	0			64			00	0

Bachelor – module descriptions

Algorithms and Data Structures

	1.1 Title of module (GER / ENG Algorithmen und Date Algorithms and Data S	enstrukturen /		1.2 Short description (optional)	n 1.3 Module ETI.1.000	code (from HIO)
	2.1 Cycle of module:			2.2 Duration of mod		
	Every summer semester Other cycle, namely:	Every winter semester		🛛 1 semester 🗌 2 s	semesters	
	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		nended
	Bachelor`s programm	les:				
	Mechanical Engineering	g -				
	International Engineerir					
	Mechanical Engineering					
	International Engineerir					
	Mechanical Engineering					
	Specialisation in Plant I					
	Mechanical Engineering					
	•	notive and Drive Engineering	ng			
	Mechanical Engineering		Taabaalaay			
		ruction and Manufactoring	rechnology	05		F
	Computer Science in M			CE		5
		n & Engineering majoring	in Mechanical			
	Engineering					
4	Mechanical Engineering	g (dual study)				
4	Workload				Total wo	rkload
		Method of teaching	Hours per week per	Hours per semester	Workload in	ECTS (credit
			semester (SWS) for each method of teaching		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	Seminaristic Lecture	3	45		
	course, practical period/internship, group work, project work, case	Exercise	1	15		
	study, simulation game, credited tutorial (more rows can be added)	Practical course	2	30	1	
		Total	Total contact hours in	Total contact hours	-	
		Total	SWS	in hours		
	Non contact hours			90	450	
	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		60	150	5
					1	
		Total		Total non-contact		
				hours 60		
5	5.1 Intended learning outcome	es (What should students be able to do a	after having completed the		e provide the opportu	nity to acquire soft
	skills in addition to technical skills? F	For which other modules and prospective	tasks in the labour market	are the acquired knowled	lge and skills relevan	t?)
	Students will be able	to recognise algorithmic	structures in c	oncrete probler	ns, and to fir	nd, assess,
		tions in the form of algo				

	Course content
	troduction:
	oundations and brief recapitulation of C
	Elementary data structures
	rees
- F	Recursion
- /	Analysis and implementation of algorithms
- S	Sorting algorithms
- 5	Search algorithms
- 5	Searching in strings
	Pattern matching and parsing
	Compression and cryptology
	Geometric algorithms
	gorithms for graphs:
	Elementary algorithms, context, directed graphs, weighted graphs
	Random numbers
-	Arithmetic
	Gaussian elimination
	actical course:
	ueues; the eight queens problem; comparison of sorting methods; hashing; searching in strings;
	mple closed path; topological sorting.
	Details available in the university calendar, course timetable, etc.
	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
	nster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
	pical programming tasks include the sorting, search, compression and encryption of data. You
-	arn how best to approach such standard problems and to solve them using algorithms.
004	Prereguisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and
66.1	The service of the second of the second of the second of an and the second of an an and the second of an an and the second of an an and the second of an an an and the second of an an and the second of an
skill	Is should have been acquired:)
skill	
skill Ba	Is should have been acquired:) asic knowledge of computer science and the C programming language
skill Ba	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active
skill Ba 6.2 part	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation)
skill Ba 6.2 part	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active
skill Ba 6.2 part St	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation)
skill Ba 6.2 part St 6.3	As should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination
skill Ba 6.2 part St 6.3	As should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
skill Ba 6.2 pari St 6.3	As should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
skill Ba 6.2 pari St 6.3 W	As should have been acquired:) Asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) Udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination
skill Ba 6.2 pari St 6.3 W	As should have been acquired:) Asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination
skill Ba 6.2 pari St 6.3 W	As should have been acquired:) Asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) Udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination
skill Ba 6.2 pari St 6.3 W 6.4 St	As should have been acquired:) Asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase
skill Ba 6.2 part St 6.3 W 6.4 St 6.4	As should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade
skill Ba 6.2 part St 6.3 W 6.4 St 6.4	As should have been acquired:) Asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase
6.3 6.2 8 6.3 8 0 6.4 8 6.5 8 6.5 8	As should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade
6.2 6.2 parini Stt 6.3 W 6.4 St 6.5 St 	Its should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade the Examination Regulations for above-mentioned degree programmes (Section 3).*
skill, Ba 6.2 parint St 6.3 W 6.3 W 6.4 St 6.5 € *Yo muu	Its should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active iticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade the Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
6.4 6.2 parin St 6.3 W 6.4 St 6.4 St 6.5 St 77.1	Its should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active iccipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination accessful participation in the practical phase Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
6.2 6.2 parint St 6.3 W 6.4 St 6.4 St 6.5 Se *Yo mu 77.1	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active icipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- anster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module:
skill, Ba 6.2 parin St 6.3 W 6.4 St 6.5 S€ *Yo muu 7 7.1	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active icipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- anster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module:
skill, Ba 6.2 parin St 6.3 W 6.4 St 6.5 S€ *Yo muu 77.7.1 ⊠ 7.2 Pr	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade be Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module: German English Other, namely: Module Contact Person: ofessor DrIng. T. Weik
skill, Ba 6.2 parint 6.3 W 6.3 W 6.4 St 6.5 Se *Yoo muu 7 7.1 ⊠ 7.2 Pr 7.3	Is should have been acquired:) And the semination acquired:) And the contract programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active Incipation) Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination accessful participation in the practical phase Module mark weighting for calculating final grade the Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- anster.de/hostohule/aktuelles/amtiche_bekanntmachungen/index.php?p=2,7. Languages used in the module: German _ English _ Other, namely: Module Contact Person: offessor DrIng. T. Weik Professors (optional):
skill, Ba 6.2 part St 6.3 W 6.4 St 6.5 Se *Yoo muu 77.7.1 ⊠ 7.2 Pr 7.3 Pr	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade the Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- anste.de/hochschule/aktuelles/amiliche_bekanntmachungen/index.php?p=2,7. Language used in the module: German lenglish lother, namely: Module Contact Person: ofessor DrIng. T. Weik Professors DrIng. T. Weik
skill, Ba 6.2 pariar St 6.3 W 6.4 St 6.5 Se *Yoo muu 777.1 Z Pr 7.3 Pr 7.3 Pr	Is should have been acquired:) And the semination acquired:) And the contract programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active Incipation) Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination accessful participation in the practical phase Module mark weighting for calculating final grade the Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- anster.de/hostohule/aktuelles/amtiche_bekanntmachungen/index.php?p=2,7. Languages used in the module: German _ English _ Other, namely: Module Contact Person: offessor DrIng. T. Weik Professors (optional):
skill Ba 6.2 parint St 6.3 W 6.4 St 6.5 St 6.5 St 6.5 St 6.4 St 7.7 St 7.2 Pr 7.3 Pr 7.4	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active icipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade tee Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes of FH Münster: https://www.fh- neter.de/hochschule/aktueles/amtiche_bekanntmachungen/index.php?p=2,7. Languages used in the module: German English Other, namely: Module Contact Person: ofessor DrIng. T. Weik Professors (optional): ofessor DrIng. T. Weik Maximum number of participants (optional)
skill, Ba 6.22 parint formation Ga formation Ga <	Is should have been acquired:) asic knowledge of computer science and the C programming language Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active ticipation) udents must pass the examination Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) ritten or oral examination Requirements for admission to examination uccessful participation in the practical phase Module mark weighting for calculating final grade the Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- anste.de/hochschule/aktuelles/amiliche_bekanntmachungen/index.php?p=2,7. Language used in the module: German lenglish lother, namely: Module Contact Person: ofessor DrIng. T. Weik Professors DrIng. T. Weik

Apparatus and Plant Engineering

1.1 Title of module (GER / ENG) Apparate- und Anlagent	oau /		1.2 Short description (optional)	on 1.3 Module c MB.1.001	ode (from HIO)
Apparatus and Plant En			/		~
2.1 Cycle of module: ☐ Every summer semester ⊠ E Other cycle, namely:	very winter semester		2.2 Duration of mod ☑ 1 semester □ 2		
3.1 Module offered in the following	ng degree programme(s):		3.2 Compulsory (C) compulsory electiv (CE), elective (E)		ended semester:
Bachelor`s programmes	5.				
Mechanical Engineering -					
International Engineering	(Outgoings)				
Mechanical Engineering -			С	2	. GS
International Engineering					
Mechanical Engineering -	С	5			
Specialisation in Plant En	gineering		_		
Mechanical Engineering -	hun and Datus Franks				
Specialisation in Automoti	ive and Drive Engineeri	ng			
Mechanical Engineering -	tion and Manufactorian	Tachnology			
Specialisation in Construc		тесппоюду			
Computer Science in Med		in Machanical			
Business Administration 8	x ⊏ngineering majoring	in wechanical			
Engineering Mechanical Engineering (dual study)				
Wechanical Engineering (uuai siuuyj				
				Total wo	rkload
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	3	45		
practical period/internship, group work, project work, case study, simulation	Exercise	1	15		
game, credited tutorial (more rows can be added)	Practical course	1	15		
	Total	Total contact hours in SWS	Total contact hours in hours 75	150	5
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Preparation, follow-up work			150	5
homework, research, etc.)	preparation for the examination				
	Total		Total non-contact hours 75		

-	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:
	a) Identify the physical sub-processes of process engineering plant
	b) Apply the sub-processes of conceptual designing plant and apparatus in process engineering
	c) Assess technical concepts for the safe design of process engineering plant and apparatus
	d) Apply rules for dimensioning pressure equipment and piping
	e) Develop technical documents (e.g. MS Excel calculation sheets) in group work
	f) Develop original process simulations (using CAS) for the computational design
	and balancing of binary phase equilibria
	The prestical source and eversion along enable students to develop and enably
	The practical course and exercise class enable students to develop and apply
	solution strategies for the set tasks, building on the specialist knowledge gained
	during the lectures, and to formulate and document the results. 5.2 Course content
	• Apparatus and plant (AppAn) as the link between apparatus and process engineering
	(materials)
	- Forms and functions of apparatus for material conversion and material separation
	- Strength behaviour and dimensioning specifications (comparison)
	Welding techniques
	Apparatus and pressure vessel designs
	Closure constructions
	Safety concepts
	• Piping and instrumentation diagrams (explanation and development)
	• Sets of regulations and directives (e.g. CE, Pressure Equipment Directive applies to the
	machinery directive 2006/42/EC)
	Specification sheets
	Thermal calculation of apparatus and tube sheets
	Computer-aided simulation (CAS) computer practical
	→ Details available in the university calendar, course timetable, etc.
1	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 on the acquired competencies, you will be able to carry out planning, design, calculations and
	technical documentation of process engineering apparatus and plant technology, suitable for
	professional application in many fields: Mechanical and plant engineering, utilities engineering,
	building services and process engineering, and materials technologies.
(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 or oral examination
	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. A. Wäsche
	7.3 Professors (optional):
	Professor DrIng. A. Wäsche
	7.4 Maximum number of participants (optional
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
I	Apparate- und Anlagentechnik. E. Klapp
I	Planung und Bau verfahrenstechnischer Anlagen. Bernecker
	• Planung im Anlagenbau. Ed. W. Wagner
l	 Taschenbuch der Verfahrenstechnik. K. Schwister

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1 1.1 Title of module (GER / ENG) Angewandte Informatik /	1		1.2 Short descriptio (optional)	on 1.3 Module MB.1.001	code (from HIO)	
Applied Computer Scien	се					
2 2.1 Cycle of module: ☐ Every summer semester ⊠ Every	very winter competer		2.2 Duration of mod			
Other cycle, namely:	very winter semester		🛛 1 semester 🗌 2	semesters		
3 3.1 Module offered in the followin	g degree programme(s):		3.2 Compulsory (C) compulsory electiv (CE), elective (E)		nended	
Bachelor`s programmes	:					
Mechanical Engineering -						
International Engineering	(Outgoings)					
Mechanical Engineering -	CE	2	. GS			
International Engineering	UL					
Mechanical Engineering -			CE	3	o. 5	
Specialisation in Plant Eng						
Mechanical Engineering -	CE	3	3 o. 5			
Specialisation in Automoti						
Mechanical Engineering -	CE	3	o. 5			
Specialisation in Construc						
Computer Science in Mechanical Engineering Business Administration & Engineering majoring in Mechanical			C		3	
	CE		5			
Engineering						
Mechanical Engineering (c	dual study)		CE	N N	ViSe	
4 WOIKIOAU				Total wor	kload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	3	45			
practical period/internship, group work, project work, case study, simulation	Exercise	1	15	1		
game, credited tutorial (more rows can be added)	Practical course	1	15			
	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	ation for 75 19 nents, follow-up reparation for		150	5	
	Total		Total non-contact hours 75			

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 are able to develop data-based models using programming methods. The competences are achieved to measure an unknown system in a meaningful way, to analyze the measurement data as well as to develop a model from it, and to evaluate the quality of the model. Through the exercise and the practical course the theoretical basics from the lecture are deepened and in particular the safe handling of Jupyter notebooks (Python) is acquired. 5.2 Course content Evaluation and visualization of measurement data **Error measures Design of experiments (DoE)** • Model approaches: Lookup table, polynomials, grey-box models, artificial neural networks Use of optimization algorithms for parameter determination • Training of artificial neural networks • > 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 systems cannot be modeled by simple physical relationships. An alternative approach is using mathematical models. You are able to develop such models using programming methods. 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:) **Recommended: Mathematics 1, Programming Basics** 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. Thiel 7.3 Professors (optional): Professor Dr.-Ing. M. Thiel 7.4 Maximum number of participants (optional) 7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Artificial Intelligence

1.1 Title of module (GER / ENG) Künstliche Intelligenz /	Artificial Intelligence		1.2 Short descriptior (optional)	MB.1.007 ETI.1.013	'8 (alt-		
2.1 Cycle of module: Every summer semester E B Other cycle, namely:	Every winter semester		2.2 Duration of modu				
3.1 Module offered in the following	ng degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recomm	nended semester		
Bachelor`s programmes	6:						
Mechanical Engineering -							
International Engineering	(Outgoings)						
Mechanical Engineering -	-	CE		5			
International Engineering			0L		5		
Mechanical Engineering -			CE		5		
Specialisation in Plant En	ŰL.		0				
Mechanical Engineering -	CE		5				
Specialisation in Automot	02		•				
Mechanical Engineering -	CE		5				
Specialisation in Construe		Technology	-		.3 Recommended semester		
Computer Science in Med	¥ ¥		CE		5		
Business Administration & Engineering	& Engineering majoring ir	n Mechanical	CE		5		
Mechanical Engineering ((dual study)		CE		5		
Workload				Tatalaa			
	Method of teaching	Hours per week	Hours per				
	5	per semester (SWS) for each method of teaching	semester for each method of	Tours Fotal contact and non-contact hours	points) 30 hrs usually correspond to 1 credit point; whole		
Contact hours (e.g. lecture, seminar, practical	Seminaristic Lecture	2	30				
	Practical course	2	30				
	Total	Total contact hours SWS	s in Total contact hours in hours 60				
(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		90	150	5		
5.1 Intended learning outcomes	Total	er having completed the	Total non- contact hours 90 module? Does the modul	e provide the oppos	tunity to acquire		
soft skills in addition to technical skills? The course considers the <u>Professional competence</u> Students gather an over fields of of applications methods of artificial interview.	For which other modules and prospective ne development of comp <u>cies:</u> rview of the area of exp . They have an overview	ve tasks in the labour ma petencies in th ertise "artificia	e following field	wiedge and skills re ds: and know			

Through regular discussions in small teams within the practical sessions and with the instructors, the students improve on their teamwork and communication skills. They are able to communication and explain technical matters and contexts.

Personal competencies:

The course addresses approaches (paradigms) the have been barely considered at this point of the course of studies. It requires the eagerness to learn by the students. They relate their results in the practical sessions and the lecture contents. Students can realistically assess and reflect on the quality.

<u>Methodological competencies:</u> Preparation, follow-up work, preparation for the examination

5.2 Course content

Some Theory:

Biological background of neural networks.

McCulloch-Pitts neurons and boolean networks.

Perceptron, learning algorithm, Fähigkeitsanalyse;

Learning in multi layer networks, backpropagation, convergency.

Hopfield networks and pattern recognition.

Kohonen networks and self organizing maps.

Practical course:

Implementation of neural networks with Matlab.

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.

This lecture introduces methods for simulation of complex systems in Al. It focusses on modelling systems as neural networks and implementation on basis of standard mathematical software such as Matlab. Learning algorithms and convergency behaviour for several kinds of nets are treated in detail.

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:)

Computer science and mathematics modules of semester 1 – 3 (according to study plan) must be passed

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

Successful participation in the practical course: all practical sessions need to be passed successfully

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:

Dean Professor Dr. E. Finke

7.3 Professors (optional):

Professor Dr. M. Geisler

7.4 Maximum number of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
 Literature (Selection):
 [1] S. Russel, P. Norvig: "Artificial Intelligence A Modern Approach"

[2] W. Ertel: "Grundkurs Künstliche Intelligenz: Eine praxisorientierte Einführung"

[3] M. T. Jones: "Artificial Intelligence, A Systems Approach"

• [4] Dan W. Patterson "Künstliche neuronale Netze"

[5] Raul Rojas "Theorie der neuronalen Netze"

[6] Adolf Grauel "Neuronale Netze. Grundlagen und mathematische Modellierung."

[7] Domschke/Drexl "Operations Research"

Software: Matlab, Scilab,

Automotive Development and Interconnection

1.1 Title of module (GER / ENG) Fahrzeugentwicklung un Automotive Developmen		1	1.2 Short descriptio (optional)	0n 1.3 Module co MB.1.020	
2.1 Cycle of module: ⊠ Every summer semester	very winter semester		2.2 Duration of mod ☑ 1 semester □ 2		
3.1 Module offered in the followir	ng degree programme(s):		3.2 Compulsory (C) compulsory electiv (CE), elective (E)		ended semester:
Bachelor`s programmes	:				
Mechanical Engineering -					
International Engineering	(Outgoings)				
Mechanical Engineering -	· · · · · ·	с	4	<u> </u>	
International Engineering	(Incomings)		L C	I	. GS
Mechanical Engineering -			CE		4
Specialisation in Plant En	gineering		UE		4
Mechanical Engineering -		с		А	
Specialisation in Automot			4		
Mechanical Engineering -	CE 4		4		
Specialisation in Construc	CE		4		
Computer Science in Mec	hanical Engineering				
Business Administration &	Engineering majoring				
Engineering					
Mechanical Engineering (dual study)				
Workload					
				Total wor	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Lecture	2	30		
(e.g. lecture, seminar, practical course, practical period/internship, group work,	Exercise	1	15		
project work, case study, simulation game, credited tutorial (more rows can be added)	Practical course	1	15		
	Total	Total contact hours in SWS	Total contact hours in hours 60	450	F
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Preparation, follow-up work		90	150	5
homework, research, etc.)	written elaboration, presentation				
	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 can understand the structure and function of systems for environment sensing and algorithms for object recognition. They are able to analyze the application fields of different sensor principles for environment recognition (camera, radar, ...) and their combination (sensor fusion) and to recognize the potential of future systems as well as the requirements for sensors and actuators. The internships not only serve to provide a more in-depth description of the technical context, but also specifically promote critical reflection on the results achieved, independent work and the ability to work in a team. 5.2 Course content In-vehicle communication sensor technology • Data acquisition in the vehicle • Sensor data processing Data buses for in-vehicle communication **Connected cars** Data storage and data analysis in the cloud Data security and reliability Communication technologies (cellular and short-range technologies) Car-to-car communication and communication with the environment (smart cities) Autonomus driving → 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. Vehicles are becoming increasingly intelligent, which increases the complexity of collected data. You learn which sensors vehicles use to collect information and how it is processed, focusing in particular on data security. 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.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. M. Brockmann 7.3 Professors (optional): Prof. Dr.-Ing. M. Brockmann 7.4 Maximum number of participants (optional) 7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Automotive Systems

1.1 Title of module (GER / ENG) Automotive Systems			1.2 Short descriptio (optional)	on 1.3 Module c MB.1.019	code (from HIO) 5	
2.1 Cycle of module: ☐ Every summer semester ⊠ E Other cycle, namely:	-		2.2 Duration of mo ☑ 1 semester □ 2			
3.1 Module offered in the followir			3.2 Compulsory (C compulsory electiv (CE), elective (E)		ended semeste	
Bachelor`s programmes						
Mechanical Engineering -						
International Engineering						
Mechanical Engineering -			С		2. GS	
International Engineering						
Mechanical Engineering -			CE		3 o. 5	
Specialisation in Plant En			_			
Mechanical Engineering -	С		5			
Specialisation in Automotive and Drive Engineering Mechanical Engineering -					3 0. 5	
Specialisation in Construct		Technology	CE		50.5	
	CE		5			
Computer Science in Mechanical Engineering Business Administration & Engineering majoring in Mechanical			_		-	
Engineering			CE	5		
Mechanical Engineering (dual study)					
Workload	ddarolddyj					
				Total wo	rkload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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; wh numbers only	
Contact hours	Lecture	2	30			
e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation	Exercise	1	15			
game, credited tutorial (more rows can be added)	Practical course	1	15			
	Total	Total contact hours ir SWS	Total contact hours in hours 60	450	_	
Non-contact hours e.g. tutorial, preparation, follow-up work, preparation for assignments and	Preparation, follow-up work		90	150	5	
nomework, research, etc.)	written elaboration, presentation					
	Total		Total non-contact hours 90			
5.1 Intended learning outcomes (acquire soft skills in addition to technical relevant?)						

systems as well as boundary conditions for mobility (sustainability, safety, reliability, ...).

The practical exercises not only serve to provide a more in-depth description of the technical context, but also specifically promote critical reflection on the results achieved, independent work and the ability to work in a team.

5.2 Course content
Vehicle components
Vehicle electronics
• Energy storage technologies
Vehicle mechatronics
• Electric driving and alternative drive technology
• Driver assistance systems
Reliability and quality management
→ 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 components do vehicles consist of? How are they driven? And how do driving assistance systems work? This module addresses these and other basic issues concerning mobility. You directly apply your newly acquired knowledge to practical exercises. 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:)
6.2 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: DrIng. M. Brockmann
7.3 Professors (optional): DrIng. M. Brockmann
7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Basics of Business Administration

1.1 Title of module (GER / ENG) Grundlagen der Betriel	oswirtschaftslehre /		1.2 Short description (optional)	n 1.3 Module o ITB.1.0027	code (from HIO)
Basics of Business Ad 2.1 Cycle of module:			2.2 Duration of mod		
Every summer semester Other cycle, namely:	Every winter semester		🛛 1 semester 🗌 2 s	semesters	
3.1 Module offered in the follow	ing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semeste
Bachelor`s programme	es:				
Mechanical Engineering			•		•
International Engineering			С		3
Mechanical Engineering	-				
International Engineering					
Mechanical Engineering	-		С		3
Specialisation in Plant E	ngineering		C		3
Mechanical Engineering	С		3		
Specialisation in Automo	J		3		
Mechanical Engineering	С		3		
Specialisation in Constru	-		3		
Computer Science in Me	С		3		
Business Administration					
Engineering					
Mechanical Engineering	(dual study)		С		3
Workload				Total wo	rkload
	Mother defines			Workload in	
	Method of teaching	Hours per week per 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 hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who numbers only
Contact hours (e.g. lecture, seminar, practical	Lecture	2	30		
course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise	2	30		
	Total	Total contact hours SWS	hours in hours 60	150	5
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		90	150	5
	Total		Total non- contact hours 90		

general business administration. In particular, they will be able to describe the value chain, from materials management and production to marketing and supporting areas. They will, for example, be able to run ABC analyses, calculate the break-even point, economic order quantities and contribution margins, and also apply product program planning. These aspects will enable students to practice their mathematical/analytical skills, problem-solving skills and capacity for reflection, and to learn scientific working methods.

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	5.2 Course content
	Based on the foundations of business management, the following partial areas are addressed:
	Object and methods of business administration
	Business administration as an academic discipline
	Basis of operational decisions
	• Decisions on legal form
	Business performance processes
	Materials management
	Production management
	Marketing
	Business financial processes
	External accounting
	Controlling
	Investment and finance
	Elements and structures of management systems
	Organisation
	Human resources management
	 Foundations of corporate management
	Different weighting is given to the partial areas at the advanced stage. Students systematically
	acquire the course content during lectures and exercise classes with the involvement of
	students.
	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
5	3.3 Onort information about module (This section [max. 250 characters] will be published on the FTT wurster website to help people interested in studying at FTT
5	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
5	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.
5	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. Ordering, production and sales: this module focuses on business processes related to the value
5	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.
5	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. Ordering, production and sales: this module focuses on business processes related to the value
5	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
5	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
6	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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
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5 6 7 7	Munster 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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
66	Munetr 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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools. 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 or oral examination 6.4 Requirements for admission to examination 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 of FH Münster: https://www.th- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: Q German _ English _ Other, namely: 7.2 Module Contact Person:
5	Munster 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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools.
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66	Winster to choose the right degree. Please focus on the main intended learning outcomes and ocurse 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. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools. 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 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 or oral examination 6.4 Requirements for admission to examination 6.5 Module mark weighting for calculating final grade 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 so al degree programmes in the official announcements of FH Münster: https://www.fh-muester.dhoch
5 €	Winster 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 with exhole sentences, address your (prospective) students directly and avoid technical terms. Ordering, production and sales: this module focuses on business processes related to the value chain. You understand the tasks involved, and learn how to perform them using the relevant tools. 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 6.4 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 Legament/machungen/index.php?p=2,7. 7.1 Languages used in the module: German legish lo ther, namely: 7.3 Professor Dr. phil. F. Striewe 7.3 Professor Dr. phil. F. Striewe

Basics of Construction Design

1	1.1 Title of module (GER / ENG Grundlagen der Kons	truktion /		1.2 Sl (optic	hort description onal)	1.3 Module co MB.1.0050		
2	Basics of Constructio 2.1 Cycle of module: Every summer semester [Other cycle, namely:				uration of modul semester 🛛 2 se			
3	3.1 Module offered in the follo	wing degree programme(s):		comp	ompulsory (C) , oulsory elective elective (E)	3.3 Recomme	nded semester:	
	Bachelor`s programm	es:						
	Mechanical Engineering -				С		+2	
	International Engineerir	ng (Outgoings)			C		+2	
	Mechanical Engineering	g -						
	International Engineering (Incomings)							
	Mechanical Engineering -				С			
	Specialisation in Plant				L L		+2	
	Mechanical Engineering -				•			
	Specialisation in Automotive and Drive Engineering				C	1	+2	
	Mechanical Engineering -				•			
	Specialisation in Construction and Manufactoring Technology				С	1	+2	
	Computer Science in Mechanical Engineering				С	1	+2	
		n & Engineering majoring	in Mechanical					
	Engineering	·· •· _··g···•g····g			С	1	+2	
	Mechanical Engineering	a (dual study)			С	3	8+4	
4	Workload				•			
						Total wo	rkload	
		Method of teaching	Hours per week p semester (SWS) f each method of teaching	or : 1 1	semester for each method of	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	Lecture	2+0		30			
	(e.g. lecture, seminar, practical course, practical period/internship,	Practical course	2+2		60			
	group work, project work, case study, simulation game, credited tutorial (more rows can be added)							
		Total	Total contact hours in	ł	Total contact nours in hours 90			
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination			180	270	9	
		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 of the module, students will be able to apply basic methods of construction design. These methods form the basis of construction design work in companies. Specifically, students will be able to read technical drawings and to create, explain and assess manufacturing and assembly drawings in the form of a sketch. Students will be able to design and develop assemblies of machines (including moving parts and cast parts), taking into account functionality, the manufacturing process, service requirements, standards and costs, and to plan the necessary production processes. Students will be able to transfer these construction designs into a high-end CAD system (NX). Students will therefore be capable of implementing and assessing their own construction design results in terms of specifications. In addition, students will be able to analyse, assess and design the fit and the tolerance chains as required. By applying tolerance chains, students learn the following skills: one- and two-dimensional chains, as well as arithmetic and approximate stochastic chain analysis. Students will be able to identify and assess surface, geometrical and position tolerances, and to work out appropriate tolerances for their own construction designs. They will have the skills required to confidently apply elements of methodological construction (such as the morphological box, FMEA and TRIZ), enabling them to develop the methodologically correct way to implement specific construction designs. The practical course enables students to transfer the specialist knowledge gained in the lectures to practical tasks. Students will be able to use different techniques to manually create technical drawings in conformity with standards. Depending on the component or

assembly, they will also be able to take into account various production-oriented design guidelines. Using the design environment in the Siemens NX program package, students will be able to create complex, three-dimensional components according to drawings. Students will be able to apply the computational methods learned (e.g. tolerance chain) to the application examples provided. The skills learned will help students to accompany the design process professionally and confidently in their future career.

5.2 Course content

- Presentation of workpieces
- Dimensioning of workpieces, production-oriented dimensioning
- Tolerances and fit, geometrical and position tolerances
- Surface specifications and edge conditions
- Parts list
- Tolerance chains
- Press fit calculation
- General information on standards
- 3D technology
- Failure modes and effect analysis (FMEA)
- Theory of inventive problem solving (TRIZ)
- Methodological construction
- CAD system NX CAD techniques for creating and dimensioning basic geometric constructions in 2D and 3D

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.

Construction design is all about skilfully combining your theoretical and practical knowledge – which is exactly what you practise in this module. Besides acquiring mathematical and legal basics, you practise computer-aided construction design.

In the second part of the module, you apply your knowledge of construction design to practical tasks. You sketch technical drawings of components and then display them in 3D on the computer.

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.

7.2 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.) Recommended reading: Lecture and practical course notes

Basics in Operations Management

1.1 Title of module (GER / ENG) Produktionswirtschaft Basics in Operations M	iche Anwendungen /		1.2 Short description (optional)	n 1.3 Module c ITB.1.007	ode (from HIO) 9
2.1 Cycle of module: ☐ Every summer semester ⊠ Other cycle, namely:			2.2 Duration of mod ☑ 1 semester □ 2 s		
3.1 Module offered in the follow	ing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester:
Bachelor`s programme	es:				
Mechanical Engineering					
International Engineering					
Mechanical Engineering			CE	2	2. GS
International Engineering					
Mechanical Engineering			CE	3	3 0. 5
Specialisation in Plant E	<u> </u>				
Mechanical Engineering			CE	3	3 0. 5
	tive and Drive Engineering				3 o. 5
	echanical Engineering - CE				0.5
	pecialisation in Construction and Manufactoring Technology omputer Science in Mechanical Engineering usiness Administration & Engineering majoring in Mechanical				5
					-
Engineering		Conanica	С		3
Mechanical Engineering	(dual study)		CE		NiSe
Workload	(_		
				Total wo	rkload
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for each method of	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	Lecture	2	30		
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study,	Exercise	1	15		
simulation game, credited tutorial (more rows can be added)	Practical period	1	15		
	Total	Total contact hours SWS	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, follow-up work, preparation for the examination		90	150	5
	Total		Total non- contact hours 90		

53	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 this module, students will be able to (expertise) • Identify, name and plan production resources required in a production system;
	Assess the potential of production systems and evaluate the result of improvement
	 initiatives by using relevant key performance indicators; Compare production systems with each another and make clear the differences between
	the production processes in order to be able to identify best practices and to find good
	examples for companies;
	Develop production programmes so that they can provide skilled support and advice in
	production control practice;
	 Recognise waste in production processes due to batch production, enabling them to develop an eye for it in practice, too.
	In addition, after successful completion, students will be able to (methodological and social skills)
	Consider complex issues and develop solutions within a team, enabling them to solve
	problems in collaboration with colleagues in their future career;
	 Analytically solve production management problems by using formulae and algorithms, enabling them to use them for their intended purpose in practice, too;
	• Use an ERP system (in particular SAP) to plan and control factors of production, enabling
	them to successfully apply the methods and tools learned in practice, without further
	training;
	 Use multimedia support to teach themselves key aspects of production management,
	enabling them to acquire the skill of independent learning and to apply this skill in
	their future career with a view to lifelong learning. 5.2 Course content
	A. Classification of production systems and processes
	B. Organisation of production systems – production equipment, materials, processes
	C. Planning of the production programme
	D. Production control
	E. Modern concepts of production management
	F. SAP application in procurement and production (practical course) G. Lean application (practical course)
	\rightarrow 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.
	Production management is about the economic use of resources. You learn about the main tools
	involved, and apply them to exercises and case studies.
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
	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 or oral examination
	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: <u>https://www.fh-</u>
	muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7	77.1 Languages used in the module:
	German English Other, namely: 7.2 Module Contact Person:
	Professor Dr. rer. pol. Ralf Ziegenbein
	7.3 Professors (optional):
l	Professor Dr. rer. pol. Ralf Ziegenbein / Academic staff of ITB
	/ / Representation of the section of
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Basics of Reciprocating Machines (Module not valid for enrolment from WiSe 21/22 onwards)

	1.1 Title of module (GER / ENG Grundlagen der Kolbe			1.2 Short description (optional)	on 1.3 Module of MB.1.004	ode (from HIO)	
	Basics of Reciprocati					•	
2	2.1 Cycle of module:			2.2 Duration of mod			
	3.1 Module offered in the follo	wing degree programme(s):	(3.2 Compulsory (C) compulsory electiv (CE), elective (E)		ended semester:	
	Bachelor`s programmes:						
	Mechanical Engineerin						
	International Engineerii						
	Mechanical Engineerin						
	International Engineeri						
	Mechanical Engineerin						
	Specialisation in Plant						
	Mechanical Engineerin	<u> </u>					
		notive and Drive Engineering					
	Mechanical Engineerin	g -					
	Specialisation in Const	ruction and Manufactoring Te	chnology	С		3	
	(General Mechanical E	ngineering)					
	Computer Science in M	lechanical Engineering					
	Business Administratio	n & Engineering majoring in N	lechanical				
	Engineering						
	Mechanical Engineerin	g (dual study)		С		5	
4 Workload							
4	Workload				Total wa	rkload	
4	Workload				Total wo		
4	Workload	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	erkload ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only	
4	Contact hours	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole	
4	Contact hours (e.g. lecture, seminar, practical course, practical period/internship,		per semester (SWS) for each method 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	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole	
	Contact hours (e.g. lecture, seminar, practical	Lecture	per semester (SWS) for each method of teaching 2	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole	
	Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited	Lecture Exercise	per semester (SWS) for each method of teaching 2 1	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 15	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole	
	Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited	Lecture Exercise	per semester (SWS) for each method of teaching 2 1	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 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 period/internship, group work, project work, case study, simulation game, credited	Lecture Exercise Practical course	per semester (SWS) for each method of teaching 2 1 1 Total contact hours	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 15 15 Total contact hours in hours	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole	
	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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Lecture Exercise Practical course Total Preparation, follow-up work, preparation for the	per semester (SWS) for each method of teaching 2 1 1 Total contact hours	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 15 15 15 Total contact hours in hours 60	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only	

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. In particular, they will be able to understand and assess the different technical designs of reciprocating engines. Students will be able to solve special tasks related to the dynamics of reciprocating engines. 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 Classification and overview Kinematics and dynamics of reciprocating engines Work machines: pumps and compressors Piston combustion engines Modern developments and trends 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. Those involved professionally with engine technology should understand how reciprocating engines work. You therefore explore various designs of these engines, and apply the knowledge gained to practical problems. 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 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.) Recommended reading: Lecture notes: Küttner: Kolbenmaschinen, Vieweg-Verlag

Car Body Engineering

1	1.1 Title of module (GER / ENG Karosserietechnik / C			1.2 Short descriptio (optional)	on 1.3 Module MB.1.00	e code (from HIO))63	
)	2.1 Cycle of module:	7 Eveny winter comester		2.2 Duration of moc ☐ 1 semester ☐ 2			
	Other cycle, namely:				361163(613		
	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		mended	
	Bachelor`s programm	es:					
	Mechanical Engineering						
International Engineering (Outgoings)							
	Mechanical Engineering			C/CE		2. GS	
	International Engineerir			0,02		2.00	
	Mechanical Engineering			CE		3 o. 5	
	Specialisation in Plant I			_			
	Mechanical Engineering			С		5	
		otive and Drive Engineering					
	Mechanical Engineering	g - ruction and Manufactoring Teo	choology	CE		3 o. 5	
			chilology				
Computer Science in Mechanical Engineering Business Administration & Engineering majoring in Mechanical			lechanical			<u> </u>	
	Engineering		leenamear	CE		5	
	Mechanical Engineering	n (dual study)		CE		WiSe	
	Workload						
					Total wo	orkload	
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	 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	Lecture	3	45			
	course, practical 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 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, follow-up work, preparation for the examination		75	150	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 assess modern car bodies in terms of structural properties and car body design, taking into account the relevant economic, legal and technical frameworks. They will be able to describe the relevant development tools, specifically select materials for body components, dimension components appropriately, develop optimisation proposals, and analyse alternative component or car body designs and concepts. In their future career, students will be able to thoroughly compare and assess the advantages and disadvantages of different car body designs.

Presentation of the social and political framework conditions in vehicle manufacturing Driving resistances Car body designs and types of bodywork Modern car body materials and light weight construction Development load cases, development tools and virtual functional layout Aspects of body manufacturing Joining techniques in body engineering Debuils available in the survesty valued, course similate, etc. S 3 Short Information about module (The seeks of the same state learning pulsiones and course content, itely also comprised in statements of a double and the first and the serves of the set of the		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 and their independent working practices.
Car body designs and types of bodywork Modern car body materials and light weight construction Development load cases, development tools and virtual functional layout Aspects of body manufacturing Joining techniques in body engineering Details available in the unversity calendar, course limitable, site S 3.3 Short information about module (The section flax; 250 charactere) will be published on the FH Minster website to help people interested in studying at FH Mindet to focuse limitable, site What materials are used to build cars? How do you go about designing a car body? After exploring existing solutions to these questions, you contemplate the potential for development in vehicle construction. G Efforterquisities (crange) examination of module XY has to be passed or similar <u>content wear</u> module XY should have been attended, the following knowledge and statis should make been acquired:,) None Students must pass the examination G.3 Type and scope of examination (e.g. writen examination, oral exam (1.5 - 3 hours), an oral exam (20 - 45 minutes) or a term paper (approx. 10 pages) See current version of the Examination Regulations / special examination rules and regulations Regularements for advecting or above-mentioned degree programmes (Section 3).* 'vo will find the Examination find grade See turned weighting for calculating final grade See turned weighting for aclueid and the grade programmes in the followerk So Module contact Person: Professor DrIng. M. Große Gehling Ta Professor Dr		•
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- Details available in the university calendar, course timetable, etc. 5 3.3 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 relavance of the module for the further course of study and the labour market. Please will evide sentence, address your (help study) and avoid technical terms. What marker labs are used to build cars? How do you go about designing a car body? After exploring existing solutions to these questions, you contemplate the potential for development in vehicle construction. 6.1. Prerequisites (torng) examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and skill 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, 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 administion to examination See current version of the Examination See current version of the Examination Regulations / special examination rules and regulations Regular participation in the practical course and recognition of associated work 5.5 Module mark weighting for above-mentioned degree programmes (Section 3).* 'vou will find the Examination Regulations of FH Münster: https://www.th- maneater.dwhochschuleakuter.degrees programmes in the official announcements of FH Münster: https://www.th- maneater.dwhochschuleakuter.degrees programmes in the official announcements of FH Münster:		
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6 6.1 Percequisites (<u>somal</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 5.5 Module mark weighting for calculating final grade See Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- muenstr.de/hochschule/akueles/amtiche_bekantmachungen/index.php?p=2,7. 7.1 Languages used in the module: ② German □ English □ Other, namely: 7.2 Module Contact Person: Professor DrIng. M. Große Gehling 7.3 Professor DrIng. M. Große Gehling 7.4 Maximum number of participants (optional)		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 materials are used to build cars? How do you go about designing a car body? After exploring existing solutions to these questions, you contemplate the potential for development in vehicle
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Professor DrIng. M. Große Gehling 7.3 Professors (optional): Professor DrIng. M. Große Gehling 7.4 Maximum number of participants (optional)	7	German 🗍 English 🗍 Other, namely:
Professor DrIng. M. Große Gehling 7.4 Maximum number of participants (optional)		Professor DrIng. M. Große Gehling
7.4 Maximum number of participants (optional)		
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)		
		7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Chemistry for Process Engineers (Module not valid for enrolment from WiSe 21/22 onwards)

1	1.1 Title of module (GER / ENG Chemie für Anlagenter	chniker /		1.2 Short descriptio (optional)	on 1.3 Module of CIW.1.00	code (from HIO) 88
2	Chemistry for Process 2.1 Cycle of module:	Engineers		2.2 Duration of mod		
~	Every summer semester	Every winter semester		⊠ 1 semester □ 2		
	Other cycle, namely:					
3	3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C) compulsory electiv (CE), elective (E)		ended semester:
	Bachelor`s programme	es:				
	Mechanical Engineering	-				
	International Engineering	g (Outgoings)				
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering			с		3
	Specialisation in Plant E	<u> </u>				0
	Mechanical Engineering					
		otive and Drive Engineerin	g			
	Mechanical Engineering		Taabaalaay			
		uction and Manufactoring	rechnology			
	Computer Science in Me	& Engineering majoring ir	Maghaniag			
	Engineering	& Engineering majoring in	Tiviechariicai			
	Mechanical Engineering	(dual study)				
4	Workload					
	* workload			Total worklo		
					Total wo	orkioad
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
	Contact hours	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship,		per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical	Lecture	per semester (SWS) for each method of teaching 3	semester for each method of teaching (usually the number of hours per week multiplied by 15) 45	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Lecture Exercise Practical course – in the form of a block placement outside term time / the examination	per semester (SWS) for each method of teaching 3 1	semester for each method of teaching (usually the number of hours per week multiplied by 15) 45 15	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Lecture Exercise Practical course – in the form of a block placement outside term time / the examination period Total Preparation, follow-up work	per semester (SWS) for each method of teaching 3 1 1 1 Total contact hours in	semester for each method of teaching (usually the number of hours per week multiplied by 15) 45 15 15 15	Workload in hours Total contact and non-contact hours	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) Non-contact hours (e.g. tutorial, preparation, follow-up	Lecture Exercise Practical course – in the form of a block placement outside term time / the examination period Total Preparation, follow-up	per semester (SWS) for each method of teaching 3 1 1 1 Total contact hours in	semester for each method of teaching (usually the number of hours per week multiplied by 15) 45 15 15 15	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only

	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 implement the basic concepts and methods in inorganic and physical chemistry. They will be able to identify certain cross-links to materials sciences at appropriate places, and highlight concrete applications. The practical courses enable students to develop solution strategies for carrying out chemical experiments and analysis. This enables them to transfer theoretical learning content to practice, and to assess the significance and problems of chemical experiments.
	5.2 Course content <u>General Chemistry</u> Units of measurement, atomic and molecular structure and chemical bonds, periodic table of the elements, application of the law of mass action, chemical equilibrium, acids and bases, oxidation and reduction <u>Inorganic Chemistry</u> Chemistry and properties of the main and transition group elements (as examples), hydrogen and its compounds, chemistry of noble gases and of atmospheric trace gases <u>Physical Chemistry</u> Ideal gas, chemical material transformations (change of state, reactions), energy turnover during chemical processes (enthalpy, entropy, free enthalpy), activation
	energy, chemical reaction kinetics <u>Electrochemistry</u> Nernst's law, Faraday's laws, electrolysis, batteries and accumulators, fuel cells <u>Quality assurance</u> <u>Selected analytical and spectroscopic methods for monitoring processes</u> → 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 learn the basic concepts and methods of inorganic and physical chemistry, and discover specific potential applications via cross-connections to materials sciences. You put your knowledge to the test in laboratory classes.
	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 or oral examination
	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:
	7.2 Module Contact Person: Professor Dr. rer. nat. T. Jüstel
	7.3 Professors (optional): Professor Dr. rer. nat. T. Jüstel
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Recommended reading: C.E. Mortimer, U. Müller, Chemie, Thieme, 8th edition 2003

Manuscript for download: www.fh-muenster.de/juestel

1	1.1 Title of module (GER / ENG) CIM)		1.2 Short descriptio (optional)	0n 1.3 Module MB.1.00	code (from HIO)
2	2.1 Cycle of module: ⊠ Every summer semester □ Every winter semester			2.2 Duration of module: ☑ 1 semester □ 2 semesters		
2	Other cycle, namely: 3.1 Module offered in the follow	ing degree programme(c)		2.2 Compulsory (C)	2.2 Bosomn	nended semester:
3	3.1 module offered in the follow	nng degree programme(s):		3.2 Compulsory (C) compulsory electiv (CE), elective (E)		ienaea semester:
	Bachelor`s programme	es:				
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering					
	Specialisation in Plant E					
	Mechanical Engineering	<u> </u>				
	Specialisation in Automo		na			
	Mechanical Engineering	¥				
		uction and Manufactoring	I Technology			
	Computer Science in Me		reennelegy			
	Business Administration		in Mechanical			_
	Engineering		in moonarioa	С		3
	Mechanical Engineering	(dual study)				
4	Workload	(ddai stddy)				
					Total we	orkload
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Lecture	1	15		
	course, practical period/internship, group work, project work, case study,	Exercise	1	15		
	simulation game, credited tutorial (more rows can be added)	Practical course	2	30		
		Total	Total contact hours in SWS	Total contact hours in hours 60	450	-
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Preparation, follow-up work			150	5
	and homework, research, etc.)	preparation for the examination				
		Total		Total non-contact hours 90		
	5.1 Intended learning outcomes					
	skills in addition to technical skills? For	which other modules and prospective	tasks in the labour market	are the acquired knowle	dge and skills releva	ant?)
	After successful comp	letion of the module st	udents will he a	ble to apply ar	d further de	velon
	modern, computationa					
	the automotive industr					

the automotive industry. They will be able to identify the methods used in practice to plan, control and simulate production facilities, and to adapt them to concrete issues.

	The aim of the practical course is to enable students to expand on their theoretical knowledge on modelling and simulating production facilities, and to independently develop solution methods for tackling practice-oriented assignments.
	5.2 Course content Lecture/exercise class: - Planning philosophies - Subtasks - Hierarchical sequential PPC concept (PPC = production planning and control) - Manufacturing resource planning II (MRP II)
	- Load-oriented order release
	- Retrograde scheduling
	- Kanban approach - Optimised production technology (OPT)
	- Enterprise resource planning
	- Supply chain management
	Practical course: - Modelling, simulation and optimisation of production facilities
	→ 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 makes production plants, e.g. in the automotive industry, functional and efficient? You learn various methods that can be used to plan, control and simulate such plants.
	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.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7	7.1 Languages used in the module: ☑ German
	7.2 Module Contact Person:
	Professor DrIng. A. Komainda 7.3 Professors (optional):
	Professor DrIng. A. Komainda
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

1.1 Title of module (GER / ENG Regelungstechnik / Closed Loop Control	5)		1.2 Short descriptio (optional)	n 1.3 Module c MB.1.010	ode (from HIO) 5
2.1 Cycle of module: Every summer semester Other cycle, namely:] Every winter semester		2.2 Duration of mod ⊠ 1 semester □ 2		
3.1 Module offered in the follo			3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester
Bachelor`s programmes:					
Mechanical Engineering					
International Engineerir					
Mechanical Engineering			CE	2	2. GS
International Engineerin					
Mechanical Engineering			С		5
Specialisation in Plant I	<u> </u>				
Mechanical Engineering	otive and Drive Engineering		С		5
Mechanical Engineering					
	uction and Manufactoring Tec	chnology	С		5
Computer Science in M	<u> </u>	Sintelegy	С		5
	n & Engineering majoring in M	lechanical	•		•
Engineering					
Mechanical Engineering	g (dual study)		С		7
Workload					
				Total wo	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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	Lecture	2	30		
course, practical 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 contact hours 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, follow-up work, preparation for the examination		90	150	5
	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?)

After successful completion of the module, students will be able to recognise and describe the structure and functioning of closed loops. By applying the mathematical methods and techniques they have learned, students will be able to calculate standard closed loops, and to classify the main controller types and methods.

The practical course enables students to expand on and consolidate the specialist knowledge gained in the lectures by transferring the knowledge to practical tasks. In particular, students will be able to measure signals in control loops, set a closed loop in practice, and analyse the effects of incorrect controller settings on system behaviour. The work performed in small groups

	resembles the work practices often conducted in engineering practice, and will improve students' communication and team working skills, as well as their capacity for reflection. The use of MatLab- Simulink, a software program widely used in industry, enables students to design closed loops as used in standard engineering practice.
	5.2 Course content Signals and signal flow diagrams; modelling; Laplace transformation; controller and track types; closed loops; stability; control precision; standard methods for setting and optimising controllers. Calculation examples related to the above thematic areas are addressed in the exercise classes. In the practical course, students are divided into small groups to expand on the knowledge gained in practice on test benches.
	\rightarrow 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. We encounter closed loop control in our everyday lives wherever machines move or change things automatically. You understand the technical connections behind it, and are able to calculate closed
6	loops.
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 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: Image: Second S
	7.2 Module Contact Person:
	Professor DrIng. D. Scholz
	7.3 Professors (optional):
	7.3 Professors (optional): Professor DrIng. D. Scholz
	7.3 Professors (optional):
	7.3 Professors (optional): Professor DrIng. D. Scholz

65

Combustion Engines

1.1 Title of module (GER / ENG Verbrennungskraftma Combustion Engines			1.2 Short descripti (optional)	on 1.3 Module MB.1.02	e code (from HIO 205	
Combustion Engines 2.1 Cycle of module:			2.2 Duration of module:			
🗌 Every summer semester 🗵	Every winter semester		⊠ 1 semester □ 2			
Other cycle, namely: 3.1 Module offered in the follow	wing degree programme(s):		3.2 Compulsory (C compulsory electiv (CE), elective (E)		mended	
Bachelor`s programm	es:					
Mechanical Engineering						
International Engineerin						
Mechanical Engineering						
International Engineerin			С		2. GS	
Mechanical Engineering			05		0 - 5	
Specialisation in Plant E			CE		3 o. 5	
Mechanical Engineering			^		~	
	otive and Drive Engineering		С		5	
Mechanical Engineering	¥¥				~	
	vuction and Manufactoring Tec	chnology	С		5	
Computer Science in M						
· ·	n & Engineering majoring in M	lechanical			_	
Engineering	· · · _ · · g · · · · g · · · · g · · · ·		CE		5	
Mechanical Engineering	a (dual study)		С		5	
Workload	<i>y</i> (<i>uum uuuy</i>)					
		Total wo	orkload			
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for h each method of	Jorkload in ours otal contact and on-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who numbers only	
Contact hours	Lecture	2	30			
(e.g. lecture, seminar, practical course, practical 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 contact hours in SWS	Total contact hours in hours 60	150	5	
Non-contact hours	Preparation, follow-up work,		90			
(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	written elaboration					
	Tatal		Total no.			
	וסדמו		l otal non- contact hours 90			
acquire soft skills in addition to techn relevant?)	Total (What should students be able to do after had a skills? For which other modules and prospected by the stude of the module, stude of the module, stude of the module stude stude of the module stude stude of the module stude	ective tasks in the labo	90 nodule? Does the module bur market are the acquir	ed knowledge and	l skill	

related to combustion engines including reciprocating engines and gas turbines. They will able to transfer them into practical engineering applications. In the practical course, the the students can apply their theoretical knowledge in experiments. The work in small groups and the preparation of reports and presentations enhance their communication and social skills, too.

5.2 Course of	
Intro	oduction and Overview (Classification)
Ther	rmodynamics of Combustion Engines and Cycles
Com	hustion
Piste	on Engines (Otto and Diesel Engines)
	ormance
	Turbines and Jet Engines
	n Components
	•
	ormance and Component Matching of Gas Turbeines and Jet Engines
• woa	ern Trends in Combustion Engines
→ Details avai	lable in the university calendar, course timetable, etc.
	formation 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 cho	bose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms.
	volved professionally with engine technology should understand how reciprocating engines
	tubrines incuding jet engines work. You therefore explore various designs of these engines,
	y the knowledge gained to practical problems.
	isites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and
	ave been acquired:)
None	
6.2 Poquiror	ments for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active
participation)	nents for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active
Students	s must pass the examination
6.3 Type and	d scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
The mod	ule is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes)
or a term	n paper (approx. 10 pages)
	ments for admission to examination
See curre	ent version of the Examination Regulations / special examination rules and regulations
6.5 Module r	mark weighting for calculating final grade
	nination Regulations for above-mentioned degree programmes (Section 3).*
	he Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh-
muenster.de/ho	ochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
7 7.1 Languag	jes used in the module:
🖾 German [🗌 English 🗌 Other, namely:
	Contact Person:
	or DrIng. habil. S. aus der Wiesche
	ors (optional):
	or DrIng. habil. S. aus der Wiesche m number of participants (optional)
7.4 Maximur	n number of participants (optional)
7.5 Further i	information (optional) (e.g. recommended reading, other persons involved, etc.)
Literatur	
	ecture material and information; Urlaub: Verbrennungsmotoren, Springer; Pischinger:
	by a mile day Varbrannungalyraftmaaabina. Springer, Laabhay 8 Sauma, Statianäya

Thermodynamik der Verbrennungskraftmaschine, Springer; Lechner & Seume: Stationäre Gasturbinen, Springer; Bräunling: Flugtriebwerke, Springer; Cumpsty & Heyes: Jet Propulsion, Cambridge

Communication (Prerequisite for Practicle Project)

1	1.1 Title of module (GER / ENG Kommunikation / Com) munication		1.2 Short description (optional)	1.3 Module c MB.1.019			
	2.1 Cycle of module: ☐ Every summer semester ⊠ Other cycle, namely:	er semester 🛛 Every winter semester			2.2 Duration of module: ☑ 1 semester □ 2 semesters			
3		Module offered in the following degree programme(s):			3.3 Recommo	ended semester:		
	Bachelor`s programmes:							
	Mechanical Engineering							
	International Engineering (Outgoings)				_			
	Mechanical Engineering -							
	International Engineerin							
	Mechanical Engineering			С	3			
	Specialisation in Plant E			_				
	Mechanical Engineering			С	3			
		otive and Drive Engineering				- 		
	Mechanical Engineering		boology	С		3		
		uction and Manufactoring Tec	nnology	С		3		
	Computer Science in Me	& Engineering majoring in M	lachanical	C		3		
	Engineering	a Engineening majoring in M	echanica					
	Mechanical Engineering	(dual study)		С		2		
4	Workload	(dual study)		0		L		
					Total wo	rkload		
		Method of teaching	Hours per weel per semester (SWS) for each method of teaching	semester for h each method of	Vorkload in iours iotal contact and on-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only		
	Contact hours	Exercise Communication	2	30				
	(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	s Total contact hours in hours 30				
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination						
5	5.1 Intended learning outcome	Total s (What should students be able to do after ha	aving completed the	Total non- contact hours	provide the opport	unity to		
5		cal skills? For which other modules and prosp						

This course will enable students to deliver specialised presentations and describe their projects and present their group work. They will learn to proficiently apply rhetorical devices, audience-oriented methods and specialist terms in describing and explaining technical processes. In discussions and conversations they train to ask and answer questions respectfully while giving their own opinion in a deliberated and well-argued way. This is complemented by an introduction into preparation techniques based on literature search and specialised documentation, which promotes academic writing across modules. In terms of form and style, proficiency in writing lab reports and e-mails is also part of the course. The

ſ	emphasis is on providing students with practice for effective communication, giving them confidence and poise for everyday situations in their studies as well as in a professional context.
	5.2 Course content
	Using language in a clear and concise manner in writing and speaking, presenting with technical aids and rhetorical skills, arguing and debating, preparing practical exercises and
	contributing them in class, prompting techniques, conversational skills in a meeting/negotiation situation, literature search and documentation.
	→ 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.
	Communicating professionally and efficiently is the key to success. It provides a solid foundation for any project. Focusing on methods and training in practical exercises, the goal of this module is proficiency in this important skill.
6	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)
	Passing the final examination, which is a term of admission for starting an industrial placement to write the Bachelor thesis.
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) Semi-public talk based on presentation software (15 minutes + Q & A).
	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: Image: Second S
	7.2 Module Contact Person: Dean Professor Dr. rer. nat. E. Finke
	7.3 Professors (optional): Lecturer Dr. S. Schiller-Lerg
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

1.1 Title of module (GER / ENG Strömungssimulation / Computational Fluid Dyn	-		1.2 Short description (optional)	n 1.3 Module d MB.1.012	code (from HIO)	
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 elective (CE), elective (E)		3.3 Recommended semester	
Bachelor`s programme						
Mechanical Engineering						
International Engineerin						
Mechanical Engineering			CE		1.GS	
International Engineering (Incomings)			02			
Mechanical Engineering						
Specialisation in Plant E						
Mechanical Engineering						
	otive and Drive Engineering					
Mechanical Engineering			CE		4	
	uction and Manufactoring Tec	chnology			-	
Computer Science in Me			C 4		4	
Business Administration & Engineering majoring in Mechanical Engineering			CE 4		4	
Mechanical Engineering	(dual study)		CE SuS		SuSe	
Workload						
				Total wo		
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for each method of	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 period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Lecture	2	30			
	Exercise	1	15			
	Practical course	2	30			
	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, follow-up work, preparation for the examination		75	150	5	
5.1 Intended learning outcome	Total		Total non- contact hours 75			

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 assess the strengths and weaknesses of modern computer-assisted methods and, using a current standard CFD program, to calculate and analyse simple technical flow processes.

Following a detailed introduction to the theoretical grounding, students will conduct their own numerical projects using a commercial software package. The methods of calculation learned in the "Basics of Fluid Mechanics" module will be used to verify the results and derive the calculation equations.

	The practical course enables students to develop their own simulation models using state-of-the-
	art software, and to implement CFD projects independently. They will be able to independently
	develop basic models, define the necessary boundary conditions, and assess the calculation
	results for plausibility. They will also acquire profound abilities in 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
	Foundations of mesh generation, relevant mathematical equations, modelling turbulence, selection
	of boundary conditions, treatment of walls, multiphase models, the finite difference method (FDM),
	the finite element method (FEM), the finite volume method (FVM)
l	→ Details available in the university calendar, course timetable, etc.
l	
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
5	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.
	Special simulation programs can be used to calculate and assess flow processes. You familiarise
	yourself with the basics so as to be able to design your own simulation models as part of 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
	Regular participation in the practical course and recognition of associated work 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-
	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. HA. Jantzen
	7.3 Professors (optional):
	Professor DrIng. HA. Jantzen 7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Computer Graphics

1	Title of module (GER / ENG) omputergrafik / Computer Graphics		1.2 Short descriptior (optional)	iption 1.3 Module code (from HIO) ETI.1.0056		
2	2.1 Cycle of module: ☐ Every summer semester ⊠ E Other cycle, namely:	every winter semester	2.2 Duration of module: ☑ 1 semester			
3		Module offered in the following degree programme(s):			3.2 Compulsory (C), compulsory elective (CE), elective (E)	
	Bachelor`s programmes	5:				
	Mechanical Engineering -	· ·				
	International Engineering	ternational Engineering (Outgoings)				
	Mechanical Engineering -					
		ternational Engineering (Incomings) echanical Engineering -				
	Specialisation in Plant En	Y Y				
	Mechanical Engineering -					
	Specialisation in Automot	<u>v</u>	ng			
	Mechanical Engineering - Specialisation in Construct					
	Computer Science in Med		Гесппоюду	CE		5
	Business Administration &		in Mochanical	UL		5
	Engineering					
	Mechanical Engineering (dual study)				
4	Workload	ddar olddy)				
					Total wor	kload
		Method of teaching	Hours per week per semester (SWS) for each method of teaching		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	Seminaristic Lecture	2	30		
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can	Practical course	2	30		
	be added)					
		Total	Total contact hours in SWS	Total contact hours in hours 60	450	F
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Preparation, follow-up work			150	5
	homework, research, etc.)	preparation for the examination				
		Total		Total non-contact hours 90		
5	5.1 Intended learning outcomes (skills in addition to technical skills? For v					
	The course introduces s Students will be familiar generated image. In the the individual steps are Students will be able to generating digital world	students to the compu- ised with the process practical course, the r applied and implemer create 2D and 3D grap	iter-assisted cre ing chain, from relevant models nted as example	ation of images model descripti , methods and a s.	and animation on to the cor algorithms in	ons. nputer- volved in

 5.2 Course content Foundations: Properties of graphics, representation of virtual 2D or 3D space, camera (perspective) Modelling: Geometric objects, curves, interpolation, splines, areas, volumes, polygons and polyhedrons, data structures, performance Synthesis: Perception, rendering, visibility, appearance, surfaces, light Visualisation: Scalar data, volumes, vector fields, modelling, data structures Animation: Key frames, routes, hierarchies and procedures Current application programming interfaces and tools, current examples being OpenGL, DirectX and Blender I build available in the univently calendar, course tentetable, etc. 3 3.3 Short information about module (This section final, 250 characters) will be published on the FH Manster website to help people interested in studying at FH Mainster to choose the light dages. Please focus on the main indende learning autoens and course content. (dealy also course) and wood therebeanes of wood and wood activations and course content. (dealy also could be advantage of a modelling and familiarise yourself with the main algorithms. 3 6.1 Prerequisites (cmmg examination of module XY has to be passed or similar content course module XY should have been attended, the following knowledge and confident use of linear algebra, as addressed in the Mathematics I and II, Mathematics I, knowledge and confident use of linear algebra, as addressed or dealing and course (calendar). 3 5.1 Prerequisites (cmmg examination (e.g. writen examination pase, successful completion of assignments in the course of study, negular active and what active a
Properties of graphics, representation of virtual 2D or 3D space, camera (perspective) Modelling: Geometric objects, curves, interpolation, splines, areas, volumes, polygons and polyhedrons, data structures, performance Synthesis: Perception, rendering, visibility, appearance, surfaces, light Visualisation: Scalar data, volumes, vector fields, modelling, data structures Animation: Key frames, routes, hierarchies and procedures Current application programming interfaces and tools, current examples being OpenGL, DirectX and Blender - betala available in the university calendar, course timetable, etc. 5.3 Short information about module (This section (max. 20) characterity will be published on the FH Munster website to help people interested in studying at FH Visualisation in the University calendar, course timetable, etc. 5.3 Short information about module (This section (max. 20) characterity will be published on the FH Munster website to help people interested in studying at FH Visu create your own worlds – in virtual and three-dimensional form. First, however, you practise general modelling and familiarise yourself with the main algorithms. 6.3 Therequisites (comme examination of module XY has to be passed or similar content with the following information about the following information statis should have been acquired: 6.4 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation 5.3 Type and scope of examination in the practical course 6.4 Requirements for admission to examination Successful participation in the practical course 6.5 Module mark weighting for calculating final grade See Examination Regulations of pass, successful completion of assignments in the course of study, regular active participation 5.3 Type and scope of examination is winter examination pass, successful completion of assignments in the course of study, regular active aminotion 5.3 Type and scope of examination is wintere exa
Modelling: Geometric objects, curves, interpolation, splines, areas, volumes, polygons and polyhedrons, data structures, performance Synthesis: Perception, rendering, visibility, appearance, surfaces, light Visualisation: Scalar data, volumes, vector fields, modelling, data structures Animation: Key frames, routes, hierarchies and procedures Current application programming interfaces and tools, current examples being OpenGL, DirectX and Blender • Details available in the university clender, course timetable, etc. Image: Split information about module (This section (ms. 20) characters) will be published on the FH Minster website to help people interested in studying at FH Minster to chose the full direct your own worlds – in virtual and three-dimensional form. First, however, you practise general modelling and familiarise yourself with the main algorithms. Image: Split information about module XY has to be passed or aimler curater was module XY should have been attended, the following knowledge and confident use of linear algebra, as addressed in the Mathematics I module, participation in the Algorithms and Data Structures module would be advantageous. Image: Split module mathematics I course and passed the examination for awarding credit points (e.g. final examination personation of a technical project, possibly in combination with achievements from the practical course Image: Split module mathematics I course Image: split module mathematics I module, split module of assignments in the couris of st
Geometric objects, curves, interpolation, splines, areas, volumes, polygons and polyhedrons, data structures, performance Synthesis: Perception, rendering, visibility, appearance, surfaces, light Visualisation: Scalar data, volumes, vector fields, modelling, data structures Animation: Key frames, routes, hierarchies and procedures Current application programming interfaces and tools, current examples being OpenGL, DirectX and Blender - otenta availation in the university cannets, course linetable, etc. 5:3 short information about module (The section max. 200 channers) will be published on the FH Münster website to help pople interested in studying at FH Monstructions the dark degree. Please focus on the main intended learning outcomes and ourse content, lideally also comprising information about the relevance of the module for the further course of study and the lactor max. 200 channers) will be published on the FH Münster website to help pople interested in studying at FH Monstruct ohoose the right degree. Please focus on the main intended learning outcomes and ourse content, lideally also comprising information about the relevance of the module for the further course of study and the labour market. Please withe whole senses our (prospecifie) students directly and avoid technical tarent You create your own worlds – in virtual and three-dimensional form. First, however, you practise general modelling and familiarise yourself with the main algorithms. 61.1 Prerequisites (<u>computer Science I and II, Mathematics I, knowledge and confident use of linear algebra,</u> as addressed in the Mathematics I module, participation in the Algorithms and Data Structures module would be advantageous. 6.2 Requirements for awarding credit points (e.g. final examination pas, successful course and passed the examination 6.3 Type and scope of examination, (e.g. withen examination, prel examination, oral examination, protein, length of examination in minutes) Written or roal examination, or completion and presentation of a technica
polyhedrons, data structures, performance Synthesis: Perception, rendering, visibility, appearance, surfaces, light Visualisation: Scalar data, volumes, vector fields, modelling, data structures Animation: Key frames, routes, hierarchies and procedures Current application programming interfaces and tools, current examples being OpenGL, DirectX and Blender - betala validate in the university calender, course timetable, etc. 6 70 8 70 9 6.3. Short Information about module (This section (max, 280 character) will be published on the FH Munster website to help people interested in studying at FH Munster value and the instructures and course court, ideally also comparise (not match the ruther course of study and the labour market. Please write whole sentences, address your (progenetive) students directly and avoid technical terms. You create your own worlds – in virtual and three-dimensional form. First, however, you practise general modelling and familiarise yourself with the main algorithms. 6 6.1. Prerequisites (cormat examination of module XY has to be passed or similar context. with avoid have been actured:) Modules Computer Science I and II, Mathematics I, knowledge and confident use of linear algebra, as addressed in the Mathematics I module, participation in the Algorithms and Data Structures module would be advantageous. 6.
Synthesis: Perception, rendering, visibility, appearance, surfaces, light Visualisation: Scalar data, volumes, vector fields, modelling, data structures Animation: Key frames, routes, hierarchies and procedures Current application programming interfaces and tools, current examples being OpenGL, DirectX and Blender • 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 fight degree. Please house on the main interdeal learning outcomes and course content, ideated will along drawing whome bein advand technical terms. You create your own worlds – in virtual and three-dimensional form. First, however, you practise general modelling and familiarise yourself with the main algorithms. 6 1.1 Prerequisites (three advantate). We have been attended, the following knowledge and advalt technical and module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and advalt should have been attended, the following knowledge and advalted have been acquired
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German English Other, namely: 7.2 Module Contact Person: Professor Dr. K. Ungru
Professor Dr. K. Ungru
7.3 Professors (optional):
Professor Dr. K. Ungru 7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
Recommended reading (selection):
(1) M. Bender, M. Brill: Computergrafik: Ein anwendungsorientiertes Lehrbuch, Hanser, 2nd edition,
2006
(2) A. Nischwitz, M. W. Fischer, P. Haberäcker: Computergrafik und Bildverarbeitung,
Vieweg+Teubner, 2nd edition, 2007
(3) HP. Gumm, M. Sommer: Einführung in die Informatik, Chapter 11 Grafikprogrammierung,
Oldenbourg, 8th edition, 2009
(4) A. Butz, H. Hussmann, R. Malaka: Medieninformatik, Chapter 7: 2D-Grafik, Chapter 8: 3D-Grafik,
(4) A. Butz, H. Hussmann, R. Malaka: Medieninformatik, Chapter 7: 2D-Grafik, Chapter 8: 3D-Grafik, Pearson,2009
(4) A. Butz, H. Hussmann, R. Malaka: Medieninformatik, Chapter 7: 2D-Grafik, Chapter 8: 3D-Grafik, Pearson,2009 (5) HJ. Bungartz, M. Griebel,C. Zenger: Einführung in die Computergraphik, 2nd edition, Vieweg,
 (4) A. Butz, H. Hussmann, R. Malaka: Medieninformatik, Chapter 7: 2D-Grafik, Chapter 8: 3D-Grafik, Pearson,2009 (5) HJ. Bungartz, M. Griebel, C. Zenger: Einführung in die Computergraphik, 2nd edition, Vieweg, 2002
 (4) A. Butz, H. Hussmann, R. Malaka: Medieninformatik, Chapter 7: 2D-Grafik, Chapter 8: 3D-Grafik, Pearson,2009 (5) HJ. Bungartz, M. Griebel, C. Zenger: Einführung in die Computergraphik, 2nd edition, Vieweg, 2002 (6) J.D. Foley, A. Van Dam, S.K. Feiner: Computer Graphics - Principles and Practice, 2nd edition,
 (4) A. Butz, H. Hussmann, R. Malaka: Medieninformatik, Chapter 7: 2D-Grafik, Chapter 8: 3D-Grafik, Pearson,2009 (5) HJ. Bungartz, M. Griebel,C. Zenger: Einführung in die Computergraphik, 2nd edition, Vieweg, 2002

Cross Border Projects

	1.1 Title of module (GER / ENG) Cross Border Projects			1.2 Short description (optional)	n 1.3 Module co ITB.1.0077	
	2.1 Cycle of module: □ Every summer semester ⊠ E	very winter semester		2.2 Duration of mod ☑ 1 semester □ 2 s		
3	Other cycle, namely: 3.1 Module offered in the followin	g degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		nded semester:
	Bachelor`s programmes	:			<u> </u>	
	Mechanical Engineering -					
	International Engineering	(Outgoings)				
	Mechanical Engineering -			CE	1.	. GS
	International Engineering	(Incomings)				
	Mechanical Engineering -			CE		4
	Specialisation in Plant En	gineering				
	Mechanical Engineering -			CE		4
	Specialisation in Automoti	ve and Drive Engineerin	ng	CE		
	Mechanical Engineering - Specialisation in Construc	tion and Manufactoring	Technology	UE UE		4
	Computer Science in Mec	Y	rechnology	CE		4
	Business Administration 8	<u> </u>	in Mechanical	CE		4
	Engineering		in weenanical	UL UL		-
	Mechanical Engineering (dual studv)		CE		4
4	Workload	<i>,</i> ,				
					Total worl	kload
		Method of teaching	Hours per week per semester (SWS) for each method of teaching		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,	Seminaristic Lecture	2	30		
	practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise	2	30		
		Total	Total contact hours in SWS	Total contact hours in hours 60	450	F
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Preparation, follow-up work			150	5
	homework, research, etc.)	preparation for the examination				
		Total		Total non-contact hours 90		

Students will be able to:

Apply the method of design thinking to different business situations and technical challenges
 explain the technical know-how required to solve the problem in theory and transfer it into practice to solve the problem

- demonstrate active listening, empathy and effective interaction with people from other cultures

- take in, pass on and understand information in English at an advanced level

successfully present an idea in English to a group

5.2 Course content

The Cross Border Project (CBP) is carried out as a Blended Intensive Programme (BIP) with students and lecturers from currently three participating European universities (SeAMK Seinäjoki University of Applied Sciences (Finland), Thomas More University of Applied Sciences (Belgium) and the FH Münster University of Applied Sciences). Together, they work on complex technical problems that change every year. To solve these problems, agile methods such as design thinking are taught as well as technical and intercultural knowledge. The seminar takes place in a hybrid format of virtual meetings and a one-week attendance phase at one of the participating partner universities

 \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.

The Cross Border Project (CBP) is a collaborative engineering program among three European universities (Finland, Belgium, and Germany). It focuses on agile methodologies, intercultural competence, and technical problem-solving in a hybrid format and a one-week physical exchange.

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:)

To participate in the module, contact the module leader

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 in the form of a portfolio

6.4 Requirements for admission to examination

Regular active participation at the seminar

6.5 Module mark weighting for calculating final grade

*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.

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

7.1 Languages used in the module:

🗌 German 🛛 English 🗌 Other, namely:

7.2 Module Contact Person:

Dr. Andreas Hövener

7.3 Professors (optional):

Dr. Andreas Hövener

7.4 Maximum number of participants (optional)

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

Database Systems

1 1.1 Title of module (GER / ENG) Datenbanksysteme / Da	tabase Systems		1.2 Short descriptio (optional)	on 1.3 Module cod MB.1.0022	le (from HIO)
2 2.1 Cycle of module: ☐ Every summer semester ⊠ E Other cycle, namely:	-		2.2 Duration of mod ☐ 1 semester ☐ 2	semesters	
3 3.1 Module offered in the followi	ng degree programme(s):		3.2 Compulsory (C) compulsory electiv (CE), elective (E)		ded semester:
Bachelor`s programmes	6:				
Mechanical Engineering -					
International Engineering	(Outgoings)				
Mechanical Engineering -			CE	2	GS
International Engineering			UL	2.	00
Mechanical Engineering -			CE	5	
Specialisation in Plant En					-
Mechanical Engineering -			CE		5
Specialisation in Automot Mechanical Engineering -		ng			
Specialisation in Construct		Technology	CE		5
Computer Science in Med		rechnology	С		5
Business Administration 8		in Mechanical	U		5
Engineering					
Mechanical Engineering ((dual study)		CE	w	/iSe
4 Workload					
				Total wor	kload
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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,	Seminaristic Lecture	2	30		
practical period/internship, group work, project work, case study, simulation	Exercise	1	15		
	Practical course	2	30		
	Total	Total contact hours in SWS	Total contact hours in hours 75	150	5
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Preparation, follow-up work			150	5
homework, research, etc.)	preparation for the examination				
	Total		Total non-contact hours 75		

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 model and design databases. They will also be able to assess integration in heterogeneous application landscapes. The practical course and the integrated project work enable 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.

5.2 Course content

Data structures, file systems, forms of data retention, decoupling from physical and logical data retention, concept of three-level architecture, relational databases, relational algebra, operations on relations, structured query language (SQL), relational database management systems, process analysis, entity relationship diagrams, implementation of databases, systems integration, client/server architectures, 3GL programming, linking relational databases to the internet, LAMP/WAMP systems.

This course involves students carrying out a project to design and implement a database (including a user application).

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.

What are databases, and how are they organised? You find the answers by designing a database and embedding it in an IT application landscape as part of a project.

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 associated elaborations

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:

7.2 Module Contact Person:

Professor Dr.-Ing. S. Behr 7.3 Professors (optional):

Professor Dr.-Ing. S. Behr

7.4 Maximum number of participants (optional)

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

Set of slides from the lecture

1 1.1 Title of module (GER / ENG)			1.2 Short descriptio	n 1.3 Module co	ode (from HIO)
Konstruktion / CAD 1 /		(optional)	MB.1.0076	6
Design Engineering / C	AD 1				
2 2.1 Cycle of module: ☐ Every summer semester ⊠	Every winter semester		2.2 Duration of mod		
Other cycle, namely:	-			semesters	
3 3.1 Module offered in the follow	ing degree programme(s):		3.2 Compulsory (C) compulsory elective		ended semester:
			CE), elective (E)	-	
Bachelor`s programme	S:				
Mechanical Engineering	-		С		3
International Engineering	(Outgoings)				
Mechanical Engineering	-				
International Engineering					
Mechanical Engineering			С		3
Specialisation in Plant Er	<u> </u>		_		
Mechanical Engineering			С		3
	tive and Drive Engineering	g			_
Mechanical Engineering		To share he are	С		3
	ction and Manufactoring	l echnology			
Computer Science in Me		March and a st			
	& Engineering majoring ir	Niechanicai	C		3
Engineering Mechanical Engineering	(dual study)		С		5
4 Workload	(duai study)		C		5
				Total wor	rkload
	Method of teaching	Hours per week	Hours per	Workload in	ECTS (credit
		per semester (SWS) for each	semester for each method of	hours Total contact and	points) 30 hrs usually
		method of	teaching	non-contact hours	correspond to 1 credit point; whole
		teaching	(usually the number of hours per week		numbers only
Contoct hours			multiplied by 15)		
Contact hours (e.g. lecture, seminar, practical	Lecture	2	30		
course, practical period/internship, group work, project work, case study,	Exercise	1	15		
simulation game, credited tutorial (more rows can be added)	Practical course	2	30		
	Total	Total contact hours i			
		SWS	hours in hours 75		
Non-contact hours	Preparation, follow-up		75	450	-
(e.g. tutorial, preparation, follow-up work, preparation for assignments and			15	150	5
homework, research, etc.)	preparation for the				
	examination				
	Total		Total non-		
	Iotal		contact hours		
			75		

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 select and design the machine elements covered to suit design tasks and dimension them reliably. As a result of the skills developed, students have a basic understanding of how to deal with standards and guidelines and have fundamental knowledge of material behavior as a function of operating conditions and can incorporate this knowledge into strength design. Students are able to apply basic design rules in the design of machine elements and are able to select machine elements and combine them to form complex assemblies. In addition, they are able to apply their developed skills to engineering problems, to develop and execute mechanical engineering designs independently or in a team with other experts.

The practical course enables students to deepen and consolidate the acquired technical knowledge by transferring it to practical tasks. In addition, working in small groups resembles the frequent way of working in engineering practice and improves the students' communication, teamwork and reflection skills.

5.2 Course content

Exploration of:

- Shaft-hub connections
- Seals
- Tribology (basics)
- Rolling bearings and rolling bearing arrangements
- Plain bearings
- Gear drives (basics)
- Spur gears with involute gearing

→ 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.

The aim of the lectures and exercises in this module is to make a significant contribu-tion to engineering education by imparting technical and methodological knowledge as well as skills and abilities for developing and designing technical products.

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.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.-Ing. C. Spura

7.3 Professors (optional):

Professor Dr.-Ing. C. Spura

7.4 Maximum number of participants (optional)

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

1.1 Title of module (GER / ENG Konstruktion / CAD 2	1		1.2 Short descriptio (optional)	n 1.3 Module c MB.1.007	ode (from HIO) 7
Design Engineering /	CAD 2				
2.1 Cycle of module:			2.2 Duration of mod		
Every summer semester [Other cycle, namely:	Lvery winter semester		🛛 1 semester 🗌 2	semesters	
3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester
Bachelor`s programm	les:				
Mechanical Engineering	g -		С		4
International Engineerin	ng (Outgoings)		C		4
Mechanical Engineering	g -				
International Engineerir	ng (Incomings)				
Mechanical Engineering	g -				
Specialisation in Plant	Engineering				
Mechanical Engineering	g -				
Specialisation in Autom	otive and Drive Engineering				
Mechanical Engineering			С		4
Specialisation in Const	ruction and Manufactoring Tec	chnology	<u> </u>		+
Computer Science in M	lechanical Engineering				
Business Administration	n & Engineering majoring in N	lechanical			
Engineering					
Mechanical Engineering	g (dual study)		С		6
Workload					
				Total wo	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Lecture	2	30		
(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	2	30		
	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, follow-up work, preparation for the examination		75	150	5
	Total		Total non-		

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 analyze and classify the functions and operating principles of the machine elements covered in the overall context of machine systems. They acquire a comprehensive understand-ing and basic knowledge of the machine elements covered as well as their design characteristics and technical representation. Students will be familiar with the tools and technical standards required for design and will be able to recognize basic technical relationships in machine design as well as systematically analyze the func-tion and stress of machine elements in technical systems.

	The practical course enables the students to deepen and consolidate the acquired technical knowledge by transferring it to practical tasks. In addition, working in small groups resembles the frequent way of working in engineering practice and improves the students' communication, teamwork and reflection skills.
	5.2 Course content
	Exploration of: • Springs • Clutches and brakes • Belt transmission • Chain gear • Worm gear • Planetary gear • Cost calculation according to VDI 2225
	\rightarrow 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 aim of the lectures and exercises in this module is to make a significant contribution to engineering education by imparting technical and methodological knowledge as well as skills and
	abilities for developing and designing technical products.
6	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.
7	7.1 Languages used in the module: German I English I 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 (ontional) (e.g. recommended reading, other persons involved, etc.)

1.1 Title of module (GER / ENG)			1.2 Short description		le (from HIO)	
Digitale Produktion /			(optional)	MB.1.0196		
Digital Manufacturing						
2.1 Cycle of module:	very winter semester		2.2 Duration of mo			
Other cycle, namely:	-			Semesters		
3.1 Module offered in the followir	ng degree programme(s):		3.2 Compulsory (C compulsory electiv (CE), elective (E)		ded semester:	
Bachelor`s programmes	5					
Mechanical Engineering -						
International Engineering						
Mechanical Engineering -						
International Engineering			С	2. GS		
Mechanical Engineering -				3 0. 5		
Specialisation in Plant En		CE		50.5		
Mechanical Engineering -	0 0		3 0. 5			
Specialisation in Automot		CE				
Mechanical Engineering -				-		
Specialisation in Construct	tion and Manufactoring	Technology	С		5	
Computer Science in Med			CE		5	
Business Administration 8	ž ž	n Mechanical	05		-	
Engineering	5 5 7 5		CE	5		
Mechanical Engineering (dual study)		С			
Workload			Total workload			
				Total wor		
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Lecture	2	30			
(e.g. lecture, seminar, practical course, practical period/internship, group work,	Exercise	1	15			
project work, case study, simulation game, credited tutorial (more rows can be added)	Practical course	1	15			
be added)						
	Total	Total contact hours in SWS	Total contact hours in hours 60	150	5	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Preparation, follow-up work		90	150	5	
homework, research, etc.)	written elaboration, presentation					
	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 elevant?) After successful completion of the module, students will have the following capabilities: **Professional expertise:** Know and be able to apply the creation of product data and the field of production planning and control systems. Be able to classify simulation tools of manufacturing processes and use them correctly. Understanding the necessary input parameters and be able to analyze and evaluate the potentials and limits of digital planning and simulation tools. Ability to decide under which conditions the use of digital planning and simulation tools makes sense. Being able to use selected tools of the digital factory on plain examples. Know and be able to utilize the possibilities of the Internet of Things in the manufacturing environment Creation of simple programs to solve problems from the production environment Methodological competence: Carry out an independent analysis and structuring of production-related issues Be able to prepare and execute digital planning and simulation applications Analyze the results of digital planning and simulation tools and have the ability to transfer them for problem solving Systematic decision-making from a technological, economic and ecological point of view Systematically analyze complex problems with regard to digital production data Combine solutions for partial tasks within the overall system to form an overall solution Systematically understand and classify the opportunities and limits of the simulation methods used Self-competence: Independent analysis and structuring of manufacturing technology and production engineering issues Critical handling of the possibilities of innovative digital planning and simulation tools Systematic approach to process method selection Get actively involved in small teams and work out solutions together Learning of teamwork for joint processing of simulation projects Discuss and present the solution results

 5.2 Course content Product development process and digital production processes Tasks and goals of production process planning in an industrial company Specific requirements for manufacturing and assembly processes Definition and objectives of the "digital factory"; Overview of tools in the digital factory Introduction to the Industrial Internet of Things (IoT) and Industry 4.0, product data management (PDM) and ERP systems and machine learning Approaches to VR, AR in production and assembly systems Assembly simulation, accessibility analyzes The exercises comprise: Implementation of examples with tools from the digital factory, creation of programs for selected standard problems taken from the production environment, Implementation of a digital process environment for manufacturing and assembly systems.
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.
Production processes – from a single screw to a complete aircraft – are usually complicated. In this
module, you learn about digital tools, which assist you in planning and simulation processes. 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
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.
77.1 Languages used in the module:
7.2 Module Contact Person:
Prof. DrIng. M. Brockmann
Prof. DrIng. M. Brockmann 7.3 Professors (optional):
Prof. DrIng. M. Brockmann

Digitalisation in Mechanical Engineering

1 1.1 Title of module (GER / ENG) Digitalisierung im Masc Digitalisation in Mechai			1.2 Short description (optional)	1.3 Module cod MB.1.0145	e (from HIO)
2 2.1 Cycle of module: ☐ Every summer semester ⊠ I Other cycle, namely:	Every winter semester		2.2 Duration of mod ☐ 1 semester ☐ 2		
3 3.1 Module offered in the followi	ng degree programme(s):		3.2 Compulsory (C) compulsory electiv (CE), elective (E)		ded semester:
Bachelor`s programme	S:				
Mechanical Engineering	-				
International Engineering					
Mechanical Engineering			CE	2	GS
International Engineering			02		
Mechanical Engineering			CE	3	o. 5
Specialisation in Plant Er				-	_
Mechanical Engineering	CE	3	o. 5		
Specialisation in Automo		2	0. 5		
0 0		CE	3	0.5	
Specialisation in Construction and Manufactoring Technology Computer Science in Mechanical Engineering Business Administration & Engineering majoring in Mechanical			CE		5
			UL		0
Engineering		in Meenanica			
Mechanical Engineering	(dual studv)		CE	w	iSe
4 Workload					
				Total wor	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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,	Seminaristic Lecture	3	45		
	Exercise	2	30		
be added)	Total	Total contact hours in	Total contact		
		SWS	hours in hours 75	150	5
·····, [-··[-···························	Preparation, follow-up work				
homework, research, etc.)	preparation for the examination				
	Total		Total non-contact hours 75		

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 recognise and describe the current trends in digitalisation. They will also be able to identify the opportunities arising from digitalisation for mechanical engineering, and to develop new ideas accordingly. To ensure the efficient implementation of these ideas, students will be able to use a wide range of specific tools and methods. They will be made aware of the need to work together on an interdisciplinary basis with computer scientists and business economists, and will be able to apply the necessary specialist vocabulary. By tackling case studies in small groups, students will be able to train their team working and communication skills.

5.2 Course content

Motivation and status quo with regard to developments in mechanical engineering

• Basic concepts of digitalisation (general fields of application (horizontal) and components (vertical), big players in the digital business)

Principles of digitalisation and comparison to traditional mechanical engineering
Potential offered by digitalisation in mechanical engineering and process engineering (including examples)

• Foundations of mechanics and physics with regard to the "digital fingerprint" of machinery

• Measurement technology, focusing on vibration analysis (including smartphones)

• Applications, options and toolboxes for digitalisation (including examples)

Master data with a particular focus on digitalisation

Digital transformation in companies (ERP systems, case study)

Structure and functionality of expert systems for mechanical engineering

• Foundations of machine learning, focusing on neural networks

Basics of the General Data Protection Regulation

 \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.

The modul "Digitalization in Mechanical Engineering" delivers the knowledge to improve skills and competitiveness by focusing on digital mechanical fingerprints, digital twins, big data, master data and utilizing arifical intelligence

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

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. Brockmann

7.3 Professors (optional): Lecturer Dipl.-Ing. W. Mackel

7.4 Maximum number of participants (optional)

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

.1 Title of module (GER / ENG Dynamik / Dynamics			1.2 Short description (optional)	1.3 Module cod MB.1.0025	e (from HIO)
.1 Cycle of module: ⊠ Every summer semester ⊡ 0ther cycle, namely:] Every winter semester		2.2 Duration of mode ☐ 1 semester ☐ 2 s		
.1 Module offered in the follow	wing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recommend	ded semester:
Bachelor`s programm	es:				
Mechanical Engineering			с		4
nternational Engineerin			•		-
Mechanical Engineering			С	1	GS
nternational Engineerin			-		
Aechanical Engineering			с		4
Specialisation in Plant E			-		•
Aechanical Engineering]-		С		4
	otive and Drive Engineering		_		-
Mechanical Engineering			С		4
	uction and Manufactoring Te	chnology			
Computer Science in M					
	a & Engineering majoring in M	lechanical			
Ingineering			•		_
Mechanical Engineering	(dual study)		C		2
VORKIOAO				Total wo	rkload
	Method of teaching	Hours per	Hours per	Norkload in	ECTS (credit
		week per semester (SWS) for each method of teaching	semester for each I method of	Total contact and non-contact hours	points) 30 hrs usually correspond to 1 credit point; who numbers only
Contact hours	Lecture	2	30		
e.g. lecture, seminar, practical ourse, practical period/internship,	Exercise	2	30		
roup work, project work, case tudy, simulation game, credited utorial (more rows can be added)					
	Total	Total contact hours in SWS	Total contact hours in hours 60	150	5
lon-contact hours	Preparation, follow-up work				
e.g. tutorial, preparation, follow-up ork, preparation for assignments	preparation for the				
nd homework, research, etc.)	examination				
	Total		Total non-contact		
			hours		
1 Intended learning outcome	Mhat should students be able to do after the	aving completed the	90	provide the enert	unity to possive -
. I interfueu leaffillig outcome	S (What should students be able to do after has a students be able to do after has	avinu completed the	module: Does the module		unity to acquire s

velocity and acceleration vectors for mass points and for random points on rigid bodies in plane motion. They will be able to investigate the interaction between the motion of a body and the action of force on that body using the fundamental law of dynamics, the energy theorem and law of conservation of energy, or the principle of linear and angular momentum. Students will be able to derive abstract mechanical models from practice-related problems of mechanical engineering, and to interpret and critically assess their own results.

	The specialist solution strategies gained are the basis for understanding advanced study elements, and can be transferred to related engineering subjects such as machine elements, construction design and gear technology. In addition, the solution strategies are an essential precondition for enabling students to determine motion sequences in machinery in their later professional environment and to create products that meet kinematic and kinetic requirements.
	5.2 Course content • Kinematics of the mass point
	Kinetics of the mass point
	 Kinematics of a rigid body in plane motion
	Relative kinematics
	Kinetics of a rigid body in plane motion
	Kinetics of the point mass system
	Impact laws Operillations with one degree of freedom
	 Oscillations with one degree of freedom → 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 "Statics and Strength of Materials" module, you learn further terms and methods
	from the field of dynamic processes. This thorough knowledge of mechanical interrelations makes it
	easier for you to understand subsequent modules.
6	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
	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. J. Korn
	7.3 Professors (optional): Professor DrIng. J. Korn
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
	Recommended reading:
	Lecture notes; Denkort, H., Denkort, J., Technische Mechanik, Teuhner Verleg
	Dankert, H.; Dankert, J.: Technische Mechanik, Teubner Verlag

Electrical Engineering in Vehicle Construction

1				1		
	1.1 Title of module (GER / ENG) Elektrotechnik im Fahrz	aughau /		1.2 Short descriptio (optional)	n 1.3 Module o MB.1.018	code (from HIO)
	Electrical Engineering in		n	(optional)		5
	2.1 Cycle of module:		11	2.2 Duration of mod	lule:	
~	Every summer semester 🛛 E	Every winter semester		⊠ 1 semester □ 2		
	Other cycle, namely:					
3	3.1 Module offered in the following	ng degree programme(s):		3.2 Compulsory (C) compulsory electiv	,	ended semester:
				(CE), elective (E)	-	
	Bachelor`s programmes	8:				
	Mechanical Engineering -					
	International Engineering	(Outgoings)				
	Mechanical Engineering -					
	International Engineering	(Incomings)				
	Mechanical Engineering -			CE		4
	Specialisation in Plant En	gineering		UL UL		4
	Mechanical Engineering -					
	Specialisation in Automot	ive and Drive Engineer	ing			
	Mechanical Engineering -					
	Specialisation in Construct	ction and Manufactoring	g Technology	CE		4
	(General Mechanical Eng	ineering)				
	Computer Science in Med	chanical Engineering		CE		4
	Business Administration &	& Engineering majoring	in Mechanical	CE		4
	Engineering			UL		7
	Mechanical Engineering (dual study)		CE		SuSe
4	Workload				Total wa	uldo o d
					Total wo	
		Method of teaching	Hours per week per semester (SWS) for	Hours per semester for each	Workload in hours	ECTS (credit points)
			each method of	method of	Total contact and	30 hrs usually
			teaching	teaching (usually the number of	non-contact hours	correspond to 1 credit point; whole
				hours per week		numbers only
	Contact hours	1 (4	multiplied by 15)		
	(e.g. lecture, seminar, practical course,	Lecture	1	15		
	practical pariod/interpship_group_work					
	practical period/internship, group work, project work, case study, simulation	Exercise	1	15		
		Exercise Practical course	1 2			
	project work, case study, simulation game, credited tutorial (more rows can			15		
	project work, case study, simulation game, credited tutorial (more rows can	Practical course	2	15 30		
	project work, case study, simulation game, credited tutorial (more rows can			15 30 Total contact hours in hours		
	project work, case study, simulation game, credited tutorial (more rows can be added)	Practical course	2 Total contact hours in	15 30 Total contact	150	5
	project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours	Practical course Total Preparation, follow-up	2 Total contact hours in	15 30 Total contact hours in hours	150	5
	project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Practical course Total Preparation, follow-up work	2 Total contact hours in	15 30 Total contact hours in hours	150	5
	project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up	Practical course Total Preparation, follow-up work preparation for the	2 Total contact hours in	15 30 Total contact hours in hours	150	5
	project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Practical course Total Preparation, follow-up work	2 Total contact hours in	15 30 Total contact hours in hours	150	5
	project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Practical course Total Preparation, follow-up work preparation for the examination	2 Total contact hours in	15 30 Total contact hours in hours 60	150	5
	project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Practical course Total Preparation, follow-up work preparation for the	2 Total contact hours in	15 30 Total contact hours in hours 60 Total non-contact	150	5
	project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Practical course Total Preparation, follow-up work preparation for the examination	2 Total contact hours in	15 30 Total contact hours in hours 60	150	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 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 demonstrate different possibilities for the use of electronic circuits in the manufacture and operation of vehicles. Students will be able to design simple electronic circuits and implement them in practice. They will be able to simulate electronic circuits using the LTspice program system and to develop simple applications in assembler code using the Atmel Studio program system.

The practical course enables students to expand on and consolidate the theoretical specialist knowledge gained in the lectures by transferring the knowledge to practical applications. As part of

the practical course, experiments selected by the students, involving different active and passive electronic elements in different circuits, are prepared, conducted and evaluated. During the practical course, students will gain basic knowledge that may be required in order to apply the electronic circuits under investigation to advanced areas of application. In the field of engineering, the ability to familiarise oneself with unfamiliar thematic areas is an important professional basis for being able to bring in new ideas and input to the continuously evolving fields of technology. 5.2 Course content Lecture: Semiconductor electronics Sensor technology • **Automotive electronics Microcontrollers** Exercise class: Calculation and programming examples Practical course: **Diodes**, transistors **Operational amplifiers (OPV)** Timers, decade counters **Microcontrollers** LTspice Atmel Studio 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. The influence of electrical engineering is constantly increasing in both the production and operation of vehicles. You will learn about various possibilities for using electronic circuits. Furthermore, you will be able to design and practically implement simple electronic circuits. 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. Korn 7.3 Professors (optional) Professor Dr.-Ing. J. Korn 7.4 Maximum number of participants (optional) 7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Energy Systems Technology II - Hydrogen

1.1 Title of module (GER / ENG Energietechnik II – Wa Energy Systems Techi	sserstoff /		1.2 Short descriptio (optional)	n 1.3 Module c EGU.1.02	ode (from HIO) 74	
2.1 Cycle of module: ⊠ Every summer semester □ Other cycle, namely:	Every winter semester		2.2 Duration of mod			
3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester:	
Bachelor`s programme	es:					
Mechanical Engineering	-					
International Engineerin						
Mechanical Engineering	-		CE		. GS	
International Engineerin	g (Incomings)		UE		. 65	
Mechanical Engineering	-		CE		4	
Specialisation in Plant E	ingineering		CE		4	
Mechanical Engineering			CE		4	
	otive and Drive Engineering		CE		4	
Mechanical Engineering	-		CE		4	
Specialisation in Constr	uction and Manufactoring Tec	chnology	CE			
Computer Science in Me	echanical Engineering					
Business Administration Engineering	& Engineering majoring in M	lechanical	CE		4	
Mechanical Engineering	(dual study)		CE		SuSe	
Workload						
				Total wo	rkload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for each method of	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	Lecture	3	45			
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study,	Exercise	1	15			
simulation game, credited tutorial (more rows can be added)						
	Total	Total contact hours in SWS	Total contact hours in hours 60	450	_	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		90	150	5	
	₩ - (- 1		Tatal you			
	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 have the specialist knowledge required to plan and operate hydrogen plants for the purpose of providing hydrogen as a basic material for industry and as a source of energy for energy supply
	5.2 Course content Physical and chemical properties of hydrogen, material behaviour under the influence of hydrogen, production of hydrogen, safety in handling hydrogen, technology paths for the future use of hydrogen, methods of producing hydrogen, transport, storage and distribution of hydrogen, the use of hydrogen
	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.
	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:) Foundations of Thermodynamics and Materials Science
	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 or oral examination
	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. T. Schmidt 7.3 Professors (optional):
	Professor DrIng. T. Schmidt
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

1.1 Title of module (GER / ENG) Energie- und Ressource	eneffizienz /		1.2 Short description (optional)	on 1.3 Module cod MB.1.0203	e (from HIO)	
Energy and Resource E						
2.1 Cycle of module:			2.2 Duration of mo			
☐ Every summer semester ⊠ E Other cycle, namely:	very winter semester		🛛 1 semester 🗌 2	semesters		
3.1 Module offered in the followir	ng degree programme(s):		3.2 Compulsory (C compulsory electiv (CE), elective (E)		ded semester:	
Bachelor`s programmes						
Mechanical Engineering -						
International Engineering						
Mechanical Engineering -						
International Engineering			C/CE	2.	GS	
Mechanical Engineering -			•		_	
Specialisation in Plant En			С		5	
Mechanical Engineering -	ž ž		05		<i>r</i>	
Specialisation in Automot		ng	CE		5	
Mechanical Engineering -			CE		5	
Specialisation in Construct	tion and Manufactoring	Technology	CE		5	
Computer Science in Mec						
Business Administration &	Engineering majoring i	n Mechanical	CE		5	
Engineering			UL		5	
Mechanical Engineering (dual study)		CE	W	ïSe	
Workload				Total wor	kload	
	Mother of teaching	Llauna manusali				
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Seminaristic Lecture	2	30			
(e.g. lecture, seminar, practical course, practical period/internship, group work,	Exercise	1	15			
project work, case study, simulation game, credited tutorial (more rows can be added)	Practical course	1	15			
	Total	Total contact hours in SWS	Total contact hours in hours 60	150	E	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Preparation, follow-up work		90	150	5	
homework, research, etc.)	written elaboration, presentation					
	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 describe technical processes regarding mass and energy flow. They can choose and evaluate different methods for assessing sustainability of products and processes. The students can judge the energy and resource efficiency of different technical applications. In addition, students will be able to independently generate, analyse, assess and present experimental data in the context of experiments.
	The module content enables students to perform efficiency assessments based on technical and methodical understanding and to contextualize them into technical and social background.
	 5.2 Course content introduction to energy and resource efficiency methods and key figures for assessing sustainability balancing energy and mass flow renewable energies and energy storage measures for improvement of energy efficiency
	 hydrogen technology basics and selected technologies of recycling → 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 get to know the basics of energy efficiency, renewable energies and resource technologies in order to assess different technologies concerning sustainability.
6	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:) Thermodynamics and Fluid 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 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: Image: Second
	Prof. DrIng. J. Scholz 7.3 Professors (optional):
	Prof. DrIng. J. Scholz 7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Literature: Accompanying material to the lecture Klöpffer / Grahl: Ökobilanz (LCA), Verlag Wiley-VCH, 2009 Watter: Regenerative Energiesysteme, Springer-Verlag, 2019
	Martens: Recyclingtechnik, Spektrum-Verlag, 2011

Engineering for Power Generation

(Module not valid for enrolment from WiSe 21/22 onwards)

1	1.1 Title of module (GER / ENG))		1.2 Short description	1.3 Module co	de (from HIO)
	Energietechnik /			(optional)	MB.1.0029	
	Engineering for Power	Generation				-
	2.1 Cycle of module: ☑ Every summer semester □ Other cycle, namely:			2.2 Duration of module ⊠ 1 semester □ 2 sen		
3	3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recomme	nded semester:
	Bachelor`s programme	es:				
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering					
	Specialisation in Plant E			CE		4
	Mechanical Engineering	<u> </u>				
		otive and Drive Engineering				
	Mechanical Engineering					
		uction and Manufactoring Tec	chnology	CE		4
	(General Mechanical En		Jiniology	-		•
	Computer Science in Me					
		& Engineering majoring in M	lechanical			
	Engineering		oonanioai			
	Mechanical Engineering	(dual study)		CE	S	uSe
4	Workload					
					Total w	orkload
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Lecture	3	45		
	course, practical period/internship, group work, project work, case study,	Exercise	2	30		
	simulation game, credited tutorial (more rows can be added)	Practical course	1	15		
		Total	Total contact hours in SWS	Total contact hours in hours 90	150	5
	Non-contact hours (e.g. tutorial, preparation, follow-up	Preparation, follow-up work				
	work, preparation for assignments	preparation for the			1	
	and homework, research, etc.)	examination				
					1	
		Total		Total non-contact hours 60		

After successful completion of the module, students will be able to transfer problems from the field of power engineering to technical issues and applications. In particular, they will be able to understand and assess the different technical designs of thermal power plants. Students will be able to solve special tasks related to the design of thermal power plant processes and components. The practical course enables students to transfer the specialist knowledge gained to tasks relating to the experimental investigation of energy systems. 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
lgroup.
5.2 Course content
 Energy management data and interrelations
Basics of heat engineering
Structure of steam power plants
• Boilers and steam generators
-
Power plants on the basis of gas turbines
Design of power plant components
Nuclear power plants
Combined heat and power plants
 New energy systems and concepts
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.
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
6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3) *
6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Section 3).*
See Examination Regulations for above-mentioned degree programmes (Section 3).*
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.
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:
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.
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:
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:
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. habil. S. a. d. Wiesche
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. habil. S. a. d. Wiesche 7.3 Professors (optional):
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. habil. S. a. d. Wiesche 7.3 Professors (optional): Professor DrIng. habil. S. a. d. Wiesche
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. habil. S. a. d. Wiesche 7.3 Professors (optional):
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: \alpha German Brglish Other, namely: 7.2 Module Contact Person: Professor DrIng. habil. S. a. d. Wiesche 7.3 Professors (optional): Professor DrIng. habil. S. a. d. Wiesche 7.4 Maximum number of participants (optional)
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. habil. S. a. d. Wiesche 7.3 Professors (optional): Professor DrIng. habil. S. a. d. Wiesche

Fluid Machines (Module **not** valid for enrolment from WiSe 21/22 onwards)

1 1.1 Title of module (GER / ENG) Strömungsmaschinen / Fluid Machines			1.2 Short description (optional)	1.3 Module co MB.1.011	(
2 2.1 Cycle of module: ☐ Every summer semester ⊠ E Other cycle, namely:	very winter semester		2.2 Duration of modu ⊠ 1 semester □ 2 s		
3 3.1 Module offered in the following	ng degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recomme	ended semester:
Bachelor`s programmes	:				
Mechanical Engineering -					
International Engineering	(Outgoings)				
Mechanical Engineering -					
International Engineering	(Incomings)				
Mechanical Engineering -			С		5
Specialisation in Plant En	gineening				
Mechanical Engineering - Specialisation in Automoti	ive and Drive Engineering				
Mechanical Engineering -	ive and Drive Engineering				
<u> </u>	tion and Manufactoring Tech	nology	С		5
(General Mechanical Eng		mology	Ū		•
Computer Science in Med					
	& Engineering majoring in Me	chanical			
Engineering	~ge egge				
Mechanical Engineering (dual study)		С		7
4 Workload					
				Total wo	rkload
	Method of teaching	Hours per wee per semester (SWS) for eacl method of teaching	semester for each method of	Workload in hours Total contact and hon-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	1	15		
	Total	Total contact hou in SWS	rs Total contact hours in hours 60		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		90	150	5
	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 apply the basics acquired in the foundation lecture on "Fluid Mechanics" to various types of turbomachines. They will be able to recognise and argue on the key fluid flow phenomena in concrete applicable cases. In addition, they will be capable of independently addressing fundamental questions with regard to the selection and design of machines, applying the main laws of transfer, and comparatively assessing control methods. The practical course enables students to build on the specialist knowledge gained in the lectures, compare the main control methods, use experimental setups for specific experiments, and handle electronic measuring instruments. They will also have the profound skills required to follow up experiments, i.e. 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 Energy conversion, model laws, characteristics, characteristic diagrams, cavitation, centrifugal pumps, ventilators, blowers, compressors → 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. 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. 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.)

Fluid Machines and Computational Fluid Dynamics

1.1 Title of module (GER / ENG) Strömungsmaschinen ur Fluid Machines and Com	nd CFD / outational Fluid Dynami	cs	1.2 Short description (optional)	1.3 Module c MB.1.0204	ode (from HIO)
2.1 Cycle of module: ⊠ Every summer semester □ Eve Other cycle, namely:	ery winter semester		2.2 Duration of modu ☑ 1 semester □ 2 set		
3.1 Module offered in the following	degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recomm	ended semester
Bachelor`s programmes:					
Mechanical Engineering -					
International Engineering (C	Dutgoings)				
Mechanical Engineering -			C / CE	1	. GS
International Engineering (I	ncomings)		0,02		
Mechanical Engineering -			С		4
Specialisation in Plant Engi	neering		-		-
Mechanical Engineering -			С		4
Specialisation in Automotiv	e and Drive Engineering				-
Mechanical Engineering -			CE		4
Specialisation in Constructi		chnology		_	
Computer Science in Mech				_	
Business Administration &	Engineering majoring in I	viecnanical	CE		4
Engineering Mechanical Engineering (di	ial atudu)		CE		SuSe
Workload	ual Sluuy)				buse
				Total wo	orkload
	Method of teaching	Hours per we per semester (SWS) for eac method of teaching	semester for ch each method of	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	Lecture	2	30		
(e.g. lecture, seminar, practical course, practical period/internship, group work,	Exercise	1	15		
project work, case study, simulation game, credited tutorial (more rows can be added)	Practical course	1	15		
			15		
	Total	Total contact ho in SWS	urs Total contact hours in hours 60		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		90	150	5
	Total		Total non- contact hours 90		

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, the students are able to apply the basics acquired in the basic lecture "Fluid Mechanics" to different representatives of fluid machines. Furthermore, they are able to work out fundamental questions on machine selection and design themselves, to apply the most important similarity laws and to evaluate control methods comparatively. Furthermore, they are able to transfer the knowledge of fluid mechanics acquired in the basic module to simple examples in the field of flow simulation, to understand modelling limits as well as possible sources of error and thus to assess the resilience of numerical solution approaches.

5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the opportunity to

The fluid mechanics practical course enables the students to apply the specialist knowledge acquired in the lecture, to compare the most important control methods, to use experimental set-ups for targeted experiments and to handle electronic measuring devices. The CFD practical course enables the students to build their own simulation models and to carry out CFD projects independently. They are able to create basic models themselves, define the necessary boundary conditions and evaluate the calculation results for plausibility.

In both parts of the practical course, the students acquire in-depth skills in the postprocessing of the experiments or the computational data preparation, the extraction of essential variables and, in particular, the complete and clearly structured documentation and presentation.

5.2 Course content

Fluid Machinery:

Energy conversion, similarity laws, key figures, characteristic diagrams, centrifugal pumps, fans, blowers, compressors.

Flow simulation:

Fundamentals of mesh generation, mathematical equations used, modelling of turbulence, choice of boundary conditions, wall treatment, multiphase models, discretisation approaches (FDM, FEM, FVM).

 \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 are already familiar with the basics of fluid mechanics. Now, using specific case studies and a variety of fluid flow machines, you show your ability to assign and apply key fluid flow phenomena to suit the situation at hand.

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 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):

Dr. Sven Annas

7.4 Maximum number of participants (optional)

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

1.1 Title of module (GER / ENG Strömungslehre /	5)		I.2 Short descriptio optional)	n 1.3 Module c MB.1.011	
Fluid Mechanics					
2.1 Cycle of module:			2.2 Duration of mod		
Every summer semester Other cycle, namely:	Every winter semester	Ĺ	🛛 1 semester 🗌 2	semesters	
3.1 Module offered in the follo	wing degree programme(s):	c	3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester
Bachelor`s programm	les:				
Mechanical Engineering			С		3
International Engineering			C		3
Mechanical Engineering					
International Engineerin					
Mechanical Engineering			С		3
Specialisation in Plant			•		-
Mechanical Engineerin			С		3
	otive and Drive Engineering				
Mechanical Engineering		abaalaay	С		3
Computer Science in N	ruction and Manufactoring Tec	chhology			
	n & Engineering majoring in M	lachanical			
	n & Engineering majoring in w	lechanical			
Fuanoorina					
Engineering Mechanical Engineering	n (dual study)		<u> </u>		5
Engineering Mechanical Engineering Workload	g (dual study)		C		5
Mechanical Engineering	g (dual study)		С	Total wo	-
Mechanical Engineering	g (dual study) Method of teaching	Hours per week per semester (SWS) for each method of teaching	Hours per semester for	Total wo Workload in hours Total contact and non-contact hours	orkload ECTS (credit points) 30 hrs usually correspond to 1
Mechanical Engineering Workload		per semester (SWS) for each method of	Hours per semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	Prkload ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
Mechanical Engineering Workload Contact hours (e.g. lecture, seminar, practical course, practical period/internship,	Method of teaching	per semester (SWS) for each method of teaching	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and	Prkload ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
Mechanical Engineering Workload Contact hours (e.g. lecture, seminar, practical	Method of teaching Lecture	per semester (SWS) for each method of teaching 3	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15) 45	Workload in hours Total contact and	Prkload ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
Mechanical Engineering Workload Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited	Method of teaching Lecture Exercise	per semester (SWS) for each method of teaching 3 1	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15) 45 15	Workload in hours Total contact and non-contact hours	Prkload ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
Mechanical Engineering Workload Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited	Method of teaching Lecture Exercise Practical course	per semester (SWS) for each method of teaching 3 1 1 1 Total contact hours	Hours per semester for each method of teaching (usually the number of hours per week multiplied by 15) 45 15 15 15	Workload in hours Total contact and	Prkload ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole

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 and calculate simple fluid flow issues. They will be able to apply basic calculation methods to application examples, and to assess and mathematically analyse the behaviour of inviscid and viscous flow processes.

The practical course enables students to conduct experiments under instruction, and to operate and calibrate experimental setups and electronic measuring instruments. They will also be able to conduct experiments in group work and to conclusively follow them up. 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
	Surface tension phenomena, inviscid flows (Bernoulli's equation), viscous flows, (momentum equation), boundary layer flows, flows through pipework systems, buoyancy and flow resistance to 3D bodies, supersonic flows, flow measurement technology, flow
	visualisation, applications
5	→ 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 makes aeroplanes fly? What is a sonic boom? You understand these and other fundamental
	phenomena of fluid mechanics. You then use various experiments in the lab to test your new knowledge in practice.
	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.fh- muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
	7.1 Languages used in the module: Image: Second S
	7.2 Module Contact Person: Professor DrIng. HA. Jantzen
	7.3 Professors (optional): Professor DrIng. HA. Jantzen
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Fundamentals of Agricultural Engineering

	1.1 Title of module (GER / ENG Grundlagen der Landt Fundamentals of Agric	echnik /		1.2 Short descriptio (optional)	n 1.3 Module c MB.1.005	code (from HIO)
2	2.1 Cycle of module: ⊠ Every summer semester □			2.2 Duration of mod ☑ 1 semester □ 2		
	Other cycle, namely: 3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester:
	Bachelor`s programme	es:				
	Mechanical Engineering					
	International Engineerin	g (Outgoings)				
	Mechanical Engineering	-		CE	1. GS	
	International Engineerin	g (Incomings)		CE	1.03	
	Mechanical Engineering			CE	4	
	Specialisation in Plant E	Ingineering		CL	-	
	Mechanical Engineering			CE	4	
		otive and Drive Engineering		CL	4	
	Mechanical Engineering			CE	4	
	Specialisation in Constr	uction and Manufactoring Tec	chnology	CL	4	
	Computer Science in Me	echanical Engineering				
	Business Administration	& Engineering majoring in M	echanical	CE	4	
	Engineering			CE	4	
	Mechanical Engineering	(dual study)		CE	SuSe	
4	Workload					
					Total wo	
		Method of teaching	Hours per weel per semester (SWS) for each method of teaching	semester for each method of	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
				maniphod by roy		
	Contact hours	Seminaristic Lecture	3	45		
	(e.g. lecture, seminar, practical course, practical period/internship,	Seminaristic Lecture Exercise	3 1			
	(e.g. lecture, seminar, practical			45		
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise	1	45 15 15		
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise Practical course	1 1 Total contact hour	45 15 15 s Total contact		
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Exercise Practical course	1 1 Total contact hour	45 15 15 s Total contact hours in hours	150	5
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Exercise Practical course Total Preparation, follow-up work, preparation for the	1 1 Total contact hour	45 15 15 s Total contact hours in hours 75	150	5
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Exercise Practical course Total Preparation, follow-up work, preparation for the	1 1 Total contact hour	45 15 15 s Total contact hours in hours 75	150	5
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.) 5.1 Intended learning outcome	Exercise Practical course Total Preparation, follow-up work, preparation for the examination Total S (What should students be able to do after ha	1 Total contact hour in SWS	45 15 15 5 Total contact hours in hours 75 75 75 Total non- contact hours 75 75 75 75 75 75 75 75 75 75	le provide the oppor	tunity to acquire
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.) 5.1 Intended learning outcome	Exercise Practical course Total Preparation, follow-up work, preparation for the examination Total	1 Total contact hour in SWS	45 15 15 5 Total contact hours in hours 75 75 75 Total non- contact hours 75 75 75 75 75 75 75 75 75 75	le provide the oppor	tunity to acquire
5	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.) 5.1 Intended learning outcome soft skills in addition to technical skills	Exercise Practical course Total Preparation, follow-up work, preparation for the examination Total s (What should students be able to do after ha ? For which other modules and prospective ta	1 Total contact hour in SWS aving completed the sks in the labour material	45 15 15 15 s Total contact hours in hours 75 75 75 Total non- contact hours 75 75 75 Total contact hours in hours 75 75 75 75 75 75 75 75 75 75	le provide the oppor wledge and skills re	tunity to acquire levant?)
5	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.) 5.1 Intended learning outcome soft skills in addition to technical skills	Exercise Practical course Total Preparation, follow-up work, preparation for the examination Total S (What should students be able to do after ha	1 Total contact hour in SWS aving completed the sks in the labour manual nts will be a	45 15 15 5 Total contact hours in hours 75 75 75 75 Total non- contact hours 75 rotal contact hours in hours 75 75 75 Total non- contact hours 75 Total non- contact hours Total non- total non- contact hours Total non- total non- total non- total non- total non- total non- total non- total non- total non- tota	le provide the oppor owledge and skills re e appropria t	tunity to acquire elevant?)

to explain the functioning and application limits of the equipment addressed, and to independently formulate proposals for the selection and setting of machinery on this basis. The practical courses enable students to practice the options for setting devices and machines using a selection of examples. In this way, their capacity for teamwork and ability to present results to suit the target group are actively promoted.

	5.2 Course content
	• Fundamentals of tractor engineering
	Tillage devices
	Agricultural transportation
	Cultivation and sowing technology
	Self-propelled harvesters → 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.
	You gain an overview of appropriate tools and machinery for a variety of agricultural work
	processes. In your future career, you can then independently formulate proposals for the selection
	and adaptation of such machinery.
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
	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
	orduents 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.
7	7.1 Languages used in the module: Image: Second S
	7.2 Module Contact Person: Professor DrIng. M. Große Gehling

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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.)

Heat and Mass Transfer

1.1 Title of module (GER / ENG Wärme- und Stoffübertra	1.2 Short descriptio (optional)	m 1.3 Module c MB.1.014	ode (from HIO) 1			
Heat and Mass Transfer						
2.1 Cycle of module:			2.2 Duration of mod			
Every summer semester Other cycle, namely:		⊠ 1 semester □ 2 semesters				
3.1 Module offered in the following degree programme(s):			3.2 Compulsory (C) compulsory elective (CE), elective (E)	oulsory elective		
Bachelor`s programm	es:					
Mechanical Engineering						
International Engineerir						
Mechanical Engineering			0 / 05			
International Engineerir	C/CE	1	l. GS			
Mechanical Engineering			•			
Specialisation in Plant			С		4	
Mechanical Engineering			05			
	otive and Drive Engineering		CE		4	
Mechanical Engineering		~=				
	ruction and Manufactoring Tec	chnology	CE		4	
Computer Science in M						
	n & Engineering majoring in M	lechanical				
Engineering						
Mechanical Engineering	r (dual study)		CE		SuSe	
Workload			•=			
				Total workload		
	Method of teaching	Hours per week		Workload in	ECTS (credit	
		per semester (SWS) for each		hours Total contact and	points) 30 hrs usually	
		method of		non-contact hours	correspond to 1	
		teaching	(usually the number of hours per week		credit point; who numbers only	
			multiplied by 15)			
Contact hours (e.g. lecture, seminar, practical	Seminaristic Lecture	2	30			
(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	2	30			
	Total	Total contact hours in SWS	Total contact hours in hours			
			75	150	5	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work,		75		_	
	written elaboration					
and nomework, research, etc.)						
and nomework, research, etc.)						
and nomework, research, etc.)	Total		Total non-			
and nomework, research, etc.)	Total		Total non- contact hours 75			

After successful completion of the module, students will be able to transfer problems from the field of heat and mass transfer to technical issues and applications. In particular, they will be able to understand and assess the different technical designs of heat transmitters. Students will be able to determine heat transfer coefficients, and to use them to solve design issues. The practical course enables students to transfer the specialist knowledge gained to tasks related to the experimental investigation of heat transmitters. 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 target-oriented presentation of experiment results.

5.2 Course content
 Mechanisms of heat and mass transfer, and basic concepts Heat conduction and radiation
• Thermodynamic design of heat transferring devices
Convective heat transfer
• Heat transfer with phase change
• Selected 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.
A water-cooled engine is an example of heat and mass transfer. You take a closer look at the mechanisms and technical systems used for this. By the end of the course, you'll be able to find
your own technical solutions to specific practical problems.
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.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. habil. S. a. d. Wiesche
7.3 Professors (optional): Professor DrIng. habil. S. a. d. Wiesche
7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Baehr, Stephan: Wärmeübertragung, Springer, 1996

Lienhard & Lienhard: A Heat Transfer Textbook. Dover, New York, 2010

1.1 Title of module (GER / ENG) Hydraulik / Hydraulics			1.2 Short descriptio (optional)	m 1.3 Module om 1.3 Module om 1.3 MB.1.005	dule code (from HIO) .0057	
2.1 Cycle of module: ⊠ Every summer semester Other cycle, namely:] Every winter semester		2.2 Duration of mod ☑ 1 semester ☐ 2			
3.1 Module offered in the follow	3.2 Compulsory (C) compulsory elective (CE), elective (E)		3.3 Recommended semester			
Bachelor`s programm	es:					
Mechanical Engineering] -		С		4	
International Engineerin	g (Outgoings)		C		4	
Mechanical Engineering	1 -		С		4.00	
International Engineerin	g (Incomings)		C		1. GS	
Mechanical Engineering	1 -					
Specialisation in Plant E						
Mechanical Engineering	1-					
	otive and Drive Engineering					
Mechanical Engineering			•			
	, uction and Manufactoring Tec	chnology	С		4	
Computer Science in Mechanical Engineering			CE		4	
•	& Engineering majoring in M	echanical				
Engineering	· · · _ · · g · · · · g · · · · g · · · ·					
Mechanical Engineering	u (dual studv)		С		6	
Workload	, (
				Total wo	rkload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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	Lecture	2	30			
(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 hours 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, follow-up work,		90	150	5	
(e.g. tutorial, preparation, follow-up work, preparation for assignments	preparation for the examination					
(e.g. tutorial, preparation, follow-up work, preparation for assignments						

relevant?)

After successful completion of the module, students will be able to name the components of a hydraulic system, describe how these components interact, and outline the entire functioning of a hydraulic system. In addition, they will be able to read hydraulic schematics, i.e. identify the components presented and derive the functioning of the system, as well as create such schematics independently and in conformity with standards. Students will be able to independently design simple hydraulic systems, and to calculate and design the main components.

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	The practical course enables students to expand on and consolidate the specialist knowledge gained in the lectures by transferring the knowledge to practical applications. In particular, students will be able to carry out series of measurements without assistance, and to independently perform troubleshooting using testing stands. The work performed in small groups resembles the work practices often conducted in engineering practice, and will improve students' communication and team working skills, as well as their capacity for reflection.
	 5.2 Course content Introduction: applications, hydraulic circuit symbols Physical foundations of hydrostatics Physical properties of real pressurised fluids Components: pressurised fluids, pumps, motors, cylinders, directional valves, pressure valves, flow control valves, check valves Hydrostatic gearboxes Hydrostatic systems
	 Hydraulic circuits and schematics In the exercise classes, knowledge is applied to practical problems (e.g. calculating forces, flow rates, pressure, power; designing hydraulic components and systems). Laboratory class experiments are carried out in small groups. → 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 mechanical engineering, hydraulics is about the transmission of large forces through a fluid, usually oil. You learn to describe hydraulic systems, e.g. construction machinery, and read circuit diagrams, and produce your own designs.
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
	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.
7	7.1 Languages used in the module:
	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.)
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Innovative Materials

1.1 Title of module (GER / ENG) Innovative Werkstoffe) / Innovative Materials		1.2 Short descriptio (optional)	n 1.3 Module c MB.1.005		
2.1 Cycle of module: ☐ Every summer semester ⊠ Other cycle, namely:	Every winter semester		2.2 Duration of mod ☑ 1 semester			
3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semeste	
Bachelor`s programme	es:					
Mechanical Engineering						
International Engineering						
Mechanical Engineering			CE	1	. GS	
International Engineering						
Mechanical Engineering Specialisation in Plant E			CE		4	
Mechanical Engineering Specialisation in Automo	- ptive and Drive Engineering		CE		4	
Mechanical Engineering		chnology	CE		4	
Computer Science in Me						
•	& Engineering majoring in M	echanical				
Engineering		oonanioai				
Mechanical Engineering	(dual study)		CE	1	ViSe	
Workload						
			Total wo	rkload		
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who numbers only	
Contact hours (e.g. lecture, seminar, practical	Seminaristic Lecture	3	45			
course, practical period/internship, group work, project work, case study,	Exercise	1	15			
	Practical course	1	15			
	Total	Total contact hours in SWS	Total contact hours in hours 75			
le a tutorial preparation tollow-up	Preparation, follow-up work, preparation for the examination		75	150	5	
and homework, research, etc.)						
and homework, research, etc.)	Total		Total non-			

After successful completion of the module, students will be able to assess innovative materials, focusing on light construction in the tribological context, and to determine technical applications accordingly. They will be able to evaluate innovative materials with regard to the mechanical stresses occurring, and to assess the resulting overall systems in terms of aspects such as life cycle costing and energy efficiency. The objective is to ensure that students will be able to meet the real-life demands of working life in the area of innovative materials.

	The practical courses enable students to structure and interpret the results generated from material tests, and to drive the introduction and application of innovative materials with adequate commitment. In addition, students will learn to develop and apply solution strategies for the set tasks, building on the specialist knowledge gained in the lectures, and to formulate and present the results to suit the target group. This also enables students to expand on their practical experience and to handle the necessary metrology. They will also gain an entrepreneurial understanding during the practical implementation of the topic of "innovative materials" in a company. Social skills are strengthened by working in groups.
	 5.2 Course content Selected trends in mechanical engineering, using the example of light construction (material and energy efficiency) and tribology (reduction of friction and wear, zero emissions) Innovative materials from the area of Light construction (light metals, fibre composites, high-strength metals) Tribology (wear-reducing coatings, dry-run capable materials, in particular plastics) Design and calculation of lightweight structures Assessment of a tribological system → 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. In this course students can learn more about lightweight materials and criteria and function for application in industrial surrounding. Over this aspect of tribology and wear will also be discussed. The students should be able to select materials for special applications in industry.
6	 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 (including a practical exercise in the form of literature search / analysis of the literature and a practical part in the form of a field trip) 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: S German English Other, namely:
	7.2 Module Contact Person: Professor DrIng. G. Gevelmann
	7.3 Professors (optional): Professor DrIng. G. Gevelmann
	7.4 Maximum number of participants (optional)
1	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Introduction to Computer Science (Module not valid for enrolment from WiSe 21/22 onwards)

	1.1 Title of module (GER / ENG) Informations- u. Prozes	0		1.2 Short description (optional)	on 1.3 Module c MB.1.005	ode (from HIO) 8
L	Introduction to Comput	er Science				
2	2.1 Cycle of module: ⊠ Every summer semester □ I Other cycle, namely:	Every winter semester		2.2 Duration of mod ☑ 1 semester □ 2		
3	3.1 Module offered in the followi	ng degree programme(s):		3.2 Compulsory (C) compulsory electiv (CE), elective (E)		ended semester:
	Bachelor`s programme	S:				
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering		_			
	Specialisation in Plant Er			С		4
	Mechanical Engineering					
		tive and Drive Engineering				
	Mechanical Engineering					
	Specialisation in Constru	boology	с		4	
		mology			4	
		General Mechanical Engineering) Computer Science in Mechanical Engineering				2
		¥¥	achanical	С		2
		& Engineering majoring in Me	echanical	С		2
	Engineering			С		4
Л	Mechanical Engineering (dual study)			L L		4
	WUIKIUau					
					Total wo	rkload
		Method of teaching	Hours per	Hours per	Total wo	
		Method of teaching	Hours per week per	Hours per semester for each	Workload in hours	ECTS (credit points)
		Method of teaching	week per semester	semester for each method of	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually
		Method of teaching	week per	semester for each	Workload in hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
		Method of teaching	week per semester (SWS) for	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1
	Contact hours		week per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	Contact hours (e.g. lecture, seminar, practical	Method of teaching Lecture	week per semester (SWS) for each method of teaching 2	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship,		week per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Lecture	week per semester (SWS) for each method of teaching 2	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study,	Lecture	week per semester (SWS) for each method of teaching 2	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Lecture	week per semester (SWS) for each method of teaching 2	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Lecture	week per semester (SWS) for each method of teaching 2 2 2	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Lecture Exercise	week per semester (SWS) for each method of teaching 2 2	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Lecture Exercise Total	week per semester (SWS) for each method of teaching 2 2 2 Total contact hours in SWS	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours 60	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours	Lecture Exercise Total Preparation, follow-up work,	week per semester (SWS) for each method of teaching 2 2 2 Total contact hours in SWS	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours	Workload in hours Total contact and non-contact hours	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) Non-contact hours	Lecture Exercise Total Preparation, follow-up work, preparation for the	week per semester (SWS) for each method of teaching 2 2 2 Total contact hours in SWS	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours 60	Workload in hours Total contact and non-contact hours	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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Lecture Exercise Total Preparation, follow-up work,	week per semester (SWS) for each method of teaching 2 2 2 Total contact hours in SWS	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours 60	Workload in hours Total contact and non-contact hours	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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Lecture Exercise Total Preparation, follow-up work, preparation for the	week per semester (SWS) for each method of teaching 2 2 2 Total contact hours in SWS	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours 60	Workload in hours Total contact and non-contact hours	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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Lecture Exercise Total Preparation, follow-up work, preparation for the	week per semester (SWS) for each method of teaching 2 2 2 Total contact hours in SWS	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours 60	Workload in hours Total contact and non-contact hours	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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Lecture Exercise Total Preparation, follow-up work, preparation for the	week per semester (SWS) for each method of teaching 2 2 2 Total contact hours in SWS	semester for each method of teaching (usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours 60	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only

	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 prepare content taught in
	the areas of
	- Data representation
	- Information backup
	- Information storage
	- Information transmission
	- Information procurement
	and to reproduce and apply the content in set examination tasks. In addition to
	understanding the specialist content, students will particularly be able to grasp computer
	science in its entirety (knowledge triangle of the basics of computer science, applied
	computer science, and programming languages). Students use this module as an indicator of
	their learning speed and of their ability to familiarise themselves with unfamiliar subject
	matter and to reproduce the knowledge gained. In the field of engineering, the ability to
	quickly familiarise oneself with unfamiliar thematic areas is an important professional basis
	for being able to survive in the continuously evolving market. This is even surpassed by the
	ever-increasing rate of change of software in the field of information technology.
	5.2 Course content
	Data encoding
	> Number systems
	> Character encoding
	> Encoding of complex data (graphics, documents, audio,)
	 Information backup procedures > parity, ECC, CRC, check digits
	> Encryption and digital signature
	 Information storage from the L1 cache to WAN-based tape systems
	• Information transmission
	> Interfaces, networks, protocols
	 Interfaces, networks, protocols Information processing
	 > Automation of sequences with scripting and macro languages → 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 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 learn the basic thematic areas of computer science: information backup, storage and
	You learn the basic thematic areas of computer science: information backup, storage and
	You learn the basic thematic areas of computer science: information backup, storage and transmission, as well as applications and programming languages. You recognise the connections
6	You learn the basic thematic areas of computer science: information backup, storage and transmission, as well as applications and programming languages. You recognise the connections and develop a comprehensive idea of this discipline.
6	You learn the basic thematic areas of computer science: information backup, storage and transmission, as well as applications and programming languages. You recognise the connections
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6	You learn the basic thematic areas of computer science: information backup, storage and transmission, as well as applications and programming languages. You recognise the connections and develop a comprehensive idea of this discipline. 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
6	You learn the basic thematic areas of computer science: information backup, storage and transmission, as well as applications and programming languages. You recognise the connections and develop a comprehensive idea of this discipline. 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)
6	You learn the basic thematic areas of computer science: information backup, storage and transmission, as well as applications and programming languages. You recognise the connections and develop a comprehensive idea of this discipline. 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	You learn the basic thematic areas of computer science: information backup, storage and transmission, as well as applications and programming languages. You recognise the connections and develop a comprehensive idea of this discipline. 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)
6	You learn the basic thematic areas of computer science: information backup, storage and transmission, as well as applications and programming languages. You recognise the connections and develop a comprehensive idea of this discipline. 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)
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Introduction to Computer Science

1.1 Title of module (GER / EN			1.2 Short descriptio (optional)		ode (from HIO)	
Informationsverarbeit			(optional)	MB.1.0197		
Introduction to Comp 2.1 Cycle of module:	uter Science		2.2 Duration of mod	ule		
Every summer semester [Every winter semester	-	1 semester 🗌 2			
Other cycle, namely: 3.1 Module offered in the follo	wing dogroe programma(c).		3.2 Compulsory (C)	2.2 Pocomm	ended semester	
5.1 module offered in the folic	wing degree programme(s).	0	compulsory elective (CE), elective (E)		ended semester	
Bachelor`s programm	ies:					
Mechanical Engineerin	g -					
International Engineeri	ng (Outgoings)					
Mechanical Engineerin			CE	-	. GS	
International Engineeri	ng (Incomings)		CL.		. 65	
Mechanical Engineerin	g -		CE		4	
Specialisation in Plant					7	
Mechanical Engineerin			CE		4	
	notive and Drive Engineering				-7	
Mechanical Engineerin			CE		4	
	truction and Manufactoring Technology					
Computer Science in N	<u> </u>		С		2	
Business Administratio	lechanical	С		4		
Engineering			-		-	
	g (dual study)		CE		SuSe	
Mechanical Engineerin Workload	g (dual study)		CE	Total wo		
Mechanical Engineerin Workload	g (dual study) Method of teaching	Hours per week	CE Hours per			
		per semester	Hours per semester for	Total wo Workload in hours	rkload ECTS (credit points)	
			Hours per	Total wo Workload in	rkload ECTS (credit points) 30 hrs usually correspond to 1	
		per semester (SWS) for each	Hours per semester for each method of teaching (usually the number	Total wo Workload in hours Total contact and	rkload ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole	
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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 are able to reproduce the content

from the following areas

- Representation of information
- Information security
- Information storage
- transfer of information

 Information gathering and apply the acquired knowlegde to problems and tasks.
The students use this module as an indicator of their learning speed and their ability to familiarize themselves with unfamiliar stuff and to reproduce this acquired knowledge. This capability to familiarize oneself with unknown subject areas as quickly as possible is an important professional basis in mechanical engineering in order to be able to survive in the constantly evolving market. This challenge represents an increasing success factor and is significantly influenced by the steadily increasing rate of technological change in the IT area.
5.2 Course content
 Information coding, character coding, coding of graphics Binary algorithms
Number systems
 Information safety procedures
 Redundancy: parity, ECC, CRC, check digits
 Encryption and digital signature
Storage (HDD / SDD)
 Networks: interfaces, protocols
\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 learn the basic thematic areas of computer science: information backup, storage and
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Introduction to Digital Electronics

1	1.1 Title of module (GER / ENG Digitaltechnik / Introduction to Digital			1.2 Short description (optional)	1.3 Module code MB.1.0024	e (from HIO)	
2	2.1 Cycle of module: Every summer semester Other cycle, namely:	S Every winter semester		2.2 Duration of mod ☑ 1 semester □ 2			
3	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		led semester:	
	Bachelor`s programm	les:					
	Mechanical Engineering						
	International Engineering	ng (Outgoings)					
	Mechanical Engineering - International Engineering (Incomings) Mechanical Engineering - Specialisation in Plant Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Construction and Manufactoring Technology			CE	1.	GS	
				CE		4	
				CE			
						4	
	Computer Science in Mechanical Engineering			С	4		
	Business Administration & Engineering majoring in Mechanical						
	Engineering		_	-			
4	Mechanical Engineering	g (dual study)		CE	Su	ıSe	
4	Workload			Total wor	kload		
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Lecture	2	30			
	course, practical period/internship, group work, project work, case	Exercise	1	15			
	study, simulation game, credited tutorial (more rows can be added)	Practical course	2	30			
		Total	Total contact hours in SWS	Total contact hours in hours 75	150	5	
	Non-contact hours	Preparation, follow-up work			100	Ū	
	(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	preparation for the examination					
		Total		Total non-contact hours 75			

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 design and simplify circuit logic, and to implement circuit logic in logic gates. In addition, they will create real circuits that are assessed in terms of their actual transmission behaviour in the component, and optimised as required. Students will also be able to evaluate existing circuits, creating the basis for detecting weak points and for designing improvements. The practical course enables students to independently solve practice-related tasks for programming digital systems. The use of a standard and general-purpose single-board computer gives students a large amount of freedom in finding a solution, promoting, among other things, their creativity and solution-oriented thinking. Armed with these skills, students will, for instance, be able to construct and optimise control systems of mechanical systems. 5.2 Course content Lecture/exercise class: Coding and number systems - Boolean algebra - Behaviour of logic gates - Circuitry - Combinatorial circuits - Synchronous and asynchronous sequential circuits Practical course: - Working with a Raspberry Pi → 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 are familiar with the concepts of "on" and "off" from simple light switches. Such circuits, and others like them, also exist in digital systems. You get to know simple variants, and practise building them yourself. 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.)

Introduction to Digital Electronics and Programmable Logic Control

(Module not valid for enrolment from WiSe 21/22 onwards)

Digitaltechnik und Steuerungstechnik / Introduction to Digital Electronics and Programmable Logic Control (optional) MB.1.00 2 2.1 Cycle of module: Every summer semester	mended semester:
Introduction to Digital Electronics and Programmable Logic Control 2 2.1 Cycle of module:	mended semester:
Control 2.1 Cycle of module: 2.2 Duration of module: Every summer semester □ Every winter semester 2.1 semester □ 2 semesters Other cycle, namely: 3.1 Module offered in the following degree programme(s): 3.2 Compulsory (C), compulsory elective (CE), elective (E) Bachelor`s programmes:	mended semester:
X Every summer semester Every winter semester X 1 semester 2 semesters 3 3.1 Module offered in the following degree programme(s): 3.2 Compulsory (C), compulsory elective (CE), elective (E) 3.3 Recond Bachelor`s programmes: Mechanical Engineering - International Engineering (Outgoings) International Engineering - International Engineering (Incomings) International Engineering - Specialisation in Plant Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering	mended semester:
Other cycle, namely: Image: Compulsory (C), compulsory elective (CE), elective (E) 3.3 Reconserved (CE), elective (E) Bachelor`s programmes: Image: Compulsory elective (E) 3.3 Reconserved (CE), elective (E) Bachelor`s programmes: Image: Compulsory elective (E) Image: Compulsory elective (E) Mechanical Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) International Engineering (Outgoings) Image: Compulsory elective (E) Image: Compulsory elective (E) Mechanical Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) International Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) Mechanical Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) Mechanical Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) Mechanical Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) Mechanical Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) Mechanical Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) Mechanical Engineering - Image: Compulsory elective (E) Image: Compulsory elective (E) Mecha	mended semester:
3 3.1 Module offered in the following degree programme(s): 3.2 Compulsory (C), compulsory elective (CE), elective (E) Bachelor`s programmes: Mechanical Engineering - International Engineering (Outgoings) Mechanical Engineering (Incomings) Mechanical Engineering - International Engineering - Specialisation in Plant Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering	mended semester:
Bachelor's programmes: compulsory elective (CE), elective (E) Mechanical Engineering - International Engineering (Outgoings) international Engineering - International Engineering (Incomings) Mechanical Engineering - Specialisation in Plant Engineering specialisation in Plant Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering specialisation in Automotive and Drive Engineering	
Bachelor`s programmes: International Engineering - International Engineering (Outgoings) Mechanical Engineering (Outgoings) Mechanical Engineering - International Engineering (Incomings) Mechanical Engineering - Specialisation in Plant Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering	
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Mechanical Engineering - Specialisation in Automotive and Drive Engineering Mechanical Engineering -	
Specialisation in Automotive and Drive Engineering Mechanical Engineering -	
Mechanical Engineering -	
Computer Science in Mechanical Engineering C	4
g	
Business Administration & Engineering majoring in Mechanical	
Engineering Mechanical Engineering (dual study)	
Mechanical Engineering (dual study)	
	vorkload
Method of teaching Hours per Hours per Workload in	ECTS (credit
week per semester for each hours	points)
semester method of Total contact and (SWS) for teaching non-contact hour	
each method (usually the number of	credit point; whole numbers only
of teaching hours per week multiplied by 15)	numbers only
Contact hours (e.g. lecture, seminar, practical Lecture 2+2 60	
course, practical period/internship, group work, project work, case study,	
simulation game, credited tutorial (more rows can be added) Practical course 1+1 30	
Total Total contact Total contact	
hours in SWS hours in hours	
	10
(e.g. tutorial, preparation, follow-up	
work, preparation for assignments and homework, research, etc.)	
examination	
Total Total non-contact	
hours 180	
5 5.1 Intended learning outcomes (What should students be able to do after having completed the module? Does the module provide the op	

After successful completion of the module, students will be able to explain how control systems function and illustrate the functionality of digital systems in the combination of hardware and software. They will be able to apply theoretical knowledge on program structure when programming different sequences on a PLC and when tackling a variety of examples on the Raspberry Pi single-board computer.

The practical course enables students to expand on and transfer the specialist knowledge gained on the structure of programs by conducting PLC sequence programming and by implementing practiceoriented Raspberry Pi projects. By independently developing the programs and by detecting and

eliminating occurring errors, students particularly practise their problem-solving skills and solution orientation. In addition, by working in small groups, students are able to improve their capacity for teamwork and their communication skills. The specialist knowledge gained is the basis for working with automated processes, an increasingly important aspect in current engineering practice.
Digital engineering: - Lecture/exercise class: Coding and number systems, Boolean algebra, behaviour of logic gates, circuitry, combinatorial circuits, synchronous and asynchronous sequential circuits - Practical course: Working with a Raspberry Pi
Control engineering: - Lecture: Introduction, Boolean algebra, control components, implementation of sequence control, programming PLCs - Exercise class: Calculation and programming examples - Practical course: Programming PLCs in small groups → 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.
 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
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 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. 7.1 Languages used in the module:
German 🗌 English 🔲 Other, namely:
7.2 Module Contact Person: Professor DrIng. A. Komainda, Professor DrIng. D. Scholz 7.3 Professors (optional):
Professor DrIng. A. Komainda, Professor DrIng. D. Scholz 7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Introduction to Electrical Engineering

	1.1 Title of module (GER / ENG	3)		1.2 Short description	1.3 Module code	e (from HIO)
	Elektrotechnik /			(optional)	MB.1.0028	
	Introduction to Electri	ical Engineering		,		
2	2.1 Cycle of module: ☐ Every summer semester ☑ Other cycle, namely:	S Every winter semester		2.2 Duration of modu ☑ 1 semester □ 2 s		
3	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		led semester:
	Bachelor`s programm	es:		(0_), 0.00000 (2)		
	Mechanical Engineering					
	International Engineerir	С		3		
	Mechanical Engineering					
	International Engineerir					
Mechanical Engineering -				С		3
Specialisation in Plant Engineering				•		.
Mechanical Engineering -				С		3
		otive and Drive Engineering		_		-
	Mechanical Engineering		abaalaay	С		3
	•	ruction and Manufactoring Tec	chhology	С		3
	Computer Science in M	n & Engineering majoring in M	Inchanical	-		3
	Engineering		lechanicai	С		3
	Mechanical Engineering	g (dual study)		С		5
4	Workload					
					Total wor	kload
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for each h method of	Vorkload in nours 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	Lecture	3	45		
	course, practical 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 contact hours in SWS	Total contact hours in hours 75	150	5
	Non-contact hours (e.g. tutorial, preparation, follow-up	Preparation, follow-up work				
	work, preparation for assignments and homework, research, etc.)	preparation for the examination				
1		7-1-1		Total part contract		
		Total		Total non-contact hours		
F	E 4 Intended learning outcom			75		it. to a series a str
5		es (What should students be able to do after h for which other modules and prospective tasks				
	After successful comp	letion of the module, student	e will be able	a ta domanstrata	the basic	
	-	ach for solving electrical engi				
		ive AC and DC networks usir				will
		ent fundamental interactions			-	
		o apply their knowledge to si		-	•	IIIa
1		will be able to describe how t nables students to develop a	•	-		sks in a
		napies students to develop a		anon shaleyies i		

team, building on the specialist knowledge gained in the lectures, and to present and introduce the results to suit the target group. Students will be able to handle the devices commonly used to examine

	electrical engineering issues – multimeters, laboratory power supply units, function generators and oscilloscopes, make the necessary settings, and also to assess the possible applications of these devices. Electrical engineering experiments selected by the students, involving different passive elements in different circuits and electrical circuits, are prepared, conducted and evaluated in the practical course. During the practical course, students will acquire the basic knowledge that may be required to use the above devices in other courses or practical courses and to prepare projects and dissertations. The specialist knowledge gained is the basis for understanding advanced study elements, and can be transferred to related engineering subjects such as instrumentation and control.
	5.2 Course content
	• Ohm's law
	• Kirchhoff's laws
	• DC networks
	• Electric field, capacitors
	Magnetic field, ferromagnetism, induction
	• AC circuits
	Introduction to three-phase alternating current
	\rightarrow 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. Energy and signals are transmitted electrically. That is why electrical engineering has a firm place in mechanical engineering. You will learn about their most important areas of application and methods.
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
Ŭ	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.
7	7.1 Languages used in the module: German English Other, namely:
	7.2 Module Contact Person: Professor DrIng. J. Korn
	7.3 Professors (optional): Professor DrIng. J. Korn, lecturer on the degree programme in Mechanical Engineering – dual study - J. Fricke
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
	Recommended reading:
	Lecture notes;
	Hagmann, G.: Grundlagen der Elektrotechnik, Aula Verlag;
	Hagmann, G.: Aufgabensammlung zu Grundlagen der Elektrotechnik, Aula Verlag

Introduction to Finite Element Methods

1 1.1 Title of module (GER / ENC Grundzüge der FEM / Introduction to Finite			1.2 Short description (optional)	1.3 Module o MB.1.005	ode (from HIO) 6
2 2.1 Cycle of module:	Every winter semester		2.2 Duration of modu		
Other cycle, namely: 3 3.1 Module offered in the follo			3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recomm	ended semester:
Bachelor`s programm	es:				
Mechanical Engineering	g -		С		4
Mechanical Engineering	5		С		1.GS
Mechanical Engineering Specialisation in Plant	İngineering				
	otive and Drive Engineering		С		4
	ruction and Manufactoring Tec	chnology	C C		4
	Computer Science in Mechanical Engineering Business Administration & Engineering majoring in Mechanical			4	
Engineering	n & Engineering majoring in w	lechanical	CE		4
Mechanical Engineering	g (dual study)		С		8
4 Workload		-			
				Total wo	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for h each method of	Vorkload in ours otal contact and on-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
Contact hours (e.g. lecture, seminar, practical	Lecture	3	45		
course, practical 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 contact hours in SWS	Total contact hours in hours 75	450	-
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		75	150	5
55.1 Intended learning outcome	Total		Total non- contact hours 75		

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 create linear finite element analysis simulations for single statically loaded components by means of both linear algebra

analysis simulations for single statically loaded components by means of both linear algebra and 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, students will learn to create element stiffness matrices for structural and volume elements, as well as overall stiffness matrices. Using the functional approach, they will be able to develop element stiffness matrices and generate corresponding load vectors.

Students will also be able to analyse and assess boundary conditions and FEM meshes, and to establish appropriate meshes and boundary conditions as well as develop meshing strategies for new issues. Students will be able to classify different types of elements (1D, 2D, 3D, RBE) and to specifically use them in FEM models. They will be able to express the difference between the h-method and the p-method, and to select the correct method for the issue at hand. Students will also understand effects such as locking and zero-energy modes, and will be able to assess these effects. 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. Specifically, students will be able to use the Siemens NX program package, comprising the pre- and post-processor and the NASTRAN solver, to investigate and solve linear issues that are to be processed using different types of elements (structural and volume elements). Students will be able to analyse and assess the simulation results. They will also be able to draw conclusions for the construction design, which is the standard process when involved later in engineering practice in the field of construction design and product development. 5.2 Course content Basic idea and principles of FEM Alternative methods to FEM Foundations of classical mechanics · Description of problems concerning mechanics of materials as the starting point of FEM Beam elements, bar elements Disk elements, plate elements, shell elements Continuum elements Meshing and element selection Boundary conditions Application of the Siemens NX program package (pre- and post-processor NX and the NASTRAN solver) to linear issues for solving problems with different types of elements 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. Technical components are subject to all kinds of loads, which you simulate before they are deployed. A modern approach is the finite element method (FEM), which you are able to understand mathematically and apply practically in a simulation program. 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. 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

Introduction to Fluid Mechanics

(Module **not** valid for enrolment from WiSe 21/22 onwards)

1	1.1 Title of module (GER / EN			1.2 Short description		code (from HIO)
	Grundlagen der Strör			(optional)	MB.1.005	53
	Introduction to Fluid	Mechanics				
2	2.1 Cycle of module:			2.2 Duration of mo		
	Every summer semester [Other cycle, namely:	_ Every winter semester		🛛 1 semester 🗌 2	semesters	
3	3.1 Module offered in the follo	owing degree programme(s):		3.2 Compulsory (C	, 3.3 Recomm	ended semester:
				compulsory electiv		
				(CE), elective (E)		
	Bachelor`s programm					
	Mechanical Engineerin					
	International Engineeri					
	Mechanical Engineerin	g -				
	International Engineeri	ng (Incomings)				
	Mechanical Engineerin	g -				
	Specialisation in Plant	Engineering				
	Mechanical Engineerin					
		notive and Drive Engineering				
	Mechanical Engineerin	¥¥				
		ruction and Manufactoring Tee	chnology			
	Computer Science in M			С		4
	•	n & Engineering majoring in M	lechanical	_		_
	Engineering					
	Mechanical Engineerin	a (dual study)				
4	Workload	g (add. olday)				
					Total wo	orkload
		Method of teaching	Hours per week	Hours per	Workload in	ECTS (credit
		5	per semester	semester for	hours	points)
			(SWS) for each method of	each method of	Total contact and non-contact hours	30 hrs usually correspond to 1
			teaching	teaching (usually the number		credit point; whole
			5	of hours per week multiplied by 15)		numbers only
	Contact hours	Looturo	2	45		
	(e.g. lecture, seminar, practical	Lecture	3			
	course, practical period/internship, group work, project work, case	Exercise	1	15		
	study, simulation game, credited					
	tutorial (more rows can be added)					
		Total	Total contact hours			
			in SWS	hours in hours 60		
	Non-contact hours	Preparation, follow-up work,		90	150	5
	(e.g. tutorial, preparation, follow-up	preparation for the		30		
	work, preparation for assignments and homework, research, etc.)	examination				
					-	
		Total		Total non-		
				contact hours 90		
				190		
5	5.1 Intended learning outcom	es (What should students be able to do after h	aving completed the	module? Doos the mod	Ile provide the oppor	tunity to

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 and calculate simple fluid flow issues. They will be able to apply basic calculation methods to application examples, and to assess and mathematically analyse the behaviour of inviscid and viscous flow processes. They will have the ability to check the plausibility of the results calculated in the "Computational Fluid Dynamics" module.

5.2 Course content

Surface tension phenomena, Euler equations, Navier–Stokes equations, momentum equation, boundary layer flows, flows through pipework systems, buoyancy and flow resistance to 3D bodies, supersonic flows, flow measurement technology and visualisation, examples

 \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.

What makes aeroplanes fly? What is a sonic boom? You understand these and other fundamental phenomena of fluid mechanics. You then use various experiments in the lab to test your new knowledge in practice.

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

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.)

	1.1 Title of module (GER / ENG)			1.2 Short descriptio	n 1.3 Module d	ode (from HIO)
	IT Projektmanagement			(optional)	MB.1.0190)
	IT Project Management					
2	2.1 Cycle of module:	Every winter semester		2.2 Duration of mod ☐ 1 semester ☐ 2		
	Other cycle, namely:	-				
3	3.1 Module offered in the followi	ing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester:
	Bachelor`s programme					
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering			CE		2. GS
	International Engineering					
	Mechanical Engineering			CE	3	3 o. 5
	Specialisation in Plant Er	<u> </u>				
	Mechanical Engineering		a	CE		3 o. 5
	Mechanical Engineering	tive and Drive Engineerin	iy			3 0. 5
		- iction and Manufactoring	Technology	CE		50.5
	Computer Science in Me	<u> </u>	reennology	С		3
		& Engineering majoring in	n Mechanical			0
	Engineering		in moonarnoar			
	Mechanical Engineering	(dual study)		CE	1	NiSe
	Workload			_		
					Total wo	rkload
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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	Seminaristic Lecture	2	30		
	(e.g. lecture, seminar, practical course, practical period/internship,	Exercise	1	15		
	group work, project work, case study, simulation game, credited tutorial (more rows can be added)					
		Total	Total contact hours SWS	s in Total contact hours in hours 45		
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		105	150	5
		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 plan and implement IT projects, and to document them to suit the target group, enabling them to contribute to IT projects in their future career.
5.2 Course content
 Basic elements of planning activities Software for project planning processes Special features of IT projects Resource estimates
 Processes and process improvements Case examples → 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. IT projects are often very complex, with several programmers working on them simultaneously. Besides learning the basics of programming, you gain the knowledge required to plan and structure your project effectively.
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:
7.2 Module Contact Person: Professor DrIng. S. Behr
7.3 Professors (optional): Professor DrIng. S. Behr
7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Set of slides used in the lecture Recommended reading:
H. Wieczorrek, P. Mertens: Management von IT-Projekten. Von der Planung zur Realisierung

IT Project Management – Realisation (Module not valid for enrolment from WiSe 21/22 onwards)

	1.1 Title of module (GER / EN			1.2 Short descriptio		code (from HIO)
	IT Projektmanagemer			(optional)	MB.1.006	51
	IT Project Manageme	nt – Realisation				
2	2.1 Cycle of module:	🛛 Every winter semester		2.2 Duration of mod ⊠ 1 semester □ 2		
	Other cycle, namely:				Semesters	
	3.1 Module offered in the follo	owing degree programme(s):		3.2 Compulsory (C)		nended semester:
				compulsory elective (CE), elective (E)	e	
	Bachelor`s programn	nes:				
	Mechanical Engineerin					
	International Engineeri					
	Mechanical Engineerin					
	International Engineeri					
	Mechanical Engineerin					
	Specialisation in Plant					
	Mechanical Engineerin					
	Specialisation in Auton	notive and Drive Engineering				
	Mechanical Engineerin					
		ruction and Manufactoring Te	choology			
		Aechanical Engineering	chilology	С		3
	•	<u> </u>	Inchanical	6		3
		n & Engineering majoring in M	lechanical			
	Engineering Mechanical Engineerin					
4	Wechanical Engineenin Workload	g (duai study)				
-	Workiodd				Total wo	orkload
		Method of teaching	Hours per week	Hours per	Workload in	ECTS (credit
			per semester	semester for	hours	points)
			(SWS) for each method of	each method of teaching	Total contact and non-contact hours	30 hrs usually correspond to 1
			teaching	(usually the number		credit point; whole numbers only
				of hours per week multiplied by 15)		numbers only
	Contact hours (e.g. lecture, seminar, practical	Lecture	4	60		
	course, practical period/internship, group work, project work, case	Exercise	1	15		
	study, simulation game, credited tutorial (more rows can be added)	Practical course	3	45		
	lutorial (more rows can be added)					
		Total	Total contact hours in SWS	s Total contact hours in hours		
				120		
	Non-contact hours	Preparation, follow-up work,		180	300	10
	(e.g. tutorial, preparation, follow-up work, preparation for assignments	preparation for the				
	and homework, research, etc.)	examination				
		Total		Total non-		
		Total		contact hours		
				180		
5		les (What should students be able to do after h nical skills? For which other modules and prosp				
	relevant?)	modi okino: i or which other modules and prosp		and manyor are the aby	and a movieuge and	
	After successful com	pletion of the module, stude	nte will be a	ble to formulat	o complex	
		ment them using a standard				o In
		Il be able to plan and implem				

suit the target group, enabling them to contribute to IT projects in their future career.

 5.2 Course content Basic elements of object-oriented thought
Object-oriented formulation of algorithms
Syntax and semantics of object-oriented programming languages
• Development environments
Integration of external libraries
Error detection and prevention
 Software development in a team
 Basic elements of planning activities
 Software for project planning processes
 Special features of IT projects
Resource estimates
 Processes and process improvements
• Case examples
→ 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. When working on large IT projects, you will often collaborate with other developers. We show you how to plan and structure an overall project in a team, besides carrying out your own tasks.
6 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 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 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)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
Set of slides used in the lecture
Set of slides used in the lecture Recommended reading:

Joining Technology

1 1.1 Title of module (GER / ENG) Fügetechnik / Joining Technology			1.2 Short description (optional)		de (from HIO) / MB.2.0017
2 2.1 Cycle of module: ☐ Every summer semester ⊠ Other cycle, namely:	Every winter semester		2.2 Duration of mod ⊠ 1 semester □ 2 s		
3 3.1 Module offered in the follow			3.2 Compulsory (C), compulsory elective (CE), elective (E)		ided semester:
Bachelor`s programme					
Mechanical Engineering					
International Engineering					
Mechanical Engineering			CE	2.	GS
International Engineering				2	0.5
Mechanical Engineering Specialisation in Plant E			CE	3	0.5
Mechanical Engineering	<u> </u>			3	0.5
	- itive and Drive Engineerin	a	CE	5	0.5
Mechanical Engineering		9		3	o. 5
	ction and Manufactoring	Technology	CE		0.0
Computer Science in Me					
	& Engineering majoring ir	n Mechanical	05		_
Engineering	5 - 5 - 5 - 5 - 5		CE		5
Mechanical Engineering	(dual study)		С		7
4 Workload					
				Total wo	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for each method of	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	Seminaristic 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)	Practical course	1	15		
	Total	Total contact hours SWS	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, follow-up work, preparation for the examination		90	150	5
	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 characterise the joining techniques commonly used in mechanical engineering, and will, in particular, be able to classify and compare different welding techniques. The wide range of joining techniques learned will enable students to select appropriate joining techniques for materials or components to be joined, taking into account structural and economic requirements. They will also be able to determine the corresponding filler materials, auxiliary materials and production parameters in a practice-oriented way. In their future careers, students will be able to use this knowledge to examine the relevance and feasibility of joining techniques for components to be produced, and to select them accordingly.

The practical course enables students to prepare series of experiments independently and as part of a team, and to subsequently examine and check them critically. They will be able to transfer the results to the theoretical knowledge gained, questioning them accordingly, and to formulate and present the results to suit the target group.

5.2 Course content

- Mechanical joining techniques, as well as soldering and bonding techniques
- Welding techniques and machines
- Bonding techniques
- Metallurgical processes in welding and welding behaviour of metallic materials
- Heat treatment for welded constructions
- Aspects related to the design of connections
- 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 can components be joined? Should the joint be permanent? You get an overview of the different joining methods, and improve your skills of welding, bonding and mechanical joining techniques..

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:

Dr.-Ing. M. Laubrock

7.3 Professors (optional):

Dr.-Ing. M. Laubrock

7.4 Maximum number of participants (optional)

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

1.1 Title of module (GER / ENG Logistik / Logistics	G)		1.2 Short descriptio (optional)	m 1.3 Module of MB.1.007	ode (from HIO) 9
2.1 Cycle of module: Every summer semester Other cycle, namely:	⊠ Every winter semester		2.2 Duration of mod ☑ 1 semester □ 2		
3.1 Module offered in the follo			3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semeste
Bachelor`s programm					
Mechanical Engineerin					
International Engineerin					
Mechanical Engineerin					
International Engineerin					
Mechanical Engineerin					
Specialisation in Plant	ž ž				
Mechanical Engineering	g - notive and Drive Engineering				
Mechanical Engineering					
	ruction and Manufactoring Te	chnology			
	lechanical Engineering	onnology			
	n & Engineering majoring in N	/lechanical			_
Engineering			С		5
Mechanical Engineering	g (dual study)				
Workload					
				Total wo	orkload
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who numbers only
	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	hours Total contact and	points) 30 hrs usually correspond to 1 credit point; who
e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited		per 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	points) 30 hrs usually correspond to 1 credit point; who
e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited	Lecture	per semester (SWS) for each method of teaching 3	semester for each method of teaching (usually the number of hours per week multiplied by 15) 45	hours Total contact and	points) 30 hrs usually correspond to 1 credit point; who
e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited	Lecture	per semester (SWS) for each method of teaching 3	semester for each method of teaching (usually the number of hours per week multiplied by 15) 45 15	hours Total contact and non-contact hours	points) 30 hrs usually correspond to 1 credit point; who numbers only
e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited utorial (more rows can be added) Non-contact hours e.g. tutorial, preparation, follow-up work, preparation for assignments	Lecture Exercise	per semester (SWS) for each method of teaching 3 1 Total contact hours	semester for each method of teaching (usually the number of hours per week multiplied by 15) 45 15 Total contact hours in hours	hours Total contact and	points) 30 hrs usually correspond to 1 credit point; who
	Lecture Exercise Total Preparation, follow-up work, preparation for the	per semester (SWS) for each method of teaching 3 1 Total contact hours	semester for each method of teaching (usually the number of hours per week multiplied by 15) 45 15 Total contact hours in hours 60	hours Total contact and non-contact hours	points) 30 hrs usually correspond to 1 credit point; who numbers only

After successful completion of the module, students will be able to recognise and develop the technical and economic aspects of logical relationships. They will be able to express knowledge from the logistics aspects of procurement, production, distribution and disposal, and to derive their technological design with the aid of appropriate transportation and storage systems. The detailed knowledge gained is relevant in the professional context of an industrial engineer with regard to the planning, evaluation, design and assessment of logistics systems.

5.2 Course content
Types of logistics (procurement, production, distribution logistics) and methods of logistics
(route planning, supplier evaluation), analysis of movements and the mathematical
determination of cycle times and throughput, selection of means of conveyance, storage
equipment, handling equipment, sorting and order picking technologies, handling and
storage technology, planning techniques, material flow simulation.
Another focus is the design of conveyor equipment; so material flows can not only be designed
but also technically dimensioned.
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.
Logistics covers many fields – from procurement to production to disposal. You identify potential
for optimisation in the individual areas, helping to cut costs or speed up production times, for
example.
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
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:
Professor DrIng. 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.)

-

Machine Elements

) Machine Elements		1.2 Short descriptio (optional)	on 1.3 Module c MB.1.008		
2.1 Cycle of module: ⊠ Every summer semester □	Every winter semester		2.2 Duration of mod			
Other cycle, namely: 3.1 Module offered in the follow	/ing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester	
Bachelor`s programme	es:					
Mechanical Engineering			•		•	
International Engineering			С		2	
Mechanical Engineering	-					
International Engineering	g (Incomings)					
Mechanical Engineering -		С		2		
Specialisation in Plant E			•		2	
Mechanical Engineering			С		2	
	otive and Drive Engineering				_	
Mechanical Engineering			С		2	
	uction and Manufactoring Tec	nnology	•			
Computer Science in Me		a ale a si a al	С		2	
Business Administration Engineering	& Engineering majoring in M	ecnanicai	С		2	
Mechanical Engineering	(dual study)		С		4	
Workload			•		•	
				Total wo	rkload	
	Method of teaching	Hours per week per semester (SWS) for each method 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	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who numbers only	
Contact hours (e.g. lecture, seminar, practical	Lecture	3	45			
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 hours in SWS	Total contact hours in hours			
			60	150	5	
	Preparation, follow-up work, preparation for the examination		90	130	5	
				1		

	understanding of the applicable techniques and methods as well as their limitations in the design and layout of machine elements and are able to apply them to engineering problems.
	 5.2 Course content Exploration of: Introduction to machine elements Strength calculation Axles, shafts and journals Bolt, pin connections and locking elements Bolted joints welded joints Bonded joints
	\rightarrow 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 aim of the lectures and exercises in this module is to make a significant contribution to engineering education by imparting technical and methodological knowledge as well as skills and abilities for developing and designing technical products.
6	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
	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: Image: Second S
	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.)

Machine Elements / Design Engineering

(Module **not** valid for enrolment from WiSe 21/22 onwards)

4	4 4 Title of module (OED / EN/	2)			4.0 Madula	
	1.1 Title of module (GER / ENG Maschinenelemente /			1.2 Short descriptio (optional)	MB.1.008	code (from HIO)
	Machine Elements / D					•
_	2.1 Cycle of module: ☑ Every summer semester ☑ Other cycle, namely:			2.2 Duration of mod		
3	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester:
	Bachelor`s programm	les:		(
	Mechanical Engineering					
	International Engineerir					
	Mechanical Engineering	g -				
	International Engineerir	ng (Incomings)				
	Mechanical Engineering	g -				
	Specialisation in Plant I					
	Mechanical Engineering					
		otive and Drive Engineering				
	Mechanical Engineering					
		ruction and Manufactoring Tec	chnology			
	Computer Science in M	<u>v</u> v		С		2+3
		n & Engineering majoring in M	lechanical	С		2+3
	Engineering Mechanical Engineering	a (dual atudu)				
4	Workload	g (dual study)				
					Total wo	orkload
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Lecture	3	45		
	course, practical period/internship, group work, project work, case	Exercise	1	15		
	study, simulation game, credited tutorial (more rows can be added)	Practical course	3	45		
		Total	Total contact hours in SWS	Total contact hours in hours 105		
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		135	240	8
5	E 1 Intended learning outcom	Total		Total non- contact hours 135		

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 design and construct simple assemblies for general mechanical engineering. They will also be able to read assembly drawings, including those created by other members of the group. The design of assemblies in line with requirements enables the proper functioning of the assembly to be designed. It prevents damage due to undersizing and avoids a waste of resources due to oversizing.

Г	
	5.2 Course content
	Exploration of:
	 Bolted and pinned connections
	• Welding
	Shaft-hub connections
	Strength determination
	• Roller bearings
	•
	Design and dimensioning of simple assemblies
	 CAD technologies for creating assemblies in 2D and 3D
	 Emphasis is placed on working as part of a team and the use of the 3D CAD software
	Siemens NX
	ightarrow Details available in the university calendar, course timetable, etc.
5	F 2 Chevi information about modulo (This as the form 050 character) will be achieved as the FUNNington whether to have a same interacted in studying at FU
С	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.
	Durability and strength are important properties of an engineering design. You learn about the
	smallest functional machine parts and their tasks, and how to design them mathematically. You also
	practise reading technical drawings.
6	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
Ŭ	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) at the end of the 3rd semester
	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).*
	oce Examination Regulations for above-mentioned degree programmes (occum o).
	*Vou will find the Eventination Degulations of all degree programmes in the official appeuracements of EU Münster: https://www.fh
	*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):
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
L	

Materials Engineering

1	1.1 Title of module (GER / EN	G)	1.2 Short description 1.3 Module code (from						
	Verkstoffe /			(optional)	0142				
	laterials Engineering								
2	2.1 Cycle of module:				2.2 Duration of module: ⊠ 1 semester □ 2 semesters				
	Other cycle, namely:	Lvery winter semester			semesters				
3	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C)		ommended			
				compulsory elective (CE), elective (E)	e semest	er:			
	Bachelor`s programm	ies:							
	Mechanical Engineerin	g -							
	International Engineeri	ng (Outgoings)							
	Mechanical Engineerin								
	International Engineeri								
	Mechanical Engineerin								
	Specialisation in Plant								
	Mechanical Engineerin								
		notive and Drive Engineering							
	Mechanical Engineerin	g - ruction and Manufactoring Te	obnology						
	Computer Science in M	С		1					
		n & Engineering majoring in N	lochanical	U U	C 1				
	Engineering	n & Engineering majoring in w	lechanicai	C 1		1			
	Mechanical Engineerin	a (dual study)							
4	Workload	g (ddai stddy)							
		Total workload							
		Method of teaching	Hours per week		Workload in	ECTS (credit			
			per semester (SWS) for each	semester for each method of	hours Total contact and	d 30 hrs usually			
			method of	teaching	non-contact hou	rs correspond to 1 credit point; whole			
			teaching	(usually the number of hours per week		numbers only			
	Contract having	•		multiplied by 15)					
	Contact hours (e.g. lecture, seminar, practical	Lecture	3	45					
	course, practical 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 contact hours	s Total contact					
		Total	in SWS	hours in hours					
	Non-contact hours			75	150	5			
	(e.g. tutorial, preparation, follow-up	Preparation, follow-up work,		75					
	work, preparation for assignments and homework, research, etc.)	written elaboration							
	. , , ,								
		Total		Total non- contact hours					
1									
				75					

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 present the basic structure of engineered materials, and describe the production and application of material properties. In addition, they will be able to classify and compare important steel groups, cast iron materials and relevant heat treatment processes. Students will be able to link knowledge related to materials to the content of the other subject modules, and will be capable of identifying, systematically tackling, and assessing professional problems and tasks.

The aim of the practical course is to enable students to expand on the above aspects. In addition, students will be able to prepare series of experiments independently and as part of

a team, and to subsequently examine and check them critically. They will be able to transfer
the results to the theoretical knowledge gained, questioning them accordingly, and to
formulate and present the results to suit the target group.

5.2 Course content

Students are first introduced to crystalline material composition as a basis for understanding the mechanical properties. Building on this, students discuss material properties as a key factor for material selection, the methods used to produce them in materials testing, and their application to simple examples. Using this knowledge, students address important groups of materials, particularly steel groups, cast iron materials and several non-ferrous materials. The module is rounded off with knowledge as to how material properties defined by adapted heat treatments can be set (annealing process, hardening and tempering, surface layer treatment). → 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. Diverse machinery calls for a vast range of materials. You discover where and how materials are

used, and how to test them in terms of their properties.

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:

Dr.-Ing. M. Laubrock

7.3 Professors (optional):

Dr.-Ing. M. Laubrock

7.4 Maximum number of participants (optional)

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

1.1 Title of module (GER / ENG Werkstofftechnik 1 / Materials Engineering			1.2 Short descriptio (optional)	n 1.3 Module MB.1.01	43 (from HIO)		
2.1 Cycle of module:	ycle of module: very summer semester ⊠ Every winter semester			module:] 2 semesters			
3.1 Module offered in the following degree programme(s):			3.2 Compulsory (C) compulsory elective (CE), elective (E)		mended		
Bachelor`s programm							
Mechanical Engineering - International Engineering (Outgoings)			С		1		
Mechanical Engineering - International Engineering (Incomings)							
Mechanical Engineering - Specialisation in Plant Engineering			С		1		
Mechanical Engineering - Specialisation in Automotive and Drive Engineering			С		1		
Mechanical Engineering - Specialisation in Construction and Manufactoring Technology			С	1			
Computer Science in M							
Business Administration & Engineering majoring in Mechanical Engineering							
Mechanical Engineering (dual study)			С		3		
Workload		Total wo	uklaad				
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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 period/internship, group work, project work, case	Lecture	2	30				
	Exercise	1	15				
study, simulation game, credited tutorial (more rows can be added)	Practical course	1	15				
	Total	Total contact hours in SWS	Total contact hours in hours 60	150	5		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, written elaboration		90				
	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 derive the properties of engineered materials from their structure and the material processes used to produce and process them. They will be able to describe important material properties and the methods used to determine them, and to transfer them to simple application cases. In the exercise classes, the specialist knowledge gained is expanded on and broadened using examples. In addition, students will hone their soft skills by tackling tasks in groups and then presenting the solutions to suit the target group.

The practical courses enable students to independently characterise materials, and to explain and implement the treatment and testing of materials. They will be able to select

appropriate materials in specific cases. This is an important precondition for being able to adequately accompany construction design processes in their future career. By carrying out, evaluating and analysing experiments in small groups, students hone their communication skills and capacity for teamwork. 5.2 Course content Students are first introduced to crystalline material composition as a basis for understanding the mechanical properties. Building on this, students discuss material properties as a key factor for material selection, the methods used to determine them in materials testing, and their application to simple examples. Students also address the behaviour of materials under elevated temperatures. Based on this, students will learn the structure of alloy systems and can derive the structural composition accordingly. → 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 materials are suitable for manufacturing industrial products? To be able to answer such questions, you explore structures and properties of technical materials, as well as methods of materials testing and selection. 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.

7.2 Module Contact Person:

Dr.-Ing. Miriam Laubrock

7.3 Professors (optional):

Dr.-Ing. Miriam Laubrock

7.4 Maximum number of participants (optional)

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

1.1 Title of module (GER / ENG Werkstofftechnik 2 / Materials Engineering	-		1.2 Short descriptic (optional)	n 1.3 Module MB.1.01	e code (from HIO) 44	
2 2.1 Cycle of module: Every summer semester Other cycle, namely:	Every winter semester	2.2 Duration of mod ☐ 1 semester ☐ 2				
3.1 Module offered in the following degree programme(s):			3.2 Compulsory (C) compulsory elective (CE), elective (E)		mended	
Bachelor`s programme	es:					
Mechanical Engineering -			С	2		
International Engineering (Outgoings)			<u> </u>			
Mechanical Engineering						
International Engineering						
Mechanical Engineering	-		С		2	
Specialisation in Plant E	ingineering		C		Z	
Mechanical Engineering	-		С		0	
Specialisation in Automotive and Drive Engineering					2	
Mechanical Engineering -			•	2		
Specialisation in Construction and Manufactoring Technology			С			
Computer Science in Mechanical Engineering						
Business Administration & Engineering majoring in Mechanical						
Engineering		oonamoar				
	Mechanical Engineering (dual study)				4	
Workload			С		-	
				Total wo	rkload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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 period/internship, group work, project work, case study,	Lecture	3	45			
	Practical course	1	15			
simulation game, credited tutorial (more rows can be added)						
	Total	Total contact hours in SWS	Total contact hours in hours 60	150	5	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, written elaboration		90			
	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 classify and compare structural materials commonly used in engineering. They will be able to systematically and methodologically tackle certain problems related to materials engineering, and to select materials in an application-related manner, based on the operational loads required and the processing and functional characteristics. Students will also be capable of selecting appropriate heat treatment processes.

The practical courses enable students to independently characterise materials, and to explain and implement the treatment and testing of materials. They will be able to select appropriate materials in specific cases. This is an important precondition for being able to

	adequately accompany construction design processes in their future career. By carrying					
	out, evaluating and analysing experiments in small groups, students hone their					
	communication skills and capacity for teamwork.					
	5.2 Course content					
	Special heat treatment processes					
	Material behaviour under dynamic loads Corrective and tribelegiest meterial stress					
	 Corrosive and tribological material stress Steel selection on the basis of hardenability 					
	• Construction steels					
	Corrosion-resistant steels					
	• Tool steels					
	Cast iron materials					
	• Light metals					
	Engineering plastics					
	Sliding and bearing materials					
	→ 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 on your knowledge from Materials Engineering I, you now deal with more specific steel and					
	plastic materials. You also learn about finishing processes, and are able to select suitable materials					
	for technical applications.					
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 Regular participation in the practical course and recognition of associated work					
	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.					
	7.1 Languages used in the module:					
	🛛 German 🗌 English 🗌 Other, namely:					
	7.2 Module Contact Person:					
	DrIng. Miriam Laubrock					
	7.3 Professors (optional):					
	DrIng. Miriam Laubrock					
	7.4 Maximum number of participants (optional)					
	.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)					

1.1 Title of module (GER / ENG) Mathematik 1 / Mathematic	s 1		1.2 Sho (option	ort description al)	1.3 Module co MB.1.0082	· · · · · · · · · · · · · · · · · · ·	
2.1 Cycle of module: ☐ Every summer semester ⊠ Ev Other cycle, namely:	very winter semester			ation of module: mester 🗌 2 semes	ters		
3.1 Module offered in the following degree programme(s):				ompulsory (C), bulsory elective (CE), ive (E)			
Bachelor`s programmes	:						
Mechanical Engineering -				С	1		
International Engineering (Outgoings)				0	•		
Mechanical Engineering - International Engineering (Incomings)							
Mechanical Engineering - Specialisation in Plant Engineering				С	1		
Mechanical Engineering -				С	1		
Specialisation in Automoti	ve and Drive Engineering			<u> </u>			
Mechanical Engineering - Specialisation in Construction and Manufactoring Technology				С	1	1	
Computer Science in Mechanical Engineering				C 1			
	Engineering majoring in Me	chanical	C C		1		
Mechanical Engineering (dual study)			C 1			
Workload				•			
					Total wor	kload	
	Method of teaching	Hours per per semes (SWS) for method of teaching	ster each	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	Lecture	4		60			
(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 90			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work preparation for the examination	,		150	- 240	8	
	Total			Total non- contact hours 150	-		

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 define the concept of convergence, and determine the limits of sequences, series and functions. They will also be able to compute Taylor polynomials of functions, and to use them in the context of application. Students will apply the solution theory to linear systems of equations, and will be able to recognise the relationships between the rank, invertibility, regularity and singularity of square matrices, and to assess them in the relevant context. Students will be able to implement typical approaches and thought patterns in the abstraction, analysis and solution finding of problems.

5.2 Course content

Calculus:

Discrete mathematics, sequences, series, convergence, the concept of limits, algebraic and transcendental functions, the concept of continuity, real scalar differential calculus including applications, power series, Taylor expansion and approximation, real scalar integral calculus

Linear algebra:

Algebraic structures, residue classes, complex numbers, polynomials, factorisation, partial fraction decomposition, linear systems of equations and matrices, Gaussian algorithm, matrix product, vector spaces, matrix inversion, regular and singular matrices → 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.

Maths is a key element of your degree and profession. In this module, you start by laying the foundation and gaining the basic knowledge required to understand the laws of technical phenomena and to describe them mathematically.

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

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. rer. nat. L. Göllmann

7.3 Professors (optional):

Professor Dr. rer. nat. L. Göllmann, Professor Dr.-Ing. J. Korn,

Lecturer Dipl.-Math. M. Kumfert, D. Paluch M.Sc.

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 GÖLLMANN, L., et al. Mathematik für Ingenieure, Band 1 + 2, Springer Verlag LABUCH, D., Aufgaben zur Linearen Algebra. B. G. Teubner Stuttgart Leipzig PAPULA, L., Mathematik für Ingenieure und Naturwissenschaftler. Band 1 – 3, Vieweg PAPULA, L., Mathematik für Ingenieure und Naturwissenschaftler. Übungen. Vieweg

Mathematics II (Module **not** valid for enrolment from WiSe 21/22 onwards)

1.1 Title of module (GER / ENG) Mathematik II / Mathematics II			1.2 Sh (optio	ort description nal)	1.3 Module co MB.1.0084	
2.1 Cycle of module: ☑ Every summer semester □ Every win Other cycle, namely:				ration of modul emester 🗌 2 se		
3.1 Module offered in the following degree	e programme(s):		comp	ompulsory (C), ulsory elective elective (E)	3.3 Recomme semester:	ended
Bachelor`s programmes:						
Mechanical Engineering -	in an)					
International Engineering (Outgo Mechanical Engineering -	lings)					
International Engineering (Incom	ninas)					
Mechanical Engineering -				•		•
Specialisation in Plant Engineeri	ng			С		2
Mechanical Engineering -						
Specialisation in Automotive and	I Drive Engineering					
Mechanical Engineering -				•		•
Specialisation in Construction ar	-	ology		C		2
(General Mechanical Engineerin Computer Science in Mechanica				С		2
Business Administration & Engir	<u> </u>	anical		U		2
Engineering	leening majoring in Meen	anicai				
Mechanical Engineering (dual st	udy)			С		2
Workload	•				Tetel	ldee d
	Mathead of too alive	Harmana			Total wor	
	Method of teaching	Hours per per seme: (SWS) for method o teaching	ster each	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	Lecture	4		60		
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case	Exercise	2		30		
study, simulation game, credited tutorial (more rows can be added)						
	Total	Total contac in SWS	ct hours	Total contact hours in hours 90		
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination			120	210	7
	Total			Total non- contact hours 150		

After successful completion of the module, students will be able to apply the basics of integral calculus. Using differential and integral calculus, they will be able to transfer relationships of the type A=BC to situations in which B is a function of C. They will be able to implement the foundations of multidimensional analysis, and will be able to use the gradient and the Hessian matrix to determine extreme values of scalar fields. Students will also be able to carry out the linear-quadratic approximation of adequately smooth functions of several variables. In addition, students will be able to solve initial value problems of linear differential equations. They will also be conversant with the basics of spectral theory, and will be able to determine eigenvalues and eigenspaces of square matrices. Students will be able to implement typical approaches and thought patterns in the abstraction, analysis and solution finding of problems.

5.2 Course content

Calculus:

Multidimensional real differential calculus, space curves, scalar fields, vector fields, tangential vectors, gradient, Jacobian matrix, total differential, Hessian matrix, Laplace operator, diffusion equations, partial differential equations, multidimensional Taylor approximation, unrestricted nonlinear optimisation problems, multiple integrals, line integrals, cyclic integrals, ordinary differential equations, initial value problems, elementary solution methods, linear differential equation systems, variation of parameters, scalar differential equations of the nth order, Laplace transform

Linear algebra:

Determinants, kernel and image of a matrix, dimension and the concept of a basis, linear maps, geometry of linear maps, symmetric matrices, the concept of definiteness, rotation matrices, cross product, scalar triple product, eigenvalues and eigenvectors, spectral theorem and principal axis theorem

→ 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, you enhance your basic knowledge of mathematics. This enables you to solve technical issues independently, down to the smallest detail.

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.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. rer. nat. L. Göllmann

7.3 Professors (optional):

Professor Dr. rer. nat. L. Göllmann, Lecturer

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 GOLLMANN, L., et al. Mathematik für Ingenieure, Band 1 + 2, Springer Verlag GÖLLMANN, L., Henig Ch., Arbeitsbuch zur Linearen Algebra, Springer Verlag LABUCH, D., Aufgaben zur Linearen Algebra. B. G. Teubner Stuttgart Leipzig PAPULA, L., Mathematik für Ingenieure und Naturwissenschaftler. Band 1 – 3, Vieweg PAPULA, L., Mathematik für Ingenieure und Naturwissenschaftler - Ubungen. Vieweg

1.1 Title of module (GER / ENG Mathematik 2 / Statisti			1.2 Short descriptio (optional)	n 1.3 Module co MB.1.0086	· · · · ·
Mathematics 2 / Statist	tics				
2.1 Cycle of module:			2.2 Duration of mod		
Every summer semester	Every winter semester		🛛 1 semester 🗌 2 s	semesters	
Other cycle, namely: 3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		nded semester
Bachelor`s programme	25.				
Mechanical Engineering					
International Engineerin			С		2
Mechanical Engineering					
International Engineerin					
Mechanical Engineering					
Specialisation in Plant E			С		2
Mechanical Engineering	<u> </u>				
	ptive and Drive Engineeri	na	С		2
Mechanical Engineering		ng			
	uction and Manufactoring	Technology	С		2
Computer Science in Me	¥	recimology	С		2
	& Engineering majoring	in Mochanical	_		2
Engineering			С		2
Mechanical Engineering	(dual study)		С		2
Workload			.		-
				Total wo	rkload
	Method of teaching	Hours per week p semester (SWS) f each method of teaching		Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who numbers only
Contact hours	Lecture	4+2	60+30		
(e.g. lecture, seminar, practical course, practical period/internship,	Exercise	2+1	30+15	-	
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		
81 / · · I			135	_	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		135 75	210	7
(e.g. tutorial, preparation, follow-up work, preparation for assignments	work, preparation for the			210	7
(e.g. tutorial, preparation, follow-up work, preparation for assignments	work, preparation for the examination		75	210	7
(e.g. tutorial, preparation, follow-up work, preparation for assignments	work, preparation for the			210	7

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 apply the basics of integral calculus. Using differential and integral calculus, they will be able to transfer relationships of the type A=BC to situations in which B is a function of C. They will be able to implement the foundations of multidimensional analysis, and will be able to use the gradient and the Hessian matrix to determine extreme values of scalar fields. Students will also be able to carry out the linear-quadratic approximation of adequately smooth functions of several variables. In addition, students will be able to solve initial value problems of linear differential equations. They will also be conversant with the basics of spectral theory, and will be able to determine eigenvalues and

eigenspaces of square matrices. Students will be able to implement typical approaches and thought patterns in the abstraction, analysis and solution finding of problems. Moreover, students will be able to create their own context-based statistical analyses, as well as interpret and critically question statistical analyses carried out by third parties. Students will apply fundamental mathematical-statistical methods, and transfer them to other tasks. This will particularly enable them to expand on their mathematical/analytical skills. In addition, students will also improve their communication skills by tackling tasks in small groups. Finally, the module gives students the opportunity to enhance their general willingness to learn by expanding their basic knowledge. The specialist knowledge taught in the Mathematics II / Statistics module is a solid basis for getting to grips with new fields of activity not only in the further course of the programme, but also after graduation. Last but not least, students will be able to develop the basis for subsequent postgraduate education. 5.2 Course content Calculus: Multidimensional real differential calculus, space curves, scalar fields, vector fields, tangential vectors, gradient, Jacobian matrix, total differential, Hessian matrix, Laplace operator, diffusion equations, partial differential equations, multidimensional Taylor approximation, unrestricted nonlinear optimisation problems, multiple integrals, line integrals, cyclic integrals, ordinary differential equations, initial value problems, elementary solution methods, linear differential equation systems, variation of parameters, scalar differential equations of the nth order, Laplace transform Linear algebra: Determinants, kernel and image of a matrix, dimension and the concept of a basis, linear maps, geometry of linear maps, symmetric matrices, the concept of definiteness, rotation matrices, cross product, scalar triple product, eigenvalues and eigenvectors, spectral theorem and principal axis theorem

Statistics:

Distinction between descriptive, inductive and explorative statistics, sequence of a statistical analysis, preparation of empirical data, basic concepts of combinatorial analysis, chance and probability, foundations of probability distributions, special probability distributions, parameter estimations, parameter and distribution tests, measurement errors and error propagation, correlation and regression

Different weighting is given to the aforementioned statistics topics at the advanced stage. Module content is systematically developed and taught in a structured manner with the involvement of students.

 \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 your basic knowledge from the first semester, you enhance your mathematical expertise. You deal with technical tasks in even greater detail, and solve them independently.

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 C English Other, namely: 7.2 Module Contact Person:

Prof. Dr. rer. nat. L. Göllmann, Prof. Dr. rer. nat. M. Geisler

7.3 Professors (optional):

Prof. Dr. rer. nat. L. Göllmann, Prof. Dr. rer. nat. M. Geisler

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. et al., Mathematik für Ingenieure, Band 1 + 2, Springer Verlag GÖLLMANN, L., Henig Ch., Arbeitsbuch zur Linearen Algebra, Springer Verlag LABUCH, D., Aufgaben zur Linearen Algebra. B. G. Teubner Stuttgart Leipzig PAPULA, L., Mathematik für Ingenieure und Naturwissenschaftler. Band 1 – 3, Vieweg PAPULA, L., Mathematik für Ingenieure und Naturwissenschaftler - Übungen. Vieweg RINNE, H., Taschenbuch der Statistik. Harri Deutsch

Measurement Technology

1.1 Title of module (GER / ENG Messtechnik / Measure			1.2 Short description (optional)	1.3 Module o MB.1.008	ode (from HIO) 8
2.1 Cycle of module: ☐ Every summer semester ⊠ Other cycle, namely:	Every winter semester		2.2 Duration of modu ☑ 1 semester ☐ 2 s		
3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recomm	ended semeste
Bachelor`s programm	es:				
Mechanical Engineering					
International Engineerin	g (Outgoings)				
Mechanical Engineering International Engineerin			CE	2	2. GS
Mechanical Engineering Specialisation in Plant E	-		CE	3	3 o. 5
Mechanical Engineering	-		CE	:	3 o. 5
Mechanical Engineering	otive and Drive Engineering			-	3 0. 5
0 0	- uction and Manufactoring Tec	abaalaay	CE		50.5
Computer Science in Me	<u> </u>	Shnology	CE		5
	¥ ¥	lachanical	<u> </u>		5
Engineering	& Engineering majoring in M	lechanical	CE		5
Mechanical Engineering	(dual study)		CE		NiSe
Workload				Total wo	
	Method of teaching	Hours per week	Hours per	Vorkload in	ECTS (credit
		per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	otal contact and ion-contact hours	points) 30 hrs usually correspond to 1 credit point; who numbers only
Contact hours e.g. lecture, seminar, practical	Seminaristic Lecture	2	30		
course, practical period/internship,	Exercise	1	15		
group work, project work, case study, simulation game, credited tutorial	Broatical pariod	2	30		
more rows can be added)	Practical period	2	30		
	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, follow-up work, preparation for the examination		75	150	5
	Total		Total non- contact hours 75		
acquire soft skills in addition to techni relevant?) After successful comp signals mathematicall	s (What should students be able to do after ha cal skills? For which other modules and prosp pletion of the module, stude y, evaluate them using erro familiar with the concept of	ective tasks in the la ents are able r measures a	to describe me and improve the	asurement	skills

Through the exercise and the practical course the theoretical basics from the lecture are deepened and in particular the safe handling of Jupyter notebooks (Python) is acquired.

5.2 Course content
Stochastic signals
 Measurement systems and measurement errors
 State space description
 System theoretical description of measurement systems
State observers
 Sensor fusion: Complementary and Kálmán filters
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 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. Information about the underlying system is required in particular for control engineering applications. You are able to process measurement signals for this purpose and to provide interna (non-measurable) system state information.
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:) Mathematics 2
Recommended: Closed Loop Control (should be attended in parallel or already completed),
Programming Basics
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).*
We will find the Examination Devulations of all degree programmes in the official energy sector of ELLMA sector by the structure the
*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.
muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: Image: Im
muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: Image: Ima
muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: Image: Ima
muenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. 7.1 Languages used in the module: Image: Ima

Mechanics of Materials and Dynamics (Module **not** valid for enrolment from WiSe 21/22 onwards)

1	1.1 Title of module (GER / ENG Elastostatik und Dyna	mik /		1.2 Short description (optional)	1.3 Module cod MB.1.0026	de (from HIO)
	Mechanics of Material	s and Dynamics				
2	2.1 Cycle of module:	Every winter semester		2.2 Duration of modu ⊠ 1 semester □ 2 set		
	Other cycle, namely:	-				
3	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recommer	ided semester:
	Bachelor`s programm	es:				
	Mechanical Engineering					
	International Engineerir					
	Mechanical Engineering					
	International Engineering					
	Mechanical Engineering					
	Specialisation in Plant			С	2	
	Mechanical Engineering	<u> </u>				
		otive and Drive Engineeri	na			
	· · · ·		ng		-	
	Mechanical Engineering	y - ruction and Manufactoring	Taabaalaay	с	2	
	(General Mechanical E		rechnology	C	2	
	Computer Science in M	<u> </u>			-	
		<u> </u>	in Machanical			
		n & Engineering majoring	in mechanical			
	Engineering					
Л	Mechanical Engineering	g (dual study)				
	WORNDau				Total wor	kload
		Method of teaching	Hours per week	Hours per semester	Workload in	ECTS (credit
			per semester (SWS) for each method of teaching	-	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	Lecture	4	60		
	course, practical period/internship, group work, project work, case	Exercise	4	60		
	study, simulation game, credited					
	tutorial (more rows can be added)					
		Total	Total contact hours in SWS	Total contact hours in hours 120		
Í		Preparation, follow-up work			300	10
1	and homework, research, etc.)	preparation for the				
1		examination				
		Total		Total non-contact		
1	1			hours 180		

Mechanics of materials:

After successful completion of the module, students will be able to demonstrate the basic methodological approach for solving problems related to mechanics of materials. They will be able to determine tensile and compressive stresses, bending stresses, torsional stresses and transverse shear stresses in building components. Concerning the "buckling" stability problem, students will know how to analyse the actual system, refer to a case of buckling, and calculate buckling stresses. Students will be able to determine component deformations and formulate deformation approaches in order to investigate statically indeterminate systems. Students will be able to derive abstract mechanical models from practice-related problems of mechanical engineering, and to interpret and critically assess their own results. They will also be able to name the limitations of the calculation models presented. The specialist solution strategies gained are the basis for understanding advanced study elements, and can be transferred to related engineering subjects such as machine elements, construction design and finite elements. In addition, they are an essential precondition for enabling students to design machinery and its components correctly in terms of load in their later professional environment. Dynamics:

After successful completion of the module, students will be able to demonstrate the basic methodological approach for solving dynamic problems. They will be able to determine position, velocity and acceleration vectors for mass points and for random points on rigid bodies in plane motion. They will be able to investigate the interaction between the motion of a body and the action of force on that body using the fundamental law of dynamics, the energy theorem and law of conservation of energy, or the principle of linear and angular momentum. Students will be able to derive abstract mechanical models from practice-related problems of mechanical engineering, and to interpret and critically assess their own results.

The specialist solution strategies gained are the basis for understanding advanced study elements, and can be transferred to related engineering subjects such as machine elements, construction design and gear technology. In addition, the solution strategies are an essential precondition for enabling students to determine motion sequences in machinery in their later professional environment, and to create products that meet kinematic and kinetic requirements.

5.2 Course content

Mechanics of materials:

- Tensile and compressive stresses, surface pressure
- Bar deformations, statically indeterminate bar systems
- Moments of inertia of area
- Straight and general bending
- Torsion of circular and circular-ring cross-sections; torsion of open and closed thin-walled crosssections
- Transverse shear stress of the full cross-section and of thin-walled cross-sections
- Shear centre
- Uniaxial and multiaxial stress and deformation states, influence of temperature
- Composite stresses
- · Euler buckling cases, buckling theory according to Tetmajer

Dynamics:

Kinematics of the mass point

- Kinetics of the mass point
- Kinematics of a rigid body in plane motion
- Relative kinematics
- Kinetics of a rigid body in plane motion
- · Kinetics of the point mass system
- Impact laws
- · Oscillations with one degree of freedom

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. Building on your knowledge of statics, you now progress to deformation and stress states, as well as dynamic processes. The knowledge gained enables you to create an important knowledge base for subsequent modules.

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

2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active inticipation)
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 minute
r a term paper (approx. 10 pages)
4 Requirements for admission to examination
ee current version of the Examination Regulations / special examination rules and regulations
5 Module mark weighting for calculating final grade
ee 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- uenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
1 Languages used in the module:] German 🗌 English 🗋 Other, namely:
2 Module Contact Person:
rofessor DrIng. J. Korn
3 Professors (optional):
rofessor DrIng. J. Korn
4 Maximum number of participants (optional)
5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
ecommended reading:
ecture notes;
ankert, H. / Dankert, J.: Technische Mechanik, Teubner Verlag

1.1 Title of module (GER / ENG) Modellbildung und Simul Modeling and Simulation			1.2 Short descriptio (optional)	n 1.3 Module c MB.1.019	ode (from HIO)
2.1 Cycle of module: ☐ Every summer semester ⊠ Other cycle, namely:	Every winter semester		2.2 Duration of mod ⊠ 1 semester □ 2		
3.1 Module offered in the follow	ing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester:
Bachelor`s programme	es:				
Mechanical Engineering					
International Engineering					
Mechanical Engineering			CE		2. GS
International Engineering			ŰL.		
Mechanical Engineering			CE	3	3 o. 5
Specialisation in Plant E			02		
Mechanical Engineering			CE	3	3 o. 5
•	tive and Drive Engineering		02		
Mechanical Engineering			CE	3	3 o. 5
•	ction and Manufactoring Tec	hnology			
Computer Science in Me	<u> </u>		С		5
	& Engineering majoring in M	echanical			
Engineering					
Mechanical Engineering	(dual study)		CE		NiSe
Workload				Total wo	rkload
			1		
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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	Seminaristic Lecture	2	30		
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study.	Exercise	1	15		
simulation game, credited tutorial (more rows can be added)	Practical course	2	30		
	Total	Total contact hours SWS	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, follow-up work, preparation for the examination		75	150	5
	Total		Total non- contact hours 75 module? Does the modu		

After successful completion of the module, students will be able to apply mathematical modelling approaches for dynamic systems which are most relevant to practice. Besides that they learn to apply numerical algorithms to find solutions. In combination with simulation approaches and tools the students will be capable to build up such models (especially in the domain of mechanical engineering), to analyse and present them. They can apply numerical optimization methods to practical problems.

	5.2 Course content
	Basics of modelling and simulation
	Graphical modelling with SIMULINK
	 From model towards differential equation system (Lagrange's equations)
	 Oscillations (Fourier series and discrete Fourier transform)
	 Queueing theory, cellular automatons
	Modelling with neural networks
	 Local and global optimization problems as well as tools for their solution
	and a S and F and
	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. Industrial tasks are becoming increasingly complex, and can only be solved with the use of
	computers. It is therefore all the more important for you to be proficient in mathematical systems
	and simulation methods.
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
Ő	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 examination, term paper, presentation, portiono, rengin or examination in 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	7.1 Languages used in the module:
ſ	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)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

Numerical Software

1.1 Title of module (GER / ENG) Numerik Software / Nume			1.2 Short description (optional)	n 1.3 Module c MB.1.009	
2.1 Cycle of module: ☐ Every summer semester ⊠ Other cycle, namely:	Every winter semester		2.2 Duration of mod ⊠ 1 semester □ 2 s		
3.1 Module offered in the follow	ing degree programme(s):		3.2 Compulsory (C) , compulsory elective (CE) , elective (E)		ended semeste
Bachelor`s programme	es:				
Mechanical Engineering	-				
International Engineering	g (Outgoings)				
Mechanical Engineering			CE	2	. GS
International Engineering	g (Incomings)		0L		
Mechanical Engineering			CE	3	o. 5
Specialisation in Plant E			UL		
Mechanical Engineering			CE	3	o. 5
Specialisation in Automo	otive and Drive Engineering		UL		
Mechanical Engineering			CE	3	o. 5
Specialisation in Constru	uction and Manufactoring Tec	hnology			
Computer Science in Me			С		5
Business Administration	& Engineering majoring in M	echanical			
Engineering					
Mechanical Engineering	(dual study)		CE	V	ViSe
Workload				Telelous	
		•		Total wo	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for each method of	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who numbers only
Contact hours (e.g. lecture, seminar, practical	Seminaristic Lecture	2	30		
course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Practical course	2	30		
(more rows can be added)					
	Total	Total contact hours SWS	in Total contact hours in hours 60	450	_
	Total Preparation, follow-up work, preparation for the examination		hours in hours	150	5

After successful completion of the module, students will be able to assess numerical solution methods and implement them in an application-related manner using standard numerical software. This will enable them to solve relevant interdisciplinary issues in their professional work.

	 5.2 Course content Introduction to the theory of numerical analysis (error calculation, condition, calculation of
	roots)
	 Introduction to the main features of a numerical software program (MATLAB / Octave)
	• Creation of 2D and 3D graphics and animations
	• Development and use of scripts and modules
	Introduction to theory of numerics
	Solution methods for differential equations
	• Numerical differentiation, integration, regression
	rumencal unterentiation, integration, regression
	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. Many technical problems can be solved using mathematical models. Calculators are often limited in
	their ability to handle such problems. In such cases, you use numerical methods.
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
	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
	ordents 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)
	C 4 Dequirements for admission to even instign
	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.
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	7.1 Languages used in the module:
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	⊠ German □ English □ Other, namely:
	German English Other, namely: 7.2 Module Contact Person: Professor DrIng. S. Behr 7.3 Professors (optional): Contact Person:
	☑ German □ English □ Other, namely: 7.2 Module Contact Person: Professor DrIng. S. Behr 7.3 Professors (optional): Professor DrIng. S. Behr
	German English Other, namely: 7.2 Module Contact Person: Professor DrIng. S. Behr 7.3 Professors (optional): Contact Person:
	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) Professor
	☑ German □ English □ Other, namely: 7.2 Module Contact Person: Professor DrIng. S. Behr 7.3 Professors (optional): Professor DrIng. S. Behr

Set of slides used in the lecture

Object-oriented programming

1.1 Title of module (GER / ENG) Objektorientierte Program	nmierung /		1.2 Short description (optional)	1.3 Module c MB.1.019	ode (from HIO) 9
Object-oriented program 2.1 Cycle of module:			2.2 Duration of modu ⊠ 1 semester □ 2 s		
Other cycle, namely: 3.1 Module offered in the follow	ving degree programme(s):	(3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recomm	ended semeste
Bachelor`s programme	25:		(02), 01001110 (2)		
Mechanical Engineering					
International Engineering					
Mechanical Engineering			07		
International Engineering			CE	2	2. GS
Mechanical Engineering			07	3	3 o. 5
Specialisation in Plant E			CE		
Mechanical Engineering	<u> </u>		07	3	3 o. 5
0 0	otive and Drive Engineering		CE		
Mechanical Engineering			07	3	3 o. 5
	uction and Manufactoring Tec	chnology	CE		
Computer Science in Me			С		3
	& Engineering majoring in M	lechanical			-
Engineering					
Mechanical Engineering	(dual study)		CE	1	NiSe
Workload					
				Total wo	orkload
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for h each method of	Vorkload in ours otal contact and on-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who numbers only
Contact hours	Seminaristic Lecture	2	30		
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Practical course	3	45		
	Total	Total contact hours SWS	in Total contact hours in hours 75		
(a district proparation follow up	Preparation, follow-up work, preparation for the examination		75	150	5
	Total		Total non- contact hours 75		
acquire soft skills in addition to technic relevant?)	s (What should students be able to do after has a skills? For which other modules and prosp	ective tasks in the latents will be al	bour market are the acqui	complex	

Relevant methods of software development are trained.

-	
	5.2 Course content
	 Basic elements of object-oriented thought
	 Object-oriented formulation of algorithms
	 Syntax and semantics of object-oriented programming languages
	Development environments
	Integration of external libraries
	0
	Error detection and prevention
	 Software development in a team
	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.
	Building on the Foundations of Programming module, you now use a more sophisticated
	programming language to handle even complex projects.
_	
0	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
	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)
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7	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 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 all degree programmes in the official announcements of FH Münster: https://www.fh-
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7	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 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):
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7	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: ③ German □ English □ Other, namely: 7.2 Module Contact Person: Professor DrIng. S. Behr 7.3 Professors (optional): Professor DrIng. S. Behr

1.1 Title of module (GER / ENG Physik / Physics	3)		1.2 Short descriptio (optional)	n 1.3 Module c MB.1.009	
2.1 Cycle of module: ☐ Every summer semester [2 Other cycle, namely:	S Every winter semester		2.2 Duration of mod ⊠ 1 semester □ 2		
3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester
Bachelor`s programm	les:				
Mechanical Engineering	g -		С		1
International Engineerir	ng (Outgoings)				
Mechanical Engineering					
International Engineerir	ng (Incomings)				
Mechanical Engineering			С		1
Specialisation in Plant I	<u> </u>				
Mechanical Engineering	g -		С		1
Specialisation in Autom	notive and Drive Engineering				
Mechanical Engineering			С		1
Specialisation in Consti	ruction and Manufactoring Tec	chnology			
Computer Science in M	lechanical Engineering		С		1
Business Administration	n & Engineering majoring in M	echanical	С		1
Engineering					
Mechanical Engineering	g (dual study)		С		1
Workload					
		•		Total wo	
	Method of teaching	Hours per week per semester	Hours per semester for	Workload in hours	ECTS (credit points)
		(SWS) for each	each method of	Total contact and	30 hrs usually
		method of	teaching	non-contact hours	correspond to 1 credit point; whole
		teaching	(usually the number of hours per week		numbers only
			multiplied by 15)		
Contact hours (e.g. lecture, seminar, practical	Lecture	3	45		
course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	Exercise	2	30		
	Total	Total contact hours in SWS	hours in hours		
			75	100	6
Non-contact hours (e.g. tutorial, preparation, follow-up	Preparation, follow-up work,		105	180	6
work, preparation for assignments	preparation for the				
	examination				
and homework, research, etc.)					
	Total		Total non-		

After successful completion of the module, students will be able to demonstrate basic knowledge of physical quantities and relations. This is necessary as a basis for proceeding with the engineering programme. Simple physical problems from the fields of mechanics, oscillations and waves can be analysed methodologically, in order to develop solution methods from them and to implement them quantitatively.

After actively participating in the exercise class, students will be able to transfer the specialist knowledge gained in the lectures to practical examples, enabling them to gain a profound understanding of the content. In addition, students will be able to formulate and present the

ults generated to suit the target group. Group work will strengthen students' capacity for mwork and communication skills.	r
Course content e following concepts are addressed: physical quantities and units, measuring physical	
antities, kinematics and dynamics of mass points and rigid bodies, work, power, energy, mentum, kinematics and dynamics of oscillating bodies, the basic concepts of waves, a	
Indations of hydrostatics and hydrodynamics. Particular emphasis is placed on applying laws of conservation to solve physical problems. The lectures and exercise classes	
Iude experiments involving students to illustrate the subject matter.	
Short information about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in sister to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the hodule for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid tec	he relevance of the hical terms.
u address simple physics problems, giving you a basic understanding of physical relatio pecially in the areas of mechanics and vibrations. This gives you an important knowledge	
ur further studies.	
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 kn should have been acquired:) ne	owledge and
Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular accipation)	ctive
idents must pass the examination	
Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes	
e module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 a term paper (approx. 10 pages)	minutes)
Requirements for admission to examination e current version of the Examination Regulations / special examination rules and regulati	ions
Module mark weighting for calculating final grade	
e 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- nster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module:	
German 🗌 English 🔲 Other, namely: Module Contact Person:	
of. DrIng. J. Hartleb (BaMB), Prof. DrIng. A. Komainda (BaMBI, BaMB-D, BaMB-W)	
Professors (optional): of. DrIng. A. Komainda (BaMB: Representation in WiSe 23/24, BaMBI, BaMB-D, BaMB-W))
Maximum number of participants (optional)	·
Further information (optional) (e.g. recommended reading, other persons involved, etc.) commended reading:	
lliday, Resnick, Walker;	
/sik, Bachelor Edition; Wiley-VCH, 2007; ISBN: 978-3-527-40746-0	
n coli, Douglas C.; /sik; Person Studium, 3rd edition 2006, ISBN-13: 978-3-8273-7157-7, ISBN-10: 3-8273-7157-0	
b ach, Johannes; /sik für Bachelors; Fachbuchverlag Leipzig (Hanser), ISBN 978-3-446-40787-9	
chling, Horst; schenbuch der Physik; Fachbuchverlag Leipzig (Hanser), ISBN 3-446-18692-1	
rz, Günther; Hübner, Heide;	
ıfungs- und Testaufgaben zur Physik; Mechanik - Schwingungslehre – Wärmelehre; Fachbuchverlag Inser), 2008, ISBN 978-3-446-40710-7 . da am	j Leipzig
dner; _/ sikalische Aufgaben; Fachbuchverlag Leipzig (Hanser), ISBN-10: 3446224262, ISBN-13: 978-3446	224261

11.1 The of module (GER / ENG) 1.3 Short description 1.3 Short description 1.4 Module code (non HIO): MB.1.0012 21.3 Crade dimension 2.2 Duration of module: 2.3 Duration of module: 2.3 Duration of module: 23.1 Module code (non HIO): MB.1.0012 3.3 Recommended semester: 2.3 Duration of module: 3.3 Recommended semester: 23.1 Module coffered in the following degree programme(s): 3.3 Recommended semester: 3.3 Recommended semester: 35.1 Module coffered in the following degree programme(s): 3.3 Recommended semester: 3.3 Recommended semester: Mechanical Engineering - International Engineering - International Engineering - Specialisation in Plant Engineering - Specialisation in Automotive and Drive Engineering CE (PL) 2. GS Mechanical Engineering - Specialisation in Construction and Manufactoring Technology Computer Specialisation in Automotive and Drive Engineering Engineering Mechanical Engineering (dual study) International Engineering (dual study) International engineering ECTS (credit motive and Drive Engineering North Street and Street	-		-				
Bachelories Engineering Project 2.2 Duration of module: 21 Cycle of module: 2.2 Duration of module: 2.2 Duration of module: 21 Cycle of module: 2.2 Duration of module: 3.3 Recommended semester 21 Studie of module: 2.2 Computery (IC) 3.3 Recommended semester: 21 Studie of module: 2.2 Duration of module: 3.3 Recommended semester: 21 Studie of module: 2.4 Computery (IC) 3.3 Recommended semester: 31 Module of theorem CE (PL) 2.6 GS Bachelor's programmes: Mechanical Engineering - CE 3 o. 5 Specialisation in Plant Engineering - CE 3 o. 5 Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Construction and Manufactoring Technology Specialisation in Construction and Manufactoring In Mechanical Engineering - Specialisation in Construction and Manufactoring in Mechanical Engineering - Specialisation in Construction and Manufactoring in Mechanical Engineering - Specialisation in Construction and Manufactoring in Mechanical Engineering - Specialisation in Construction and Manufactoring in Mechanical Engineering - Specialisation in Construction and Manufactoring in Mechanical Engineering - Specialisation in Construction and Manufactoring in Mechanical Engineering - Specialisa	1						· · · · · ·
21 Cycle of module: Every summer semester CD twery winter semester CD terrecycle, namely: 2.2 Duration of module: CD semester: CD semesters 3.1 Module offered in the following degree programme(s): 3.2 Compulsory (C) compulsory elective (CE), elective (E) 3.3 Recommended semester: CD semester: Bachelor's programmes: Mechanical Engineering - International Engineering (Outgoings) CE (PL) 2. GS Mechanical Engineering - International Engineering - Specialisation in Plant Engineering Specialisation in Automotive and Drive Engineering Specialisation in Automotive and Drive Engineering Specialisation in Automotive and Manufactoring Technology CE 3 o. 5 Computer Science in Mechanical Engineering - Specialisation in Construction and Manufactoring Technology Total workload Total workload Mechanical Engineering (dual study) International Engineering (dual study) Total workload Total workload Image rows, practical period period period work work, member of teaching Internation of teaching Hours per week Per semester (SWS) for each method of teaching Total workload Non-contact hours (eng. tectnat, presentation, follow-up work, preparation, follow-up work, preparation, follow-up work, preparation, follow-up work, preparation, follow-up work, preparation for sagements and homework, research user) Preparation, follow-up work Total non-contact hours					(optional)	MB.1.00	12
 Every summer sensetic I Every winter semester 3.1 Module offered in the following degree programme(s): 3.2 Compulsory(C), compulsory (c), compulsory deletive (E) 3.3 Compulsory (c), compulsory deletive (E) 3.4 Compulsory (c), compulsory deletive (E) 3.4 Compulsory (c), compulsory deletive (E) 4 CE (PL) 2.6 GS 4 Mechanical Engineering - international Engineering (nocomings) CE (PL) 2.6 GS 4 Mechanical Engineering - CE 3.6 CE (PL) 2.6 GS 4 Mechanical Engineering - CE 3.6 CE (PL) 2.6 GS Mechanical Engineering - CE (PL) 2.6 GS 4 Mechanical Engineering - Specialisation in Plant Engineering - Specialisation in Automotive and Drive Engineering 2 Specialisation in Construction and Manufactoring Technology Computer Science in Mechanical Engineering majoring in Mechanical Engineering 2 Secialisation & Engineering majoring in Mechanical Engineering weak per semester for each method of teaching 4 Mechanical Engineering (dual study) 4 Mechanical Engineering (not not seed to be added) 4 Method of teaching /ul>			Project				
Other cycle, namely: 3.3 Compulsory (C), compulsory elective (E) 3.3 Recommended semester: compulsory elective (E), elective (E) Bachelor's programmes: Bachelor's programmes: 3.3 Recommended semester: compulsory elective (E), elective (E) Bachelor's programmes: Bachelor's programmes: Bachelor's programmes: Mechanical Engineering - International Engineering (Incomings) CE (PL) 2. GS Mechanical Engineering - Specialisation in Plant Engineering - Specialisation in Automotive and Drive Engineering CE 3 o. 5 Specialisation in Automotive and Drive Engineering Specialisation in Construction and Manufactoring Technology Computer Science in Mechanical Engineering Computer Science in Mechanical Engineering Mechanical Engineering - Specialisation in Construction and Manufactoring Technology Total workload Total workload Mechanical Engineering (dual study) Image: Study of the sching for each method of teaching for go, but sense sender for each method of teaching for go, but sender the sender for each method of teaching for go, but sender the sender for each method of teaching for go and the sender for each method of teaching for go and the sender for each method of teaching for go and the sender for each method of teaching for go and the sender for each method of teaching for go and the sender for each method of teaching for go and the sender for each method of teaching for go and the sender for each method of teachin	2	2.1 Cycle of module:	Every winter semester				
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Mechanical Engineering - International Engineering (Outgoings) CE (PL) 2. GS Mechanical Engineering - Specialisation in Plant Engineering - Specialisation in Automotive and Drive Engineering CE 3 o. 5 Mechanical Engineering - Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Construction and Manufactoring Technology Ce 3 o. 5 Computer Science in Mechanical Engineering Mechanical Engineering - Specialisation in Construction and Manufactoring Technology Specialisation in Construction and Manufactoring Technology Specialisation in Construction and Manufactoring Technology Computer Science in Mechanical Engineering Mechanical Engineering (dual study) Mechanical Engineering bits) Specialisation in Construction and Manufactoring Technology Mechanical Engineering - Business Administration & Engineering majoring in Mechanical Engineering Hours per week method of teaching Total workload Mechanical Engineering International Engineering Specialisation in Construction method of teaching Total contact and method of teaching Specialisation in Construction method of teaching Specialisation in Construction method of teaching Specialisation in Construction method of teaching Specialisation in Construction Specialisation in Construction Total Total contact hours in total contact hours in hours Specialisation in Construction Specinteaching Moreican ho	3	3.1 Module offered in the follow	ving degree programme(s):		compulsory electiv		nended semester:
International Engineering (Outgoings) CE (PL) 2. GS Mechanical Engineering - International Engineering (Incomings) CE (PL) 2. GS Mechanical Engineering - Specialisation in Plant Engineering - Specialisation in Automotive and Drive Engineering CE 3 o. 5 Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Construction and Manufactoring Technology		Bachelor`s programme	es:				
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International Engineering (Incomings) CE (PL) 2.033 Mechanical Engineering - Specialisation in Plant Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Construction and Manufactoring Technology CE 3 o. 5 Specialisation in Construction and Manufactoring Technology Computer Science in Mechanical Engineering Mechanical Engineering (dual study)		International Engineering	g (Outgoings)				
International Engineering (Incomings) CE (PL) 2.033 Mechanical Engineering - Specialisation in Plant Engineering Mechanical Engineering - Specialisation in Automotive and Drive Engineering Mechanical Engineering - Specialisation in Construction and Manufactoring Technology CE 3 o. 5 Specialisation in Construction and Manufactoring Technology Computer Science in Mechanical Engineering Mechanical Engineering (dual study)		Mechanical Engineering	-				2.06
Specialisation in Plant Engineering CE Mechanical Engineering - Specialisation in Automotive and Drive Engineering							2.65
Specialisation in Plant Engineering		Mechanical Engineering	-		05		3 o. 5
Specialisation in Automotive and Drive Engineering		Specialisation in Plant E	ingineering		CE		
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Specialisation in Construction and Manufactoring Technology		Specialisation in Automo	otive and Drive Engineeri	ng			
Computer Science in Mechanical Engineering Image: Computer Science in Mechanical Engineering majoring in Mechanical Engineering Business Administration & Engineering majoring in Mechanical Engineering Image: Computer Science in Mechanical Engineering (dual study) 4 Workload Total workload 4 Workload Method of teaching Hours per week per semester (SWS) for each method of teaching teaching Workload in hours per work in the semester for each nor-contact hours Fours per week method of teaching teaching So hours and the semester for each nor-contact hours in four semester for each method of teaching teaching So hours and the semester for each nor-contact hours in four semester for each nor-contact hours in project work, case study, simulation game, credited tutorial (more rows can be added) Image: Total contact hours in four semester hours in four semester hours in hours Total Total contact hours in four semester hours in hours Total contact hours in hours Non-contact hours (e.g. tutorial, preparation, follow-up work, research, etc.) Preparation, follow-up work, research, etc.) Preparation, follow-up work, research, etc.) Preparation follow-up work in hours Total contact hours in four contact hours Total Total Total contact hours in hours Total contact hours Total contact hours		Mechanical Engineering	-				
Business Administration & Engineering majoring in Mechanical Engineering Mechanical Engineering (dual study) Image: Construct of the study of the s		Specialisation in Constru	uction and Manufactoring	Technology			
Engineering Down of the content of		Computer Science in Me	echanical Engineering				
Mechanical Engineering (dual study) Total workload 4 Total workload Total workload in bours method of teaching Hours per week per semester (SWS) for each method of teaching Hours per semester for each method of teaching Best workload in bours method of teaching Contact hours orrespond to 1 credit point; whole number of hours per week method of teaching Hours per semester for each method of teaching Contact hours orrespond 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 contact hours in Total contact hours in swys Total contact hours in hours in hours Total contact hours in hours Non-contact hours (e.g. tutorial, preparation, follow-up work, presentation for asignments and homework, research, etc.) Preparation, follow-up work Preparation, follow-up work Total contact hours in hours Total non-contact hours 150 5		Business Administration	& Engineering majoring	in Mechanical			
4 Workload Total workload 6 Method of teaching Hours per week per semester (SWS) for each method of teaching fusually the number of hours per week multiplied by 15) Workload in hours Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, research, project work, case study, simulation game, credited tutorial (more rows can be added) Image: method of teaching for the second function of teaching for the second function of teaching for		Engineering					
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, research, etc.) Method of teaching Hours per semester (SWS) for each method of teaching Hours per semester (SWS) for each nethod of teaching Workload in hours method of teaching Workload in hours ECTS (credit points) 30 hrs usually correspond to 1 credit points Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, case study, simulation game, credited tutorial (more rows can be added) Image: Contact hours in Total Total contact hours in SWS Total contact hours in SWS Total contact hours in four seminary Non-contact hours (e.g. tutorial, preparation, follow-up work, research, etc.) Preparation, follow-up work Total contact hours in SWS Total contact hours 150 5		Mechanical Engineering	(dual study)				
Method of teaching Hours per week per semester (SWS) for each method of teaching Hours per semester for each method of teaching Workload in hours ECTS (credit points) Contact hours Image: Cont	4	Workload					
Per semester (SWS) for each method of teaching semester (semester (SWS) for each method of teaching semester for each method of teaching Total contact and non-contact hours Total contact and non-contact hours Contact hours [e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credite tituonial (more rows can be added)						Total w	
Image: Contract hours method of teaching teaching non-contact hours correspond to 1 credit point; whole number of hours per week multiplied by 15) Contact hours Contact hours Image: Contact hours <td></td> <td></td> <td>Method of teaching</td> <td>per semester</td> <td>semester for each</td> <td>hours</td> <td>points)</td>			Method of teaching	per semester	semester for each	hours	points)
Contact hours Image: Contact hours Image:				method of	teaching		correspond to 1
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) Image: Contact hours in the second state is a study of the second state is a stud				teaching	hours per week		
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Image: Course cour		Contact hours			multiplied by 15)		
group work, project work, case sludy, simulation game, credited tutorial (more rows can be added) Total Total Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.) Total To		(e.g. lecture, seminar, practical					
(more rows can be added) Image: Contact contact							
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.) Preparation, follow-up work Total contact hours in SWS Total contact hours in hours 150 5 Image: Non-contact hours Preparation, follow-up work Image: Non-contact hours Image: Non-c							
Non-contact hours Preparation, follow-up work, preparation for assignments and homework, research, etc.) Preparation, follow-up work Image: Content of the second se		(more rows can be added)					
Non-contact hours Preparation, follow-up work, preparation for assignments and homework, research, etc.) Preparation, follow-up work Image: Content of the second se			Total	Total contact hours in	Total contact		
Non-contact hours Preparation, follow-up work, preparation, follow-up work, preparation for assignments and homework, research, etc.) Preparation, follow-up work Image: Work work work work work work work work w			Total				
(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.) Total Total Total Total Total Total		Non-contact hours	Preparation follow up			150	5
and homework, research, etc.) written elaboration, presentation Total non-contact hours		(e.g. tutorial, preparation, follow-up	• • •				
presentation Total Total non-contact hours							
Total Total non-contact hours							
hours							
hours			Total		Total non-contact		
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					8		
	5	5.1 Intended learning outcomes	s (What should students be able to do a	after having completed the	module? Does the mode	ule provide the oppo	prtunity to

After successful completion of the module, students will be able to independently tackle a practice-based plant engineering assignment within the time allowed, using cross-module approaches. Students will be able to apply the basics and skills already learned on the course, and to transfer them to the problems at hand. Building on this, students will be able to develop the approach and implement it independently. In addition to executing the project, students will be able to formulate the approaches used and the results obtained in the form of a report, besides plausibly presenting the approaches and results, and explaining them in the context of a discussion.

The module content prepares students for the Bachelor thesis, which also involves independently 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 present technical issues with confidence.
5.2 Course content Group work (with a maximum of 4 students) or individual work over a maximum period of 2
months Cross-module assignments from the subject areas of the degree programme. Final presentation and discussion in the presence of the supervisor(s). The project assignment may originate from industry or from the university.
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.
Either alone or as part of a team, you independently tackle a realistic assignment from the field of process engineering within a set time. You use various approaches that you learned on your programme, preparing you for your Bachelor's thesis.
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) Written elaboration by the examination candidate (main body of text usually 15-20 pages); presentation followed by a discussion, 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.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. J. Scholz
7.3 Professors (optional): Lecturers on the Bachelor's programme in Mechanical Engineering, specialisation in Plant Engineering
7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

1.1 Title of module (GER / EN Verfahrenstechnik 1 / Process Technology			1.2 Short descriptio (optional)	n 1.3 Module c MB.1.013	ode (from HIO) 4
2.1 Cycle of module: Every summer semester [Other cycle, namely:			2.2 Duration of mod ⊠ 1 semester □ 2		
3.1 Module offered in the follo			3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester
Bachelor`s programm					
Mechanical Engineerin	0				
International Engineerin					
Mechanical Engineerin International Engineeri	0		C/CE	1	. GS
Mechanical Engineerin					
Specialisation in Plant			С		4
Mechanical Engineerin	<u> </u>		•-		
	notive and Drive Engineering		CE		4
Mechanical Engineerin			CE		4
Specialisation in Const	ruction and Manufactoring Tee	chnology	CE		4
	lechanical Engineering				
	n & Engineering majoring in N	lechanical	CE		4
Engineering					-
Mechanical Engineerin	g (dual study)		CE		SuSe
Workload				Total wo	rkload
	Method of teaching	Hours per week	Hours per	Workload in	ECTS (credit
		per semester (SWS) for each method of teaching	semester for	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	Seminaristic Lecture	3	45		
course, practical 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 contact hours in SWS	Total contact hours in hours 75	150	5
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, written elaboration		75		
	Total		Total non-		

relevant?)

After successful completion of the module, students will be able to describe process engineering plants and material systems on the basis of their main components and properties. They will be able to describe various unit operations of process engineering, particularly in the field of mechanical process technology, and place them in the process engineering context. As a result, students will be able to design systems and select, design and assess appropriate methods for solving a process engineering task. In addition, students will be able to independently generate, analyse, assess and present experimental data in the context of experiments.

	The module content enables students to assess the sub-processes of process engineering
	within machinery and apparatus, also in other technical fields, and hence to optimise their
	design and construction.
	The practical courses enable students to understand the implementation and assessment of
	process engineering processes. To achieve this, selected process engineering 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
	 Introduction to process engineering
	 Characterisation of material properties (particles, fluids and multiphase systems)
	 Selected unit operations and systems of process engineering (e.g. stirring, separation,
	filtration, grinding, bulk solids handling)
	\rightarrow 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
Ŭ	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.
	Process technology is used to change material properties or composition. You learn fundamentals
	of particle charcterization and of machine operation in mechanical process technology for different
	industrial applications.
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
	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:
1	⊠ German □ English □ Other, namely:
	7.2 Module Contact Person:
	Professor DrIng. J. Scholz
	7.3 Professors (optional):
	Professor DrIng. J. Scholz / DiplIng. M. Mangelmann
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
	Recommended reading:
	K. Schwister: "Taschenbuch der Verfahrenstechnik", 2nd edition, Hanser-Verlag, 2005
	W. Hemming, W. Wagner: "Verfahrenstechnik", 9th edition, Vogel-Verlag, 2004
	K. Schwister, V. Leven: "Verfahrenstechnik für Ingenieure", 1st edition, Hanser-Verlag, 2013
	Lecture notes and documentation relating to the practical course
I	

11.1 Title of module (GER / ENG)			1.2 She (option	ort description	1.3 Module co	
Verfahrenstechnik 2 / Process Technology 2			(optioi	141)	MB.1.0136	•
2.1 Cycle of module:			2.2 Du	ration of module		
🔲 Every summer semester 🛛 Every wi	nter semester		🛛 1 se	emester 🗌 2 ser	nesters	
Other cycle, namely: 3.1 Module offered in the following degree	ee programme(s):		compu	mpulsory (C) , Ilsory elective Ilective (E)	3.3 Recomme	ended semester:
Bachelor`s programmes:						
Mechanical Engineering -						
International Engineering (Outg	oings)					
Mechanical Engineering -				C/CE	2	GS
International Engineering (Incor	nings)			C76L	۷.	65
Mechanical Engineering -				С		5
Specialisation in Plant Enginee	ring			•		•
Mechanical Engineering -				CE		5
Specialisation in Automotive an	d Drive Engineering			_		-
Mechanical Engineering -	nd Manufactoring Tash	nology		CE		5
Specialisation in Construction a Computer Science in Mechanic		nology				
Business Administration & Engi	<u> </u>	hanical				
Engineering	neering majoring in med	lianicai		CE		5
Mechanical Engineering (dual s	tudv)			CE	N	/iSe
Workload						
					Total wor	kload
	Method of teaching	Hours pe per seme (SWS) for method c teaching	ester r each	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	Seminaristic Lecture	3		45		
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case	Exercise	1		15		
study, simulation game, credited tutorial (more rows can be added)	Practical course	1		15		
		-		10		
		T (1)				
	Total	Total conta in SWS	ct nours	Total contact hours in hours 75	150	5
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, written elaboration			75	150	5
	Total			Total non- contact hours 75		

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 have considerable expertise with regard to various unit operations of process engineering, especially in the field of thermal process engineering. They will be able to
	design systems, including the appropriate measurement and control instrumentation, as
	well as select, design and assess appropriate methods for solving the process engineering
	task. In addition, students will be able to independently generate, analyse, assess and
	present experimental data. On the basis of their expertise in the unit operations of process engineering, students will be able to develop and assess complex process engineering
	processes.
	The aim of the practical courses is to enable students to gain skills in implementing and
	assessing process engineering processes. To achieve this, selected process engineering
	processes are conducted independently as experiments, including the relevant methods of
	analysis, evaluated and assessed by them, and presented in the form of a report. Compulsory
	attendance is required to achieve this goal.
	- Selected unit operations and systems of process engineering, and especially thermal
	process technology (e.g. distillation, extraction, drying)
	- Introduction to chemical and biological processes
	 Operational behaviour of process engineering systems (residence time etc.)
	 Applications of complex process engineering processes and systems
	 Instrumentation and control in process engineering systems
	Outlook on aspects concerning instrumentation with regard to process engineering systems
	The course builds on the Process Engineering I module.
	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.
	Processing plants consist of diffenernt apparatus and machines. You learn findamentals of thermal
P	process technlogy and analyze complex process tecnology plants with the associated components. 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
ľ	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.
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 / DiplIng. M. Mangelmann
	7.4 Maximum number of participants (optional)
I	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
l	Recommended reading: K. Schwister: "Taschonbuch der Verfahrenstechnik", 2nd edition, Hanser-Verlag, 2005
l	K. Schwister: "Taschenbuch der Verfahrenstechnik", 2nd edition, Hanser-Verlag, 2005 W. Hemming, W. Wagner: "Verfahrenstechnik", 9th edition, Vogel-Verlag, 2004
l	K. Schwister, V. Leven: "Verfahrenstechnik für Ingenieure", 1st edition, Hanser-Verlag, 2013
	Lecture notes and documentation relating to the practical course

1.1 Title of module (GER / ENG)	,		1.2 Short descriptio (optional)		de (from HIO)
Fertigungsverfahren 1 /			(optional)	MB.1.0036	
Production Engineering 2.1 Cycle of module:			2.2 Duration of mod	ulo:	
Every summer semester	Every winter semester		\boxtimes 1 semester \square 2		
Other cycle, namely:					
3.1 Module offered in the followi	ng degree programme(s):		3.2 Compulsory (C), compulsory elective		ided semester:
			(CE), elective (E)		
Bachelor`s programme	S:				
Mechanical Engineering ·	-		С		4
International Engineering	(Outgoings)		C		4
Mechanical Engineering ·			С	1	.GS
International Engineering	(Incomings)		C	•	.03
Mechanical Engineering ·	-		С		4
Specialisation in Plant Er	ngineering		C		4
Mechanical Engineering ·	-		С		4
Specialisation in Automot	tive and Drive Engine	ering	C		4
Mechanical Engineering ·			С		4
Specialisation in Constru	ction and Manufactori	ng Technology	C		4
Computer Science in Me	chanical Engineering		С		4
Business Administration	& Engineering majorir	ng in Mechanical	C 4		4
Engineering		-		4	
Mechanical Engineering	(dual study)		С		6
Workload				-	
				Total wo	rkload
	Method of teaching	Hours per week per semester (SWS) for		Workload in hours	ECTS (credit points)
		each method of	method of	Total contact and	30 hrs usually
		teaching	teaching	non-contact hours	correspond to 1 credit point; who
			(usually the number of hours per week		numbers only
	-		multiplied by 15)		
Contact hours (e.g. lecture, seminar, practical course,	Lecture	2	30		
practical period/internship, group work, project work, case study, simulation	Exercise	1	15		
game, credited tutorial (more rows can	Practical course	1	15		
be added)		1	15		
	Total	Total contact hours in SWS	Total contact hours in hours		
		0000	60		
Non-contact hours	Preparation, follow-		90	150	5
	up work,			150	5
(e.g. tutorial, preparation, follow-up					
(e.g. tutorial, preparation, follow-up work, preparation for assignments and	preparation for the				
(e.g. tutorial, preparation, follow-up work, preparation for assignments and					
(e.g. tutorial, preparation, follow-up work, preparation for assignments and	preparation for the				
(e.g. tutorial, preparation, follow-up work, preparation for assignments and	preparation for the				
(e.g. tutorial, preparation, follow-up work, preparation for assignments and	preparation for the		Total non-contact hours		

relevant?)

After successful completion of the module, students will be able to select appropriate production processes (forming, transforming and separating with a geometrically defined cutting edge), demonstrate their application, and apply the necessary metrology. Students will also be able to plan the production runs of these production processes. In addition, they will be capable of comparing individual tools. Students will also be able to select tools that are appropriate and suitable for the production situation, and to assess their use in terms of

	optimised production. 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 set tasks, building on the specialist knowledge gained in the lectures, and to formulate and present the results to suit the target group. This enables students to expand on their practical experience and to handle the necessary metrology. They will evaluate production processes, including monitoring cutting forces and working out the Kienzle equation. 5.2 Course content
	First of all, an explanation is given of the necessary metrology, including surface metrology and 3D coordinate metrology. Then the basic concepts of metal-cutting technology (chip formation, angle, cutting forces, wear and tear, service life), cutting materials (HSS, carbides, ceramics, CBN, PCD) and machinability (including dry machining) will be addressed. An explanation is also given of the production processes of forming and transforming, together with the associated machine tools. Finally, light is shed on the aspect of cost-efficient production, including unit costs and economic cutting conditions. In the exercise classes, students will calculate forces, torques, power, etc.
	In the laboratory class experiments, small groups of students will use measuring machines and machine tools to assess and evaluate the thematic areas addressed. → 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. New manufacturing processes in the field of shaping, forming and prototyping will be explained and discussed and applications in the field of industry will be explored. Over this, separating processes
	like milling and turning will be present within special practice.
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 Regular participation in – and successful recognition of – the practical course are requirements for admission to the module examination. For successful recognition, students must answer comprehension questions about the upcoming experiment at the start of the practical course.
	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. H. Apmann 7.3 Professors (optional): Professor DrIng. H. Apmann
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
	- Fritz Klocke, Wilfried König:
	Fertigungsverfahren 1, (7th revised edition); Springer-Verlag
	- Tönshoff, HK.; Denkena, B.:
	Spanen, Grundlagen (3rd revised and expanded edition); Springer-Verlag - Manfred Weck, Chr. Brecher:
	Werkzeugmaschinen, Maschinenarten und Anwendungsbereiche (6th completely revised edition); Springer-
	Verlag

Verlag

1.1 Title of module (GER / ENG) Fertigungsverfahren 2	1		1.2 Short descriptio (optional)	n 1.3 Module o MB.1.003	:ode (from HIO) 9
Production Engineerin	g 2				
2.1 Cycle of module:	Every winter competer		2.2 Duration of mod ☐ 1 semester ☐ 2		
Other cycle, namely:	Every winter semester			semesters	
3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester:
Bachelor`s programme	es:				
Mechanical Engineering					
International Engineering					
Mechanical Engineering	-		C / CE		2. GS
International Engineering	g (Incomings)				2.63
Mechanical Engineering	-		CE		5
Specialisation in Plant E			CL		5
Mechanical Engineering			CE		5
	otive and Drive Engineering		<u> </u>		5
Mechanical Engineering			С		5
	uction and Manufactoring Tec	chnology			0
Computer Science in Me					
	& Engineering majoring in M	lechanical	CE		5
Engineering			_		
Mechanical Engineering	(dual study)		C		7
Workload				Total wo	rkload
	Mothed of tooobing			Workload in	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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	Lecture	2	30		
course, practical period/internship, group work, project work, case study,	Exercise	1	15		
simulation game, credited tutorial (more rows can be added)	Practical course	1	15		
	Total	Total contact hours 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, follow-up work, preparation for the examination		90	150	5
	Total		Total non- contact hours 90		

After successful completion of the module, students will be able to select appropriate production processes (separating with a geometrically undefined cutting edge, jointing, coating, changing substance properties), demonstrate their application, and determine the necessary metrology. In addition, students will be able to plan the production runs for entire production processes. They will also be able to compare individual production processes, and to select appropriate and suitable processes and assess their use in terms of optimised production. 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 set tasks, building on the specialist knowledge gained in the lectures, and to formulate and present the results to suit the target group. This enables students to expand on their practical experience and to handle the necessary metrology. They will evaluate production processes, including monitoring cutting forces, torques and power.

5.2 Course content

First of all, an explanation is given of the machining processes with an undefined cutting edge, including the contact conditions in each case. In the case of eroding processes (spark erosion, electron and laser beam, ECM), the physical principles are also explained. In addition, an explanation is given of the following production processes: jointing, coating and changing material properties. In the final section, special production processes such as laser technology and plastics technology are described, and aspects related to production planning and assembly techniques are explained. The relevant machine tools in all of the production processes are also addressed.

In the exercise classes, students will calculate forces, torques, power, etc., and go over the main content again. In the laboratory class experiments, small groups of students will use machine tools to assess and evaluate the thematic areas addressed.

 \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.

More manufacturing processes like gluing and welding, performance modification of materials and coating will complete the variety of different manufacturing processes to be learnt for planning new manufacturing processes for future demands of modern technologies.

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 – and successful recognition of – the practical course are requirements for admission to the module examination. For successful recognition, students must answer comprehension questions about the upcoming experiment at the start of the practical course.

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. 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.)

- Fritz Klocke, Wilfried König:

Fertigungsverfahren 2 bis 4 (completely revised editions); Springer- Verlag

- Tönshoff, H.-K.; Denkena, B.:

Spanen, Grundlagen (3rd revised and expanded edition); Springer-Verlag

- Manfred Weck, Chr. Brecher:

Werkzeugmaschinen (6th completely revised edition); Springer-Verlag

1.1 Title of module (GER / ENG Steuerungstechnik / Programmable Logic (1.2 Short description (optional)	n 1.3 Module d MB.1.011	ode (from HIO) 4	
2.1 Cycle of module: Every summer semester			2.2 Duration of mod ☑ 1 semester ☐ 2 s			
3.1 Module offered in the follow	ving degree programme(s):	(3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester	
Bachelor`s programme						
Mechanical Engineering						
International Engineerin						
Mechanical Engineering			CE	1	I. GS	
International Engineerin						
Mechanical Engineering			CE		4	
Specialisation in Plant E	<u> </u>					
Mechanical Engineering	- ptive and Drive Engineering		CE		4	
Mechanical Engineering	<u> </u>					
	- uction and Manufactoring Teo	chnology	CE		4	
Computer Science in Me		Jinology	С		4	
	& Engineering majoring in M	lechanical	0			
Engineering		lechanicai				
Mechanical Engineering	(dual study)		CE		SuSe	
Workload						
				Total wo	orkload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for each method of	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	Lecture	2	30			
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study,	Exercise	1	15			
simulation game, credited tutorial (more rows can be added)	Practical course	1	15			
	Total	Total contact hours in SWS	Total contact hours in hours 60	450	_	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		90	150	5	

After successful completion of the module, students will be able to recognise and describe the functioning of programmable logic controllers (PLCs). In particular, they will be able to analyse the combination and interplay between hardware and software in control systems, for example. In addition, students will be able to transfer the theoretical structure of programs to the practical programming of sequences and operating interfaces for PLCs. Students will be able to select appropriate PLCs, depending on the application. The practical course enables students to expand on and consolidate the specialist knowledge gained in the lectures by transferring the knowledge to practical applications.

Students will be able to create circuits from control engineering, and to progusing market-dominating control systems by the company Siemens, student be prepared for the usual working environment of a control engineer.	
5.2 Course content Lecture:	
 Introduction, Boolean algebra 	
Control components	
Implementation of sequence controls	
Programming PLCs	
Pneumatic components and systems	
• Sensors	
Exercise class:	
 Calculation and programming examples 	
Practical course:	
• PLC programming in small groups (each containing two students)	
→ 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 h Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comp the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) stude In industry, programmable memories are used to regulate and control machi user-specific way. In this module, you familiarise yourself with their structure	ising information about the relevance of nts directly and avoid technical terms. nes and systems in a
 operation. 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 and the second state of the second state o	attended the following knowledge and
skills should have been acquired:) None	and a contract of the second
6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the or participation) Students must pass the examination	ourse of study, regular active
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 ora or a term paper (approx. 10 pages)	
6.4 Requirements for admission to examination See current version of the Examination Regulations / special examination ru	os and rogulations
Regular participation in the practical course and recognition of associated w	-
6.5 Module mark weighting for calculating final grade See Examination Regulations for above-mentioned degree programmes (Sec	tion 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	
Professor DrIng. D. Scholz 7.3 Professors (optional):	
Professor DrIng. D. Scholz	
Professor DrIng. D. Scholz 7.3 Professors (optional): Professor DrIng. D. Scholz	
Professor DrIng. D. Scholz 7.3 Professors (optional): Professor DrIng. D. Scholz	

Programming Basics

.1 Title of module (GER / ENG) Grundlagen der Prograr Programming Basics	nmierung /		1.2 Short descriptio (optional)	MB.1.0052	le (from HIO)
2.1 Cycle of module:		4	2.2 Duration of mod	ule:	
⊠ Every summer semester □ E Dther cycle, namely:	Every winter semester		🛛 1 semester 🗌 2 s	semesters	
3.1 Module offered in the following	ng degree programme(s):	(3.2 Compulsory (C), compulsory elective (CE), elective (E)		ded semester:
Bachelor`s programmes	S:				
Mechanical Engineering -			С		2
nternational Engineering	(Outgoings)		C		L
Vechanical Engineering -					
nternational Engineering					
Vechanical Engineering -			С		2
Specialisation in Plant En					-
Mechanical Engineering -			С		2
-	ive and Drive Engineering		-		-
Mechanical Engineering -			С		2
-	ction and Manufactoring Tec	hnology	-		
Computer Science in Med	ž ž		С		2
	& Engineering majoring in M	echanical	С		2
Engineering			•		4
Mechanical Engineering (Norkload	dual study)		С		4
Tornioud			Total workload		
	Method of teaching	Hours per week	Hours per	Workload in	ECTS (credit
		per semester		hours Total contact and	points) 30 hrs usually
		(SWS) for each method of		non-contact hours	correspond to 1
		teaching	(usually the number		credit point; who numbers only
			of hours per week multiplied by 15)		inallizere enity
Contact hours e.g. lecture, seminar, practical	Lecture	3	45		
	Exercise	1	15		
the set of a second second second second second set	Practical course	1	15		
-	Total	Total contact hours SWS	in Total contact hours in hours		
			75	450	-
a tutorial preparation tollow-up	Preparation, follow-up work,		75	150	5
vork, preparation for assignments	preparation for the				
and homework, research, etc.)	examination				
	Total		Total non-		
	IUtai		contact hours		

After successful completion of the module, students will be able to formulate algorithms and implement them using a standard programming language. For students pursuing the degree programme in Mechanical Engineering - Specialisation in

Construction and Manufactoring Technology, the specialist knowledge gained is an important prerequisite for the more complex programming paradigms addressed at a later stage of the course.

5.2 Course content
Basic elements of algorithms
• Formulation of the structure of algorithms
 Basic elements of a modern programming language
 Implementation of algorithms – programming language
Development environments
 Error detection and prevention
Documentation of programs
→ 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.
There are lots of programming languages for a wide range of applications. By working on your own
small projects, you familiarise yourself with a modern language commonly used in mechanical
engineering.
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
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):
L. Wieneke M.Sc.
7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)
Set of slides used in the lecture

Programming Languages 2 (Module not valid for enrolment from WiSe 21/22 onwards)

1	1.1 Title of module (GER / ENG Programmiersprache			1.2 Short description (optional)	1.3 Module c MB.1.010	ode (from HIO)
	U			(optional)	IVIB.1.010	1
2	Programming Langua 2.1 Cycle of module:	ges z		2.2 Duration of modu	10-	
~	Devery summer semester Other cycle, namely:	Every winter semester		☐ 1 semester ☐ 2 se		
3	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)	3.3 Recomm	ended semester:
	Bachelor`s programm	es:				
	Mechanical Engineering	g -				
	International Engineerir	ng (Outgoings)				
	Mechanical Engineering	g -				
	International Engineerir					
	Mechanical Engineering	g -		CE		5
	Specialisation in Plant I	Engineering		UL		5
	Mechanical Engineering					
		otive and Drive Engineering				
	Mechanical Engineering			CE		5
		ruction and Manufactoring Tee	chnology	02		<u> </u>
	Computer Science in M					
		n & Engineering majoring in N	lechanical			
	Engineering					
	Mechanical Engineering	g (dual study)		CE		ViSe
4	Workload			Г	Total wo	rkload
		Method of teaching	Hours per weel	k Hours per V	Vorkload in	ECTS (credit
		Method of teaching	per semester (SWS) for each method of teaching	semester for h each method of ⊤	ours otal contact and on-contact hours	30 hrs usually correspond 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, case	Practical course	3	45		
	study, simulation game, credited tutorial (more rows can be added)					
		Total	Total contact hours in SWS	s Total contact hours in hours 75		_
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		75	150	5
		Total		Total non-		
F	5.1 Intended learning outcome		ouing completed the	contact hours 75	provido the own	unity to
	acquire soft skills in addition to techn relevant?) After successful com	es (What should students be able to do after he ical skills? For which other modules and prosp pletion of the module, stude	ents will be a	bour market are the acquir	complex	skills

algorithms and implement them using a standard object-oriented programming language. This will enable them to contribute competently to IT projects in their future career.

5.2 Course content • Basic elements of object-oriented thought
Object-oriented formulation of algorithms
 Syntax and semantics of object-oriented programming languages
Development environments
 Integration of external libraries
Software architectures
Graphic user interfaces
 Error detection and prevention
Software development in a team
\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 I Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical term Building on the Foundations of Programming module, you now use a more sophisticated programming language to handle even complex projects.
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 at
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)
Ctudents must need the examination
Students must pass the examination
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 minuto or a term paper (approx. 10 pages)
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 minute
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 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 minute 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
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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 minute 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/amtiche_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):
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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 minute 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: ③ German □ English □ Other, namely: 7.2 Module Contact Person: Professor DrIng. S. Behr 7.3 Professors (ptional): Professor DrIng. S. Behr
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Project (Dual Study)

	1.1 Title of module (GER / EN			1.2 Short descriptio (optional)		
	Projektarbeit (Duales	Studium) /		(optional)	MB.1.0102	
	Project (Dual Study)					
2	2.1 Cycle of module: ☑ Every summer semester [- Every winter comester		2.2 Duration of mod		
	Other cycle, namely:				3611631613	
3	3.1 Module offered in the follo	owing degree programme(s):		3.2 Compulsory (C)		ended semester:
				compulsory electiv	e	
				(CE), elective (E)		
	Bachelor`s programn					
	Mechanical Engineerin					
	International Engineeri					
	Mechanical Engineerin					
	International Engineeri					
	Mechanical Engineerin					
	Specialisation in Plant					
	Mechanical Engineerin					
	Specialisation in Auton	notive and Drive Engineering				
	Mechanical Engineerin	g -				
	Specialisation in Const	ruction and Manufactoring Te	chnology			
	Computer Science in N	lechanical Engineering				
	Business Administratio	n & Engineering majoring in M	lechanical			
	Engineering					
	Mechanical Engineerin	g (dual studv)		CE	5	SuSe
4	Workload	g (
					Total wo	rkload
		Method of teaching	Hours per week		Workload in	ECTS (credit
		Method of teaching	per semester	semester for	Workload in hours	ECTS (credit points)
		Method of teaching		semester for each method of	Workload in	ECTS (credit points) 30 hrs usually correspond to 1
		Method of teaching	per semester (SWS) for each	semester for each method of teaching (usually the number	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
		Method of teaching	per semester (SWS) for each method of	semester for each method of teaching	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1
	Contact hours	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited		per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited		per semester (SWS) for each method 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	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) Non-contact hours	Total	per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole
	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up	Total Preparation, follow-up work,	per semester (SWS) for each method 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	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) Non-contact hours	Total Preparation, follow-up work, preparation for the	per semester (SWS) for each method 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	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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Total Preparation, follow-up work,	per semester (SWS) for each method 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	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only
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	(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Total Preparation, follow-up work, preparation for the examination	per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15) Total contact hours in hours 150	Workload in hours Total contact and non-contact hours	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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Total Preparation, follow-up work, preparation for the	per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15) Total contact hours in hours 150	Workload in hours Total contact and non-contact hours	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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments	Total Preparation, follow-up work, preparation for the examination	per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15) Total contact hours in hours 150	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only

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 can independently work on a science- or practice-oriented task within a specified period, both in its technical details and in the interdisciplinary contexts according to specialist practical and scientific methods. Eventually they present their results in a talk with a subsequent Discussion. The project work thus prepares for the independent implementation of the bachelor thesis.

5.2 Course content	
Practice-oriented task from the subject area of the course; usually the work is carried out in	
cooperation with industry.	
cooperation with industry.	
\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	
the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical	
You delve deeply into a scientific assignment or a practical task. You summarise your results ir	Id
term paper and present them in a presentation.	
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	no ord
	je and
skills should have been acquired:)	
See current version of the Examination 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)	
b.s Type and Scope of Chammaton (e.g. whiten chammation, oral chammation, term paper, presentation, portiono, length of chammation in minutes)	
Duration max. 3 months; written elaboration by the examination candidate (main body of text	
Duration max. 3 months; written elaboration by the examination candidate (main body of text	
Duration max. 3 months; written elaboration by the examination candidate (main body of text	
Duration max. 3 months; written elaboration by the examination candidate (main body of text approx. 15-20 pages), presentation followed by a discussion (max. 30 minutes)	
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Duration max. 3 months; written elaboration by the examination candidate (main body of text approx. 15-20 pages), presentation followed by a discussion (max. 30 minutes) 6.4 Requirements for admission to examination	
Duration max. 3 months; written elaboration by the examination candidate (main body of text approx. 15-20 pages), presentation followed by a discussion (max. 30 minutes) 6.4 Requirements for admission to examination See current version of the Examination Regulations / special examination rules and regulations	i
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Duration max. 3 months; written elaboration by the examination candidate (main body of text approx. 15-20 pages), presentation followed by a discussion (max. 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	
Duration max. 3 months; written elaboration by the examination candidate (main body of text approx. 15-20 pages), presentation followed by a discussion (max. 30 minutes) 6.4 Requirements for admission to examination See current version of the Examination Regulations / special examination rules and regulations	
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Duration max. 3 months; written elaboration by the examination candidate (main body of text approx. 15-20 pages), presentation followed by a discussion (max. 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-	
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Duration max. 3 months; written elaboration by the examination candidate (main body of text approx. 15-20 pages), presentation followed by a discussion (max. 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: See German _ English _ Other, namely: 7.2 Module Contact Person:	
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Project Management

1 1.1 Title of module (GER / ENG Projektmanagement /			1.2 Short descriptio (optional)	n 1.3 Module o MB.1.010	ode (from HIO) 3
2 2.1 Cycle of module:] Every winter semester		2.2 Duration of mod		
3 3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester:
Bachelor`s programm					
Mechanical Engineering					
International Engineerir					
Mechanical Engineering			CE	1	. GS
Mechanical Engineering			CE		4
Mechanical Engineering	g - notive and Drive Engineering		CE		4
Mechanical Engineering		chnology	CE		4
Computer Science in M					
Business Administration Engineering	n & Engineering majoring in M	lechanical			
Mechanical Engineering	g (dual study)		CE		SuSe
Workload				•	
				Total wo	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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	Seminaristic Lecture	2	30		
course, practical period/internship, group work, project work, case	Exercise	1	15		
study, simulation game, credited tutorial (more rows can be added)	Practical course / simulation game	1	15		
	Total	Total contact hours in SWS	Total contact hours in hours 60	150	5
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		90	100	
	Total		Total non- contact hours 90		

After successful completion of the module, students will be able to analyse a problem and, building on their analysis, develop an upcoming project and define its objectives, and also structure and plan the project themselves. To achieve this, students will be able to apply the basic tools of project management. Students will also be able to analyse and assess the course of the project on the basis of the key performance indicators generated, and, building on this, develop and initiate measures for achieving the project objectives. In addition, students will be able to communicate the project results to suit the target group.

The skills acquired will be expanded on in a simulation game, strengthening students' social skills due to their involvement in a project team.

The module is of great practical relevance for professional life as an engineer, given that project execution is a core task.

5.2 Course content

- Characteristics and stages of a project
- Definition of project objectives
- Project planning, control and management tools
- Sequencing and time planning, cost and risk management
- Project completion and documentation
- Consolidation of content in a simulation game

 \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.

Project management provides the basic knowledge for planning and executing projects in a corporate environment. Terms, methods, and tools of project management are introduced with practical examples and exercises.

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

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 / Lecturer Dr. M. Lutterbeck for Bachelor programme in Mechanical Engineering - Specialisation in Plant Engineering

7.4 Maximum number of participants (optional)

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

Recommended reading: Walter Jakoby: Projektmanagement für Ingenieure: Ein praxisnahes Lehrbuch für den systematischen Projekterfolg, 5. Auflage 2021 Lecture notes

1.1 Title of module (GER / ENG Qualitätsmanagement			1.2 Short descriptio (optional)	n 1.3 Module c MB.1.010	
Quality Management 2.1 Cycle of module: Every summer semester Other cycle, namely:	Every winter semester		2.2 Duration of mod ☑ 1 semester □ 2		
3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester
Bachelor`s programme					
Mechanical Engineering					
International Engineering					
Mechanical Engineering International Engineering			CE	1	. GS
Mechanical Engineering					
Specialisation in Plant E			CE		4
Mechanical Engineering					
	otive and Drive Engineering		CE		4
Mechanical Engineering			05		
	uction and Manufactoring Tec	chnology	CE		4
Computer Science in Me	echanical Engineering		CE		4
	& Engineering majoring in M	echanical	CE		4
Engineering			-		-
Mechanical Engineering	(dual study)		CE		SuSe
Workload				Total wo	rkload
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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	Seminaristic Lecture	4	60		
(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 hours in SWS	Total contact hours in hours 75	450	_
(e.g. tutorial, preparation, follow-up work, preparation for assignments	Preparation, follow-up work, preparation for the examination		75	150	5
	Total		Total non- contact hours		

After successful completion of the module, students will be able to outline the principles of quality management. They will differentiate key methods and tools for ensuring product quality, from the product idea to product disposal, and will be able to identify and highlight connections and problems related to quality. In the exercise classes, students will be able to transfer the knowledge acquired to practice-oriented issues and design problem-oriented solutions, enabling them to meet the professional challenges of quality management in engineering practice.

5.2 Course content
Introduction and overview
- Terms, fundamental aspects and historical development
Production metrology
 Overview of methods and tools for quality management
- The seven elementary quality tools
- Other methods and tools
- Mathematical methods
QM standards, QM audit, QM certification
• Quality costs
• Legal aspects
- Legal liability
- Equipment and product safety
- Labour and environmental protection law
 Integrated Management System, TQM and Business Excellence
- QM, UM, ASM,
- Basic ideas of TQM
- Quality awards
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.
Quality management is an established feature of any large company. It ensures that processes and
products maintain a certain standard. You learn methods and principles, and are able to transfer
them to practical examples.
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
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:
7.2 Module Contact Person:
Professor DrIng. G. Gevelmann
7.3 Professors (optional):
Lecturer DiplIng. M. Kaczor
Lecturer DiplIng. M. Kaczor 7.4 Maximum number of participants (optional)
Lecturer DiplIng. M. Kaczor

Spanish for Engineering and Latin American Culture 1

	1.1 Title of module (GER / ENG			1.2 Short descriptio		code (from HIO)
		rwissenschaften und Kultur	ſ	(optional)	ITB.1.017	' 5
	Lateinamerikas 1 /					
		ng and Latin American Cult	ure 1			
2	2.1 Cycle of module:	Every winter comoster		2.2 Duration of mod ☐ 1 semester ☐ 2		
	Other cycle, namely:	Every winter semester			semesters	
3	3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C)	, 3.3 Recom	mended
				compulsory electiv		
				(CE), elective (E)		
	Bachelor`s programme					
	Mechanical Engineering			С		3
	International Engineerin	g (Outgoings)		•		5
	Mechanical Engineering	-				
	International Engineerin	g (Incomings)				
	Mechanical Engineering	-				
	Specialisation in Plant E					
	Mechanical Engineering	<u> </u>				
	0 0	otive and Drive Engineering				
	Mechanical Engineering	<u> </u>				
			shology			
		uction and Manufactoring Tec	rinology			
	Computer Science in Me					
		& Engineering majoring in M	echanical			
	Engineering					
	Mechanical Engineering	(dual study)				
4	Workload					
					Total wo	rkload
		Method of teaching	Hours per week		Workload in	ECTS (credit
			per semester	semester for	hours Total contact and	points) 30 hrs usually
			(SWS) for each method of	each method of teaching	non-contact hours	correspond to 1
			teaching	(usually the number		credit point; whole
			_	of hours per week multiplied by 15)		numbers only
	Contact hours	Seminaristic Lecture /	4	60		
	(e.g. lecture, seminar, practical		4	00		
	course, practical period/internship, group work, project work, case study,	Exercise			-	
	simulation game, credited tutorial					
	(more rows can be added)					
					-	
		Total	Total contact hours in SWS	 Total contact hours in hours 		
			11 3 4 3	60		_
	Non-contact hours	Proparation follow up work		90	150	5
	(e.g. tutorial, preparation, follow-up	Preparation, follow-up work,		90		
	work, preparation for assignments and homework, research, etc.)	preparation for the				
	and homework, research, etc.)	examination			-	
		Total		Total non-	-	
		Total		contact hours		
				90		
5		s (What should students be able to do after ha				
	acquire soft skills in addition to technic relevant?)	cal skills? For which other modules and prosp	ective tasks in the la	bour market are the acq	uired knowledge and	SKIIIS
		oficient in the subject matte	er learned so	o far and, by pa	assing the w	ritten
		rst presentation, should have				
		opean Framework of Refere				
	course.			J J		
		command of the specific vo	ocabulary co	oncerning the d	engineering	

context. They will be able to understand technical presentations, actively participate in
technical discussions and also give technically oriented presentations to an audience
themselves. Students are also introduced to aspects of the culture and lifestyle of
Latin Americans to help them adjust to life abroad.
5.2 Course content
In addition to a review of grammar, students receive an introduction to mathematics and
materials science on a foreign language basis, as well as the vocabulary of technical terms
relevant to them. Also important is the examination of graphs and diagrams and how to
describe them.
An introduction to the structure and methods of presentations in the foreign language as
well as elaborating and giving these presentations in front of an audience offer the students
the opportunity to apply what they have learned.
Furthermore, students learn how to describe technical processes and correlations in the
foreign language.
By means of texts and documents as well as foreign-language audio and video material, the
ability to extract the relevant information from the aforementioned media and to present it
orally and in writing is also trained.
All this enables the students to acquire a basic stock of specific technical vocabulary
regarding the various fields of application relevant in the context of engineering.
Students are also introduced to the culture and way of life of Latin Americans so that they can
easily find their way around.
In addition to giving presentations, participation in meetings and technical discussions serve
the active language acquisition, so that the professionalization phase is thus initiated.
→ 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
Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevant the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical term
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 the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical term In this Spanish course, which runs for two semesters, you prepare for your study abroad period, focusing especially on engineering vocabulary. 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 a skills should have been acquired:) B1 - Level of the European Framework of Reference for Languages 6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Passing the cumulative module examination The points achieved for the oral presentation and the points achieved from the written exam are added up. The sum of the points achieved in both parts of the examination is then used to calcula
 the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical term in this Spanish course, which runs for two semesters, you prepare for your study abroad period, focusing especially on engineering vocabulary. 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 a skills should have been acquired:) B1 - Level of the European Framework of Reference for Languages 6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Passing the cumulative module examination The points achieved for the oral presentation and the points achieved from the written exam are added up. The sum of the points achieved in both parts of the examination is then used to calcula the module grade
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the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical term In this Spanish course, which runs for two semesters, you prepare for your study abroad period, focusing especially on engineering vocabulary. 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 a skills should have been acquired:) B1 - Level of the European Framework of Reference for Languages 6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Passing the cumulative module examination The points achieved for the oral presentation and the points achieved from the written exam are added up. The sum of the points achieved in both parts of the examination is then used to calcula the module grade 6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) Cumulative module examination with points from two examination parts:
the module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical term In this Spanish course, which runs for two semesters, you prepare for your study abroad period, focusing especially on engineering vocabulary. 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 a skills should have been acquired:) B1 - Level of the European Framework of Reference for Languages 6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active participation) Passing the cumulative module examination The points achieved for the oral presentation and the points achieved from the written exam are added up. The sum of the points achieved in both parts of the examination is then used to calcula the module grade 6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) Cumulative module examination with points from two examination parts: 1st examination part (50%): oral presentation
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Spanish for Engineering and Latin American Culture 2

11.1 Title of module (GER / ENG) Spanisch für Ingenieurw Lateinamerikas 2 / Spanish for Engineering		ur ⁽	.2 Short descriptio optional)	on 1.3 Module c ITB.1.0176	
2 2.1 Cycle of module: ⊠ Every summer semester □ E Other cycle, namely:	very winter semester		2.2 Duration of mod ☑ 1 semester □ 2		
33.1 Module offered in the followin	ng degree programme(s):	C	8.2 Compulsory (C) compulsory electiv CE), elective (E)		ended semester:
Bachelor`s programmes			<i>P X Y</i>		
Mechanical Engineering -			С		4
International Engineering	(Outgoings)		C		4
Mechanical Engineering -					
International Engineering	(Incomings)				
Mechanical Engineering - Specialisation in Plant En	gineering				
Mechanical Engineering - Specialisation in Automoti Mechanical Engineering -					
	tion and Manufactoring Te	echnology			
Computer Science in Mec		connology			
	Engineering majoring in I	Mechanical			
Engineering		in o on a noan			
Mechanical Engineering (dual study)				
4Workload					
				Total wo	rkload
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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 period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can	Seminaristic Lecture / Exercise	4	60		
be added)	Total	Total contact hours in SWS	Total contact hours in hours		
Non-contact hours	Preparation, follow-up		60 90	150	5
(e.g. tutorial, preparation, follow-up work preparation for assignments and homework, research, etc.)	work, preparation for the examination				
	Total		Total non- contact hours 90		

Students should be able to meet the B2 level of the European Framework of Reference for Languages in order to be able to apply it in their field and continue their studies abroad. Students will be proficient in the vocabulary concerning the engineering context. They will be able to understand technical presentations, actively participate in technical discussions and also give technically oriented presentations to an audience themselves. Students are also introduced to aspects of the culture and lifestyle of Latin Americans to help them adjust to life abroad.

5.2 Course content

The repetition of individual grammatical topics as well as the extension of the basic stock of specific technical vocabulary regarding the various fields of application relevant in the context of engineering is the subject of the second course.

In addition to dealing with selected economic topics such as marketing and various management areas, the students' written and oral correspondence skills are also promoted and they are trained in applying for jobs in the foreign language.

By means of texts and documents as well as foreign-language audio and video material, the ability to extract the relevant information from the above-mentioned media and to present it orally and in writing is also continued to be trained.

In addition, the students take a close look at international markets, cultural characteristics and the topic of sustainability.

With regard to active language acquisition, in addition to giving presentations, special attention is paid to the participation in meetings and negotiation situations, as well as taking the oral examination, so that the professionalization phase is rounded off and there is nothing standing in the way of studying abroad.

 \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.

Regular repetition enables you to consolidate your knowledge of grammar. But most importantly, you continuously develop your written and oral communication skills by means of practical exercises and presentations.

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:)

B1 - Level of the European Framework of Reference for Languages

B1 - Niveau des europäischen Referenzrahmens

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

Passing the cumulative module examination

The points achieved for the oral presentation and the points achieved from the written exam are added up. The sum of the points achieved in both parts of the examination is then used to calculate the module grade.

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

- Cumulative module examination with points from two examination parts:
- 1st examination part (50%): oral presentation

2nd examination part (50%): oral exam

6.4 Requirements for admission to examination

Regular and active participation, successful presentation

6.5 Module mark weighting for calculating final grade

*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: Spanish

7.2 Module Contact Person:

Julia Gockel M.A.

7.3 Professors (optional): Julia Gockel M.A.

7.4 Maximum number of participants (optional)

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

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1.1 Title of module (GER / ENG Statik / Statics	3)		1.2 Short descriptio (optional)	n 1.3 Module c MB.1.011	
2.1 Cycle of module:			2.2 Duration of mod		
Every summer semester Other cycle, namely:	Every winter semester		🛛 1 semester 🗌 2	semesters	
3.1 Module offered in the follo	wing degree programme(s):	(3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester
Bachelor`s programm	les:				
Mechanical Engineering	g -		С		1
International Engineerir	ng (Outgoings)		C		I
Mechanical Engineering					
International Engineerir					
Mechanical Engineering			С		1
Specialisation in Plant I			•		•
Mechanical Engineering			С		1
	otive and Drive Engineering		_		
Mechanical Engineering			С		1
Computer Science in M	ruction and Manufactoring Tec	chhology	С		1
		lachanical	C		I
Engineering	n & Engineering majoring in M	lechanical	С		1
Mechanical Engineering	n (dual study)		С		1
Workload			0		•
				Total wo	rkload
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	Lecture	2	30		
course, practical period/internship,	Exercise	2	30		
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 60	450	- -
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		90	150	5
	Total		Total non- contact hours 90		

After successful completion of the module, students will be able to demonstrate the principal methodology for solving static problems. They will be able to examine plane and spatial power systems using rigid bodies. They will be able to determine loads at points of support, in connections, and inside components and assemblies. Students will be able to derive abstract mechanical models from practice-related problems of mechanical engineering, and to interpret and critically assess their own results.

The specialist solution strategies gained are the basis for understanding advanced study elements, and can be transferred to related subjects. In addition, they are an essential

precondition for enabling students to address construction design problems in their later professional environment.
 5.2 Course content Central, plane and spatial power systems General, plane and spatial power systems Momentum Resultants of a plane and spatial group of forces
 Equilibrium in plane and spatial cases Centre of gravity, line loads Systems of rigid bodies Stress resultants on plane and spatial beams, frames and arches Static and dynamic friction
 Simple trusses → 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 do forces act on solid bodies, and how can you calculate them? You practise applying
mechanical principles to technical problems, enabling you to solve them. In the process, you gain important basic knowledge for your further studies. 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 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. J. Korn
7.3 Professor DrIng. J. Korn 7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Recommended reading: Lecture notes; Dankert, H. / Dankert, J.: Technische Mechanik, Teubner Verlag

Steam and Gas Turbines (Module not valid for enrolment from WiSe 21/22 onwards)

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	1.1 Title of module (GER / ENG)			1.2 Short description (optional)		
	Dampf- / Gasturbinen / Steam and Gas Turbine	_		(optional)	MB.1.0162	
	2.1 Cycle of module:	5		2.2 Duration of modu	lo	
	□ Every summer semester ⊠ E Other cycle, namely:	every winter semester		\boxtimes 1 semester \square 2 s		
	3.1 Module offered in the following	ng degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		nded semester:
	Bachelor`s programmes	S:				
	Mechanical Engineering -					
	International Engineering					
	Mechanical Engineering -					
	International Engineering	· · · · · · · · · · · · · · · · · · ·				
	Mechanical Engineering -			CE		5
	Specialisation in Plant En					
	Mechanical Engineering - Specialisation in Automot		na			
	Mechanical Engineering -		ing	CE		5
	Specialisation in Construct		Technology			5
	(General Mechanical Eng	-	, reennelegy			
	Computer Science in Med					
	Business Administration &		in Mechanical			
	Engineering					
	Mechanical Engineering (dual study)		CE	W	iSe
4	Workload					
			•		Total work	-
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	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	4	60		
	practical period/internship, group work, project work, case study, simulation	Exercise	1	15	1	
	game, credited tutorial (more rows can be added)	Practical course	1	15		
		Total	Total contact hours in	Total contact hours		
			SWS	in hours 90	150	5
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and	Preparation, follow-up work	SWS		150	5
	(e.g. tutorial, preparation, follow-up		SWS		150	5
	(e.g. tutorial, preparation, follow-up work, preparation for assignments and	work preparation for the	sws		150	5

	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 apply problems from the field of steam and gas turbines to energy issues and applications. In particular, they will be able to understand and assess the different technical designs of steam and gas turbines. Students will also be able to solve special tasks related to the design of thermal turbomachinery. The practical course enables students to transfer the specialist knowledge gained to tasks relating to the experimental investigation of turbines. 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 Overview and classification
	• Rotor dynamics of turbomachinery
	Thermodynamics of turbine processes
	 Energy conversion in the stage and design of blading
	Components of gas and steam turbines
	Operational behaviour
	Constructed designs
	→ 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.
	The use of turbomachinery determines the efficiency and environmental friendliness of many
	technical systems. You assess such machinery, enabling you to ultimately choose the right one for
	a variety of applications.
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
	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)
	6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active
	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
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Strength of Materials

Festigkeitslehre / Strength of Materials	3)	1	1.2 Short description (optional)	1.3 Module coc MB.1.0040	le (from HIO)
2.1 Cycle of module: ⊠ Every summer semester □ Other cycle, namely:] Every winter semester		2.2 Duration of mod		
3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ded semester:
Bachelor`s programm	es:				
Mechanical Engineering	5		С		2
Mechanical Engineering	5				
Mechanical Engineering			•		•
Specialisation in Plant			С		2
Mechanical Engineering			С		2
Mechanical Engineering		chnoloav	С		2
Computer Science in M			С		2
	n & Engineering majoring in M	lechanical	С		2
Mechanical Engineering	r (dual study)		С		2
Workload			•		-
				Total wo	rkload
	Method of teaching	Hours per week per semester (SWS) for each	semester for	Workload in hours Total contact and	ECTS (credit points)
		method of teaching	(usually the number of hours per week multiplied by 15)	non-contact hours	30 hrs usually correspond to 1 credit point; whole numbers only
Contact hours	Lecture		(usually the number of hours per week	non-contact hours	30 hrs usually correspond to 1 credit point; whole
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)	Lecture Exercise	teaching	(usually the number of hours per week multiplied by 15)	non-contact hours	30 hrs usually correspond to 1 credit point; whole
(e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited		teaching 2	(usually the number of hours per week multiplied by 15) 30 30		30 hrs úsually 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	Exercise	teaching 2 2 Total contact hours	(usually the number of hours per week multiplied by 15) 30 30 Total contact hours in hours	non-contact hours	30 hrs usually correspond to 1 credit point; whole

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 demonstrate the basic methodological approach for solving problems related to mechanics of materials. They will be able to determine tensile and compressive stresses, bending stresses, torsional stresses and transverse shear stresses in building components. Concerning the "buckling" stability problem, students will know how to analyse the actual system, refer to a case of buckling, and calculate the buckling stresses. Students will be able to determine component deformations and formulate deformation approaches in order to investigate

statically indeterminate systems. Students will be able to derive abstract mechanical	
models from practice-related problems of mechanical engineering, and to interpret an	nd
critically assess their own results. They will also be able to name the limitations of the	е
calculation models presented.	
The specialist solution strategies gained are the basis for understanding advanced st	
elements, and can be transferred to related engineering subjects such as machine ele	ements,
construction design and finite elements. In addition, they are an essential preconditio	
enabling students to design machinery and its components correctly in terms of load	l in their
later professional environment.	
5.2 Course content	
Tensile and compressive stresses, surface pressure	
Bar deformations, statically indeterminate bar systems	
Moments of inertia of area	
Straight and general bending	
Bending line, statically indeterminate supported cantilevers	
Torsion of circular and circular-ring cross-sections	
• Torsion of open and closed thin-walled cross-sections	
• Transverse shear stress of the full cross-section and of thin-walled cross-sections	
Shear centre	
 Uniaxial and multiaxial stress and deformation states, influence of temperature Composite stresses 	
• Euler buckling cases, buckling theory according to Tetmajer	
\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 inter	rested in studving at FH
Münster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising informatio	on 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	
You expand your knowledge of statics to include more complex mechanical relationsl about the conditions causing stresses or the deformation of building components.	nips. rou learn
6 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 fo	ollowing knowledge and
skills should have been acquired:)	
None	
	, regular active
6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, participation)	, regular active
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1 1.1 Title of module (GER / ENG Technisches Englisch			1.2 Short descriptio (optional)	n 1.3 Module c ITB.1.0106	ode (from HIO)	
Technical English					, ,	
2 2.1 Cycle of module: ⊠ Every summer semester ⊠ Every winter semester Other cycle, namely:			2.2 Duration of module: ☑ 1 semester			
3 3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester:	
Bachelor`s programme						
Mechanical Engineering						
International Engineerin						
	Mechanical Engineering -		с		2. GS	
International Engineerin						
Mechanical Engineering			С		5	
Specialisation in Plant E					•	
Mechanical Engineering			С		5	
	otive and Drive Engineering		-		•	
Mechanical Engineering			С		5	
	uction and Manufactoring Tec	chnology				
Computer Science in Me		<u> </u>	С		5	
	& Engineering majoring in M	echanical	С		2	
Engineering						
Mechanical Engineering	(duai study)		С		6	
Workload				Total wo	orkload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	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	Seminar / Exercise	4	60			
(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 60	450	- -	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		60	150	5	
	e-learning		30			
	Total		Total non- contact hours 90			

Professional competence: After participating in the module, the students are able to master the language competence of the B2 level of the Common European Framework of Reference. They should also be able to independently present professional content and technical matters in the foreign language appropriately, present them professionally and discuss them in an academic context. Methodological competence: After participating in the module, the students can systematically grasp, structure, analyse, and present a target group-specific context as part of the in-depth study of a question or a topic. The students can also apply scientific work target-specific techniques. Social competence: After participating in the module, the students are able to work on a specific topic in a cooperative and responsible manner and to present subject-related content suitable for the target group. Different communicative settings encourage the students to work in a team and actively engage in dialogues. Self-competence: After participating in the module, the students can better recognize and reflect their personal linguistic abilities in the foreign language. This helps them to further consolidate and professionalise their linguistic competence. 5.2 Course content Using texts, technical documents, audio and video materials in the target language, technical aspects are illustrated and discussed. Technical processes are described and context-specific terminology is introduced and applied in different scenarios. Working on presentations and project descriptions as well as dealing with technical questions and problems support the active language acquisition. This also contributes to the overall professionalisation of the language competencies. Students can bring in their own technical knowledge based on their field of studies when giving presentations. Next to the acquisition of technical and academic vocabulary, statistical depictions are described and analysed, professional presentation skills are taught and refined, reading and writing skills are applied. Context related grammar is revised if needed. etails 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 he module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. English is the lingua franca of science; it can also be a door opener at work. You add technical terminology to your vocabulary, and use it in presentations and project descriptions. 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:) Recommended: English B1 level (Common European Framework of Reference) 6.2 Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active articipation 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 English: Regular participation in class and completion of preliminary 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: English: H. Ermen M.A., J.-C. A. Gockel M.A., Dr. A. Hövener M.A. 7.3 Professors (optional): English: H. Ermen M.A., J.-C. A. Gockel M.A., Dr. A. Hövener M.A.

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

7.4 Maximum number of participants (optional)

elevant?

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

Technical English (B2) and Communication (Module not valid for enrolment from WiSe 21/22 onwards)

1	1.1 Title of module (GER / ENG Technisches Englisch	ः (B2) und Kommunikation /	Technical	1.2 Short description (optional)	n 1.3 Module c ITB.1.017		
		English (B2) and Communication				2	
2	2.1 Cycle of module: ☑ Every summer semester ☑ Other cycle, namely:			2.2 Duration of module: ☑ 1 semester			
3	3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester:	
	Bachelor`s programm	les:		(02), 01001110 (2)			
	Mechanical Engineering						
	International Engineerir						
	Mechanical Engineering						
	International Engineerir						
	Mechanical Engineering			(2	
	Specialisation in Plant			С		3	
	Mechanical Engineering						
		otive and Drive Engineering					
	Mechanical Engineering						
	Specialisation in Consti	ruction and Manufactoring Tee	chnology	С		3	
	(General Mechanical E						
	Computer Science in M	lechanical Engineering		С		3	
	Business Administration	lechanical					
	Engineering						
	Mechanical Engineering	g (dual study)		С		2	
4	Workload						
			-		Total wo		
		Method of teaching	Hours per week per semester (SWS) for each method of teaching	 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	Seminaristic Lecture /	3+2	75			
	course, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)	English + Communication					
		Total	Total contact hours in SWS	Total contact hours in hours			
				75	150	5	
	Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination		60	100		
		e-learning		15			
		Total		Total non- contact hours 75			

After successful completion of this module, students will be able to present freely imagebased specialist presentations, project descriptions and group work in both German and English, and to consciously apply rhetorical and audience-oriented methods. They will be able to use specialist terms to describe and explain technical processes in both languages. In discussions and talks, they will be able to respectfully ask and answer questions, and represent their own opinion argumentatively. They will be able to write professional reports and emails with confidence, in terms of form and style. Self-assurance and self-confidence for everyday study and working practices will be trained in practice. Preparation techniques and an introduction to literature search and citation promote academic writing across modules. Particularly by exchanging technical content with international students, students develop the skills required to use English – the common language of industry.

5.2 Course content

Communication: Language and speaking, presentation and rhetorical skills, presentation using technical aids, argumentation and debate, prompting techniques, conversational skills, literature search and citation.

English: Core areas of the subject of Mechanical Engineering, complemented by selected Business English modules (Presentations, Negotiations, Meetings)

 \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.

At university and at work, you learn and work with other people across geographical and linguistic boundaries – whether in team projects or presentations. You therefore practise your argumentation and presentation skills in German and English.

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 B1)

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)

Examination element for English: Written or oral examination (60%)

Examination element for Communication: semi-public talk using presentation software (40%)

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations English: Regular participation in class and completion of preliminary work Communication: Regular participation in class

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:

English: H. Ermen M.A., J.-C. A. Gockel M.A., Dr. A. Hövener M.A. Communication: Lecturer - Dr. S. Schiller-Lerg

7.3 Professors (optional):

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

Communication: Lecturer - Dr. S. Schiller-Lerg

7.4 Maximum number of participants (optional)

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

1 1.1 Title of module (GER / ENG			1.2 Short description		code (from HIO)
Technisches Projekt 1	1		(optional)	MB.1.01	85
Technical Project 1 2 2.1 Cycle of module:			2.2 Duration of mod	tulo:	
Cother cycle of module.	Every winter semester		☐ 1 semester ☐ 2		
3 3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		mended
Bachelor`s programme	es:				
Mechanical Engineering	-				
International Engineerin	g (Outgoings)				
Mechanical Engineering			CE	1 1	or 2. GS
International Engineerin			UL	1. \	51 2. 00
Mechanical Engineering			CE	4	. or 5.
Specialisation in Plant E	<u> </u>				
Mechanical Engineering			CE	4	. or 5.
	otive and Drive Engineering				
Mechanical Engineering			CE	4	. or 5.
	uction and Manufactoring Tec	chnology			
Computer Science in Me	<u> </u>	<u> </u>	CE	4	. or 5.
	& Engineering majoring in M	echanical	CE	4	. or 5.
Engineering					
Mechanical Engineering	(dual study)		CE	SuS	e or WiSe
4 WOIKIOAU				Total wo	rkload
	Method of teaching	Hours per weel	k Hours per	Workload in	ECTS (credit
		per semester (SWS) for each method of teaching	semester for	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, practical period/internship, group work, project work, case study, simulation game, credited tutorial (more rows can be added)					
	Total	Total contact hours in SWS	s Total contact hours in hours		_
Non-contact hours	Preparation, follow-up work,		150	150	5
(e.g. tutorial, preparation, follow-up	written elaboration		150		
work, preparation for assignments and homework, research, etc.)					
	Total		Total non- contact hours 150		
acquire soft skills in addition to techni relevant?)	s (What should students be able to do after ha cal skills? For which other modules and prospe ble to independently develop	ective tasks in the la	module? Does the modu abour market are the acquire	uired knowledge and	

Students should be able to independently develop solutions for a specific task in mechanical engineering using tools and methods that are adequate for engineering purposes. They will improve their personality skills and methodological skills by presenting the intermediate results.

	5.2 Course content
	Cross-module task from the subject areas of the degree programme, either from industry or
	the university.
	→ 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 a company, you focus intensively on a practice-oriented task, giving you the opportunity to gain
	valuable professional experience. You present your interim results on a regular basis, helping you to
	improve your presentation skills.
	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
	Students must pass the examination
	6.2 Tupe and econe of examination (e.e. written examination and examination term paper presentation particlin length of examination is minuted)
	6.3 Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes) Set by person responsible for the module
	Set by person responsible for the module
	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
	7.2 Module Contact Person:
	Depending on offer
	7.3 Professors (optional):
	Depending on offer
	7.4 Maximum number of participants (optional)
	7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

1.1 Title of module (GER / ENG			1.2 Short descrip (optional)		dule code (from HIO)	
Technisches Projekt 2 /			(optional)	MB.1	MB.1.0186	
Technical Project 2 2.1 Cycle of module:			2.2 Duration of m	odulor		
Every summer semester	Every winter semester		☐ 1 semester		i i	
Other cycle, namely:	-					
3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory compulsory elect		commended	
			(CE), elective (E)			
Bachelor`s programme	es:					
Mechanical Engineering	-					
International Engineering	g (Outgoings)					
Mechanical Engineering	-		CE		1. or 2. GS	
International Engineering	g (Incomings)		CL		1. 01 2. 03	
Mechanical Engineering	-		CE		4. or 5.	
Specialisation in Plant E	ngineering		UL		4. Or 5 .	
Mechanical Engineering			CE		4. or 5.	
Specialisation in Automo	otive and Drive Engineering				4.013.	
Mechanical Engineering			CE		4. or 5.	
	uction and Manufactoring Tec	chnology				
Computer Science in Me			CE		4. or 5.	
	& Engineering majoring in M	echanical	CE		4. or 5.	
Engineering					4.010.	
Mechanical Engineering	(dual study)		CE	S	SuSe or WiSe	
Workload				Tota	al workload	
	Method of teaching	Hours per week	Hours per	Workload in		
	Method of teaching	per semester	semester for	hours	points)	
		(SWS) for each	each method of	Total contact a non-contact ho		
		method of teaching	teaching (usually the number	non-contact no	credit point; whole	
		5	of hours per week multiplied by 15)		numbers only	
Contact hours			multiplied by 15)			
(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 contact hours	Total contact hours in hours			
	Total	in SWS			_	
	Total	in SWS		150		
		in SWS	150	150	5	
(e.g. tutorial, preparation, follow-up	Total Preparation, follow-up work, written elaboration	in SWS		150	5	
(e.g. tutorial, preparation, follow-up work, preparation for assignments	Preparation, follow-up work,	in SWS		150	5	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work,	in SWS		150	5	
(e.g. tutorial, preparation, follow-up work, preparation for assignments	Preparation, follow-up work, written elaboration	in SWS	150	150	5	
(e.g. tutorial, preparation, follow-up work, preparation for assignments	Preparation, follow-up work,	in SWS		150	5	

relevant?)

Students should be able to independently develop solutions for a specific task in mechanical engineering using tools and methods that are adequate for engineering purposes. They will improve their personality skills and methodological skills by presenting the intermediate results.

5.2 Course content
Cross-module task from the subject areas of the degree programme, either from industry or the
university.
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.
In a company, you focus intensively on a practice-oriented task, giving you the opportunity to gain
valuable professional experience. You present your interim results on a regular basis, helping you to
improve your presentation skills.
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)
Set by person responsible for the module
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).*
See Examination Regulations for above-mentioned degree programmes (Section 5).
*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:
Depending on offer
7.3 Professors (optional):
Depending on offer
7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.)

1.1 Title of module (GER / EN Thermodynamik /	G)		1.2 Short descriptio (optional)	n 1.3 Module MB.1.01	e code (from HIO)	
Thermodynamics						
2.1 Cycle of module:	⊠ Every winter semester		2.2 Duration of mod			
Other cycle, namely: 3.1 Module offered in the follo	owing degree programme(s):		3.2 Compulsory (C) compulsory elective		mended	
_			(CE), elective (E)			
Bachelor`s programm						
Mechanical Engineerin			С		3	
International Engineeri			_		-	
Mechanical Engineerin						
International Engineeri						
Mechanical Engineerin			С		3	
Specialisation in Plant	<u> </u>		•		•	
Mechanical Engineerin			С		3	
	notive and Drive Engineering		•		~	
Mechanical Engineerin			С		3	
	ruction and Manufactoring Te	chnology	<u>_</u>		5	
Computer Science in M	lechanical Engineering					
Business Administratio	n & Engineering majoring in N	lechanical				
Engineering						
Mechanical Engineerin	a (dual studv)		С		3	
Workload	5 (-	
				Total wo	orkload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	Workload in hours Total contact and non-contact hours	ECTS (credit points) 30 hrs usually correspond to 1 credit point; who 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	Exercise	1	15			
tutorial (more rows can be added)	Total	Total contact hours	Total contact			
		in SWS	hours in hours 60	150	5	
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, written elaboration		90			
	Total		Total non- contact hours 90			
acquire soft skills in addition to tech relevant?)	es (What should students be able to do after h nical skills? For which other modules and prosp pletion of the module, stude	pective tasks in the lat	pour market are the acq	uired knowledge and	skills	

After successful completion of the module, students will be able to understand problems related to the fundamentals of thermodynamics, and to transfer them to practical engineering applications. In particular, they will be able to understand and assess the different thermodynamic concepts of systems and components. Students will be able to solve special tasks relating to power engineering and other typical application cases.

2 Course content
Basic concepts of thermodynamics
Thermodynamic behaviour of fluids
The main laws of thermodynamics
Thermodynamic cycles and changes of state
Selected applications
Details available in the university calendar, course timetable, etc.
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 nster to choose the right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance o module for the further course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. Du explore the conversion of the different kinds of energy, which is important in the design,
alculation and analysis of machines and systems. You gain a basic understanding of thermal
ocesses in a wide range od technical applications.
Prerequisites (formal: examination of module XY has to be passed or similar content-wise; module XY should have been attended, the following knowledge and
Is should have been acquired:)
one
Requirements for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active
udents must pass the examination
B Type and scope of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
ne module is regularly completed with a written exam (1.5 - 3 hours), an oral exam (20 - 45 minutes
Te module is regularly completed with a written exam (1.5 - 5 hours), an oral exam (20 - 45 minutes
a term paper (approx. 10 pages)
a term paper (approx. 10 pages)
a term paper (approx. 10 pages) Requirements for admission to examination
a term paper (approx. 10 pages)
a term paper (approx. 10 pages) Requirements for admission to examination
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations
a term paper (approx. 10 pages) Requirements for admission to examination Recurrent version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).*
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).*
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).*
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).* but will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).* bu will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).* but will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).* but will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
A term paper (approx. 10 pages) Requirements for admission to examination dee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade dee Examination Regulations for above-mentioned degree programmes (Section 3).* u will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module: German _ English _ Other, namely:
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee 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- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module: German [English] Other, namely: Module Contact Person: Tofessor DrIng. habil. S. aus der Wiesche / Professor DrIng. J. Scholz
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).* we will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtitiohe_bekanntmachungen/index.php?p=2,7. Languages used in the module: German _ English _ Other, namely: Module Contact Person: Fofessor DrIng. habil. S. aus der Wiesche / Professor DrIng. J. Scholz Professors (optional):
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a term paper (approx. 10 pages) Requirements for admission to examination Be current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade Be 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- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module: Berman English Other, namely: Module Contact Person: Forfessor DrIng. habil. S. aus der Wiesche / Professor DrIng. J. Scholz Professor DrIng. habil. S. aus der Wiesche / Professor DrIng. J. Scholz Maximum number of participants (optional)
a term paper (approx. 10 pages) Requirements for admission to examination ee current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade ee Examination Regulations for above-mentioned degree programmes (Section 3).* we will find the Examination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module: German English Other, namely: Module Contact Person: Module Contact Person: Professor DrIng. habil. S. aus der Wiesche / Professor DrIng. J. Scholz Professor OrIng. habil. S. aus der Wiesche / Professor DrIng. J. Scholz Maximum number of participants (optional) Further information (optional) (e.g. recommended reading, other persons involved, etc.)
a term paper (approx. 10 pages) Requirements for admission to examination Be current version of the Examination Regulations / special examination rules and regulations Module mark weighting for calculating final grade Be 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- enster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7. Languages used in the module: Berman English Other, namely: Module Contact Person: Forfessor DrIng. habil. S. aus der Wiesche / Professor DrIng. J. Scholz Professor DrIng. habil. S. aus der Wiesche / Professor DrIng. J. Scholz Maximum number of participants (optional)

Thermodynamik, Springer-Verlag, Berlin

1.1 Title of module (GER / EN			1.2 Short descriptio (optional)		le code (from HIO)
Thermofluiddynamik			(optional)	MB.1.0	194
Thermofluiddynamics 2.1 Cycle of module:			2.2 Duration of mod	ule:	
Every summer semester	Every winter semester		☑ 1 semester □ 2		
Other cycle, namely:					
3.1 Module offered in the follo	wing degree programme(s):		3.2 Compulsory (C) compulsory elective		nmended
			(CE), elective (E)	-	-
Bachelor`s programm	les:				
Mechanical Engineering	g -				
International Engineerin	ng (Outgoings)				
Mechanical Engineering	g -				
International Engineerin	ng (Incomings)				
Mechanical Engineering	g -				
Specialisation in Plant	Engineering				
Mechanical Engineering					
	otive and Drive Engineering				
Mechanical Engineering	g -				
Specialisation in Const	ruction and Manufactoring Tee	chnology			
Computer Science in N	lechanical Engineering		С		3
Business Administratio	n & Engineering majoring in M	lechanical	С		2
Engineering			L L		3
Mechanical Engineering	g (dual study)				
Workload					
				Total w	orkload
	Method of teaching	Hours per week per semester	Hours per semester for	Workload in hours	ECTS (credit points)
		(SWS) for each		Total contact and	30 hrs usually
		method of	teaching	non-contact hours	correspond to 1 credit point; whole
		teaching	(usually the number of hours per week		numbers only
			multiplied by 15)		
Contact hours (e.g. lecture, seminar, practical	Lecture	2	30		
course, practical 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 contact hours	Total contact		
		in SWS	hours in hours		
New environt la			60	150	5
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, written elaboration		90		
, , ,					
	Total		Total non-		
			contact hours 90		

After successful completion of the module, students will be able to understand problems related to the fundamentals of thermodynamics and fluid mechanics, and to transfer them into practical engineering applications. In particular, they will be able to understand and assess the different thermodynamical and fluid mechanical concepts for systems and components. In the practical course, the the students can apply their theoretical knowledge in experiments. The work in small groups and the preparation of reports and presentations enhance their communication and social skills, too.

5.2 Course content
 Fundamentals in Thermodynamics and Fluid Mechanics
 Thermophysical Properties of Fluids and Equation of State
 Balance Equations
Perfect Gas
Cycles and Thermodynamics of Engines
Steady-Flow Processes
Euler-Theory (Fundamentals of Turbomachinery)
Flow Past Bodies and Basic Phenomena
Dimensional Analysis and Similitude
→ 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, which is important
in the design, calculation and analysis of machines and systems. You gain a basic understanding of
thermodynamics and fluid mechanics of turbomachinery and other 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)
or a term paper (approx. To 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:
Professor DrIng. habil. S. aus der Wiesche
7.3 Professors (optional):
7.3 Professors (optional): Professor DrIng. habil. S. aus der Wiesche
7.3 Professors (optional):
7.3 Professors (optional): Professor DrIng. habil. S. aus der Wiesche
7.3 Professors (optional): Professor DrIng. habil. S. aus der Wiesche 7.4 Maximum number of participants (optional)
7.3 Professors (optional): Professor DrIng. 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.)

Think Tank (Kooperation mit FB MSH, MSD, MSB)

A	1.1 Title of module (GER / ENG	A		4.0 Chart descriptio	4.0 Medule	
	Ideenschmiede /)		1.2 Short descriptio (optional)	MB.1.018	code (from HIO)
	Think Tank					5
	2.1 Cycle of module:			2.2 Duration of mod	dule:	
	🛛 Every summer semester 🖂	Every winter semester		🛛 1 semester 🗌 2		
	Other cycle, namely: 3.1 Module offered in the follow			2.2.Compulson/(C)	2.2 Восоти	nended semester:
3	3.1 Module offered in the follow	ing degree programme(s):		3.2 Compulsory (C) compulsory electiv		iended semester:
				(CE), elective (E)		
	Bachelor`s programme					
	Mechanical Engineering					
	International Engineering	g (Outgoings)				
	Mechanical Engineering					
	International Engineering	g (Incomings)				
	Mechanical Engineering			CE	4 and 5	
	Specialisation in Plant E	ngineering				
	Mechanical Engineering			CE	4 and 5	
		otive and Drive Engineering				
	Mechanical Engineering			CE	4 and 5	
	Specialisation in Constru	uction and Manufactoring Tec	hnology			
	Computer Science in Me	echanical Engineering		CE	4 and 5	
	Business Administration	& Engineering majoring in M	echanical	CE	4 and 5	
	Engineering					
	Mechanical Engineering	(dual study)		CE	7 and 8	
4	Workload					
					Total wo	orkload
		Method of teaching	Hours per wee		Workload in	ECTS (credit
			per semester (SWS) for each	semester for each method of	hours Total contact and	points) 30 hrs usually
			method of	teaching	non-contact hours	correspond to 1 credit point; whole
			teaching	(usually the number of hours per week		numbers only
		-		multiplied by 15)		
	Contact hours (e.g. lecture, seminar, practical	Lecture	2	30		
	course, practical period/internship, group work, project work, case study,	Exercise	2	30		
	simulation game, credited tutorial	Practical course	1	15	-	
	(more rows can be added)		-		-	
		Total	Total contact hour	rs Total contact hours in hours		
				75		
	Non-contact hours	Preparation, follow-up work,		75	150	5
	(e.g. tutorial, preparation, follow-up work, preparation for assignments	preparation for the				
	and homework, research, etc.)	examination				
					-	
					_	
		Total		Total non- contact hours		
		Total				
5		s (What should students be able to do after ha		contact hours 75 e module? Does the mod		
5				contact hours 75 e module? Does the mod		
5	acquire soft skills in addition to technic	s (What should students be able to do after ha		contact hours 75 e module? Does the mod		
5	acquire soft skills in addition to technic relevant?) After participating in this r	s (What should students be able to do after ha cal skills? For which other modules and prosponent nodule, students should be able	to create an	contact hours 75 e module? Does the mod abour market are the acc innovative entrep	quired knowledge and	nse to a
5	acquire soft skills in addition to technic relevant?) After participating in this r real-world challenge using	s (What should students be able to do after ha cal skills? For which other modules and prosponent module, students should be able g the knowledge and skills devel	to create an	contact hours 75 e module? Does the mod abour market are the acc innovative entrep	quired knowledge and	nse to a
5	acquire soft skills in addition to technic relevant?) After participating in this r	s (What should students be able to do after ha cal skills? For which other modules and prosponent module, students should be able g the knowledge and skills devel	to create an	contact hours 75 e module? Does the mod abour market are the acc innovative entrep	quired knowledge and	nse to a

- Understand the concepts of entrepreneurship, startups, customer-focused design, technology-driven innovation and sustainable entrepreneurship.
- 3. Apply innovation methods like Design Thinking, Business Model Canvas, and Lean Startup.

- 4. Identify customers (B2B and B2C) and integrate their needs into an entrepreneurial concept.
- 5. Apply validation techniques to make data-driven decisions about business model design, product/service design, and the startup process.
- 6. Integrate basic marketing principles for start-ups, including mapping and assessment of main competitors, segmenting, selection of distribution channels and branding.
- 7. Apply basic financial components of startups, including revenue models, cost structure, and pricing.
- 8. Compellingly deliver business ideas to investors, partners, and other stakeholders.
- 9. Work effectively in interdisciplinary and intercultural teams.
- 10. Learn about sustainable business models and how sustainability and entrepreneurship can be closely aligned

5.2 Course content

This project aims at creating and commercializing a product and/or service in the mobility and inclusion space by tackling the challenge of facilitating/improving the lives of people in wheelchairs. we are very excited to bring students and professors from the FH Münster School of Business (MSB), Münster School of Design (MSD), Münster School of Health (MSH), and Engineering (MB) together to work in a real-life interdisciplinary context. The project focuses on developing a product and/or service idea, along with a startup plan and business model that uses our tools to try and grow an emerging business.

In this project, the goal will be to enhance and apply knowledge within your study program but also to learn how to work effectively with people from other disciplines.

Course Format:

We will meet on Teams all semester. The students from MSB, (MSD) and MB will all start at the same time, while the students from MSH will join the course later on. We will use our time together to help you identify and build a set of interdisciplinary competencies, that you can individually select and focus on. You will have an opportunity to learn and apply these competencies through a very applied entrepreneurial team project. The course is divided into three different learning formats:

1) Input sessions for all participants: will provide the students with all relevant definitions, methods, and tools. We won't spend a lot of time lecturing, but when we do, it will be related to this core knowledge, and we will try to use lots of interesting examples and mix in discussion questions to help you learn.

2) Individual team work sessions: will provide the students time to work on their project based on the learnings from the input sessions.

3) Coaching sessions: lead by WHKs from the respective faculty: are voluntary and designed to help the students with regards to questions that might arise. These are hands-on, structured activities where you learn 'by doing' about entrepreneurial thinking (creativity, innovation, iteration) and skills (ideation, validation, financial analysis) and can practice the tools we teach you.

With these three different learning formats, this course is designed to immerse you in the knowledge and skills that support successful interdisciplinary and entrepreneurial work. This is NOT a class where you take your own idea and at the end of 15 weeks, you have a startup. While failure is a great learning experience, research and our experience shows that this approach is not the best way to learn to be a successful entrepreneur in a university setting. Rather, we will take a more guided approach that provides students with some core knowledge about entrepreneurship, some important skills, and a chance to practice those skills in a very real, but controlled, project environment.

→ 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.

In this project, the goal is to enhance and apply knowledge within your study program but also to learn how to work effectively with people from other disciplines and departments. The course focusses on developing a product or a service idea for a special headline giving at the beginning of the course.

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)
You have three deliverables this semester, worth in total, 100 points:
Deliverable 1: Group assignment, worth 30 points:
Blueprint-Portfolio of tools used that helped your team when creating your business idea. Take pictures or screen shots of all your work, notes, drawings etc. and briefly comment on those to explain their purpose.
Deliverable 2: Group assignment, worth 50 points:
Team Presentation: Pitching your business ideas. The presentations will be 15 minutes long with 5 minutes Q&A. All students will have to deliver a roughly equal part of the presentation. We will aim for 4-5 students per team.
Deliverable 3: Individual assignment, worth 20 points:
Reflection paper, summarizing what you learned and how it relates to your intended career path, by addressing these three issues:
I. Three important skills or pieces of knowledge you learned about entrepreneurship and/or innovation - apply course concepts and at least one concept from the assigned articles.
II. An assessment of how your team performed. Did everyone contribute equally? Was your team process functional and smooth?
III. Two actions you would take differently next time (or put differently, what advice would you give next semesters' students based on your experience?)
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.
7.1 Languages used in the module: Image: Comparison of the state of the s
7.2 Module Contact Person: Professor DrIng. H. Apmann
7.3 Professors (optional): Professor DrIng. H. Apmann in Kooperation mit den beteiligten Professoren 7.4 Maximum number of participants (optional)
7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Pflichtteilnahme an den Veranstaltungen

Virtual Reality in factory planning

1.1 Title of module (GER / ENG) Virtual Reality in der Fa Virtual Reality in factor	abrikplanung /		1.2 Short descriptio (optional)	01.3 Module 0 MB.1.020	code (from HIO)	
2.1 Cycle of module:			2.2 Duration of mod ☑ 1 semester ☐ 2			
3.1 Module offered in the follow	ing degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		ended semester:	
Bachelor`s programme						
Mechanical Engineering						
International Engineering						
Mechanical Engineering -			CE		1. GS	
International Engineering (Incomings), EGU + ETI			_			
Mechanical Engineering			CE		4	
Specialisation in Plant E	<u> </u>					
Mechanical Engineering			CE		4	
	otive and Drive Engineering					
Mechanical Engineering			CE		4	
	uction and Manufactoring Tec	chnology				
Computer Science in Me			CE		4	
Business Administration Engineering	& Engineering majoring in M	echanical				
Mechanical Engineering	(dual study)		CE		SuSe	
Workload						
				Total wo	rkload	
	Method of teaching	Hours per weel per semester (SWS) for each method of teaching	semester for	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	Seminaristic Lecture	1	15			
(e.g. hecture, 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	2	30			
	Total	Total contact hours in SWS 4	s Total contact hours in hours 60			
Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)	Preparation, follow-up work, preparation for the examination Elaboration of project work		45	150	5	
	Total		Total non- contact hours 90			

Developed professional competence: The students know the status of the development and use of virtual reality techniques. They have an overview of important technical systems (e.g. VR software, VR glasses, VR projection systems such as power walls), can classify them and use them for practical applications. In addition, they can assess the suitability of virtual reality for modern engineering requirements in various disciplines (mechanical engineering, automation technology, building services engineering, energy technology, logistics, etc.) and critically evaluate it from both a technical and an economic perspective. The students plan and document an interdisciplinary, industry-related project independently in teams and carry it out. They communicate about specialist content within the framework of the project in German and, if necessary, in English.

Developed social competence: The students develop teamwork and communication skills. They can deal with conflicts in small international work teams so that they are able to solve interdisciplinary project tasks.

Developed self-competence: The students are able to work out technical/scientific content independently and in a well-organized manner for the preparation and follow-up of projects. In terms of content, they make use of German and, if necessary, English documents.

Developed methodological competence: The students increase their ability to concentrate in lectures through focused listening over longer periods of time. They train their memory by taking notes by hand and are able to filter out essential content. They are able to independently acquire, prepare and present subject knowledge within the framework of seminar-style lessons. In doing so, they also make use of foreign-language specialist literature if necessary. In addition, through practical project work with a VR software tool, they can plan, carry out, simulate and evaluate industry-related practical projects and technical processe. They can record, explain and summaries them scientifically correctly in writing.

5.2 Course content

The students design virtual worlds and interactions. They learn the practical handling of a VR software tool. They also take into account perception aspects and know how to use the relevant input and output techniques. They specifically use VR glasses in the context of the VR software tool used. They plan and realize industrial (sub-) projects with the inclusion of "Virtual Reality". Suitable case studies from industry are shown for this purpose.

 \rightarrow Details available in the university ca*lendar*, 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. In the module "Virtual Reality", students design virtual worlds and interactions and use VR glasses

specifically with the VR software tool used. They plan and realize (partial) industrial projects.

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)

Creation and documentation of a factory design with the VR software tool

6.4 Requirements for admission to examination

See current version of the Examination Regulations / special examination rules and regulations Regular and active participation in the seminaristic lecture and seminar lessons, successful completion of the project 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:

Dean Prof. Dr. rer. nat. E. Finke

7.3 Professors (optional):

Lecturer Dipl.-Ing. H. Beesten

7.4 Maximum number of participants (optional) 12 Persons (20 persons in case of group formation)

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

Bachelor - Practical modules

Practical Project (Admission with passed "Communication" in the 2nd/3rd semester)

1 1.1 Title of module (GER / ENG) Praxisphase / Practical Project			1.2 Short descriptic (optional)	MB.1 MB.1	1.3 Module code (from HIO) MB.1.0095 / MB.1.0096 / MB.1.0097	
2 2.1 Cycle of module: ⊠ Every summer semester ⊠ Other cycle, namely:	Every winter semester		2.2 Duration of mod ☐ 1 semester ☐ 2			
3 3.1 Module offered in the follow	ving degree programme(s):		3.2 Compulsory (C) compulsory elective (CE), elective (E)		commended ster:	
Bachelor`s programme	es:					
Mechanical Engineering						
International Engineering						
Mechanical Engineering			С		8. / 9.	
International Engineering						
Mechanical Engineering			С		6	
Specialisation in Plant E					-	
Mechanical Engineering	-		С		6	
Specialisation in Automo		ring			-	
Mechanical Engineering			С		6	
Specialisation in Constru		ig Technology	•		<u>^</u>	
Computer Science in Me		n in Marshaniant	С		6	
Business Administration	& Engineering majoring	g in iviecnanical	С		6	
Engineering Machanical Engineering	(dual atudu)		С		9	
Mechanical Engineering	(duai study)				9	
					-	
				Tota	I workload	
	Method of teaching	Hours per week	Hours per	Tota Workload in		
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	Workload in hours Total contact ar non-contact hou	ECTS (credit points) nd 30 hrs usually	
Contact hours	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact ar non-contact hou	ECTS (credit points) nd 30 hrs usually urs correspond to 1 credit point; whole	
Contact hours (e.g. lecture, seminar, practical course, practical period/internship,	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact ar non-contact hou	ECTS (credit points) nd 30 hrs usually urs correspond to 1 credit point; whole	
Contact hours (e.g. lecture, seminar, practical	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact ar non-contact hou	ECTS (credit points) nd 30 hrs usually urs correspond to 1 credit point; whole	
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study,	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact ar non-contact hou	ECTS (credit points) nd 30 hrs usually urs correspond to 1 credit point; whole	
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact ar non-contact hou	ECTS (credit points) nd 30 hrs usually urs correspond to 1 credit point; whole	
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact ar non-contact hou	ECTS (credit points) nd 30 hrs usually urs correspond to 1 credit point; whole	
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)		per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact ar non-contact hou	nd urs 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)		per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact ar non-contact hou	Rector (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) Non-contact hours (e.g. tutorial, preparation, follow-up		per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact ar non-contact hou	nd urs 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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments		per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact ar non-contact hou	nd urs 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) Non-contact hours (e.g. tutorial, preparation, follow-up work, preparation for assignments		per semester (SWS) for each method of teaching	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact ar non-contact hou	nd urs correspond to 1 credit point; whole numbers only	

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 better assess their future professional work by performing specific tasks and undertaking practical work in companies. In particular, students will be able to apply the knowledge and skills gained previously on the study programme, and to reflect on and assess the insights and experience gained in the process. By socially interacting in the company, students are able to hone their communication skills, their ability to deal with conflict, and their capacity for teamwork. Moreover, they will master the basics of scientific literature search. Students will be able to recognise and formulate information requirements. Building on this, they will be

and present t Bachelor thes	ccess to the necessary information, select and assess appropriate sources, he results gained to suit the target group. Besides preparing students for their sis, which requires to use scientific literature, the module also prepares them nal information providing in their career.
5.2 Course conten Practice-base	t ed tasks in industrial and craft business.
\rightarrow Details available in	the university calendar, course timetable, etc.
Münster to choose the the module for the furth Get an insigh	ion about module (This section [max. 250 characters] will be published on the FH Münster website to help people interested in studying at FH right degree. Please focus on the main intended learning outcomes and course content, ideally also comprising information about the relevance of her course of study and the labour market. Please write whole sentences, address your (prospective) students directly and avoid technical terms. t into the working world: during the practical phase, lasting twelve weeks at most, you any-to-day work in mechanical engineering at first hand. You are given a certificate at the
skills should have been See current v Confirmation Module "Com	ersion of the Examination Regulations / special examination rules and regulations of participation in the online course "Information Literacy" munication" of the 2nd / 3rd semester needs to be passed
participation) Qualifying ce Confirmation Passing the "	for awarding credit points (e.g. final examination pass, successful completion of assignments in the course of study, regular active rtificate issued by the industrial company of participation in the online course "Information Literacy" Communication" exam oft he 2nd /3rd semester.
None	e of examination (e.g. written examination, oral examination, term paper, presentation, portfolio, length of examination in minutes)
See current v Practice-base	for admission to examination ersion of the Examination Regulations / special examination rules and regulations ed tasks in industrial and manual settings.
	reighting for calculating final grade tion Regulations for above-mentioned degree programmes (Section 3).*
muenster.de/hochschu	nination Regulations of all degree programmes in the official announcements of FH Münster: https://www.fh- ile/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.
	lish 🗌 Other, namely:
7.2 Module Contac The Dean	
7.3 Professors (op	,
7.4 Maximum num	ber of participants (optional)

7.5 Further information (optional) (e.g. recommended reading, other persons involved, etc.) Material to accompany the online course "Information Literacy"

1.1 Title of module (GER / ENG) Bachelorarbeit /)		1.2 Short descriptio (optional)	MB.1.0001	code (from HIO) — MB.1.0009 5 — MB.1.0016	
Bachelor Thesis					D - MB.1.0016	
2.1 Cycle of module: ☑ Every summer semester ☑	Everv winter semester		2.2 Duration of mod ☐ 1 semester ☐ 2			
Other cycle, namely:	-		1			
3.1 Module offered in the follow	/ing degree programme(s):		3.2 Compulsory (C), compulsory elective (CE), elective (E)		ended semester	
Bachelor`s programme	es:					
Mechanical Engineering						
International Engineering	g (Outgoings)					
Mechanical Engineering -			С	2	3. / 9.	
International Engineering	g (Incomings)		0		0.79.	
Mechanical Engineering			С		6	
Specialisation in Plant E			•		0	
Mechanical Engineering			С		6	
Specialisation in Automo		ring	•		U	
Mechanical Engineering			С		6	
Specialisation in Constru		g Technology			0	
Computer Science in Me			С		6	
Business Administration	& Engineering majoring	in Mechanical	С		6	
Engineering					-	
Mechanical Engineering	(dual study)		С		9	
Workload				Total wo	orkload	
Workload	Mothod of toaching	Hours por wook	Hours por	Total wo		
Workload	Method of teaching	Hours per week per semester (SWS) for each method of teaching	semester for	Total wo Workload in hours Total contact and non-contact hours	Prkload ECTS (credit points) 30 hrs usually correspond to 1 credit point; whole numbers only	
Contact hours	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whol	
	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whol	
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial	Method of teaching	per semester (SWS) for each method of	semester for each method of teaching (usually the number of hours per week multiplied by 15)	Workload in hours Total contact and	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whol	
Contact hours (e.g. lecture, seminar, practical course, practical period/internship, group work, project work, case study, simulation game, credited tutorial		per semester (SWS) for each method 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	ECTS (credit points) 30 hrs usually correspond to 1 credit point; whol numbers only	

After successful preparation, students will be able to independently tackle a practice-based question from the subject area of mechanical engineering, both as regards details of the subject and interdisciplinary contexts, within a set period. In particular, they will be able to independently apply practical and scientific methods, and to transfer them to the specific question. Students will be able to present the results in an appropriate and structured manner in a written paper.

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

5.2 Course content

Practice-based task from the subject area of the degree programme; the thesis is usually conducted in an industrial setting.

 \rightarrow 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.

Your Bachelor's thesis demonstrates your ability to independently apply the knowledge gained from your studies. You address a practice-related question in an academically sound manner, making confident use of the relevant methods.

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:

7.2 Module Contact Person:

The Dean

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 Kollquium /	i)		1.2 Short descriptio (optional)		code (from HIO) 4 – MB.1.0074	
Colloquium			,			
2.1 Cvcle of module:			2.2 Duration of mod			
Every summer semester 🛛 Every winter semester			🛛 1 semester 🗌 2 semesters			
			3.2 Compulsory (C) compulsory elective (CE), elective (E)		3.3 Recommended semeste	
Bachelor`s programm	es:					
Mechanical Engineering						
International Engineerin						
Mechanical Engineering -			С		e / 0	
International Engineering (Incomings)			C		8. / 9.	
Mechanical Engineering			С			
Specialisation in Plant Engineering			C		6	
Mechanical Engineering] -		С		6	
Specialisation in Autom	otive and Drive Enginee	ering	C		0	
Mechanical Engineering] -		С		6	
	uction and Manufactorir	ng Technology			0	
Computer Science in Me	<u> </u>		С		6	
Business Administration & Engineering majoring in Mechanical Engineering			С		6	
Mechanical Engineering	(dual study)		С		9	
Workload						
				Total wo	orkload	
	Method of teaching	Hours per week per semester (SWS) for each method of teaching	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; who numbers only	
Contact hours (e.g. lecture, seminar, practical						
sourse, 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	90	3	
Non-contact hours						
(e.g. tutorial, preparation, follow-up work, preparation for assignments and homework, research, etc.)						
and norne work, research, etc. /						
	Total		Total non-			
	i viai		contact hours			
	s (What should students be able to d cal skills? For which other modules a					

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 Building on the student's Bachelor thesis

→ 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.

The Bachelor's colloquium (oral exam) involves you orally presenting the results of your thesis. You give reasons for the approach you took, and explain interdisciplinary relationships. You also assess the significance of your thesis for practice.

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:)

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) Presentation followed by an oral examination, with a maximum 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.fhmuenster.de/hochschule/aktuelles/amtliche_bekanntmachungen/index.php?p=2,7.

7.1 Languages used in the module:

7.2 Module Contact Person:

The Dean

7.3 Professors (optional):

7.4 Maximum number of participants (optional)

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