Appendix B: Module catalogue

for the study programme Industrial Engineering and Management (work-integrated) B.Eng.

Please note: The German version of this document is the legally binding version. The English translations provided here are for information purposes only.

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	chelor T	hesis							ВА	
ID:		Workload:	Credits:	Study semester:			Frequency:		Durat	ion:
313	33	360 h	12	7th sem.		Annual (Summer)		1 semester		
1	Course:		Planned group sizes:		Volume:		Actual contact hours/face-to-face teaching:		Self-st	udy
	Lecture		60 students		0	SCH	0	h	360	h
	Semina	r tuition	30 students		0	SCH	0	h	0	h
	Exercise	;	20 students		0	SCH	0	h	0	h
	Practica seminar		15 students		0	SCH	0	h	0	h
	Supervi	sed self-	60 students		0	SCH	0	h	0	h
2		g outcomes/	competences:			•	•	•	•	•
	indeper area, b	ndently wo	y completing rk on and present subject-specification and subject-specification and subject subject.	sent a fic de	a prac tails	ctice-o and in	riented the int	task fror	n their	
3	Content	S:								
	The bachelor thesis is an independent scientific work from the subject area of the respective study programme with a description and explanation of its solution. It can be derived from current research projects at the university or from operational problems with an engineering character. It can also be carried out through an empirical investigation or through conceptual or design tasks or through an evaluation of existing sources. A combination of these is possible.									
		n an empii	rical investigat	tion o	ering or thr	charac ough	cter. It o	can also ual or d	be carr esign ta	ied out asks or
4	through	n an empii n an evalua of teaching:	rical investigat tion of existing	tion o	ering or thr rces.	charac ough	cter. It o	can also ual or d	be carr esign ta	ied out asks or
4 5	Forms of Writter	n an empii n an evalua of teaching:	rical investigation of existing	tion o	ering or thr rces.	charac ough	cter. It o	can also ual or d	be carr esign ta	ied out asks or
	Forms of Writter	n an empir n an evalua of teaching: n composition ation require	rical investigate tion of existing on with faculty ments:	tion o	ering or thr rces.	charac cough A coml	cter. It of conception	can also ual or d of these	be carr esign to is poss	ied out asks or
	Forms of Writter Participation Formal: Content	n an empir n an evalua of teaching: n composition ation required -	rical investigate tion of existing on with faculty ments:	tion o	ering or thr rces.	charac cough A coml	cter. It of conception	can also ual or d of these	be carr esign to is poss	ied out asks or
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5	Forms of Writter Participal Formal: Content Form of Condition Applicate Digital B.Eng., Engine Manage	on an empire an evaluation require composition require composition require composition for the away ion of the machine composition (wowering (worker))	on with faculty ments: rard of credit point o	tutor tion (g sould tutor tutor from ints: lowing d) B.E on (i B.E B.Eng	ering or throces. It is a study in the state of the state	charac rough A coml tudent	cter. It of concepts concepts coination dispersion disp	can also ual or d of these I subject ogies (wo	be carresign to is poss	grated) Service
5 6 7	Forms of Writter Participal Formal: Content Form of Condition Applicat Digital B.Eng., Engine Manage Importa	of teaching: a composition of the award on for the award on for the award on for the award on for the management (worment (wormed of the grant of th	on with faculty ments: rdinated topic: rard of credit point	tutor tion (g sould tutor tutor from ints: lowing d) B.E on (i B.E B.Eng	ering or throces. It is a study in the state of the state	charac rough A coml tudent	ammes): Technoloated) B	can also ual or d of these I subject ogies (wo	be carresign to is poss area ork-inter	grated) Service
5 6 7 8	Forms of Writter Participal Formal: Content Form of Condition Applicated B. Eng., Engined Managed Importation accomposition acco	on an empire an evaluation require composition require composition require composition for the away ion of the machine composition (wowering (worker))	on with faculty ments: rdinated topic: rard of credit point	tutor tion (g sould tutor tutor from ints: lowing d) B.E on (i B.E B.Eng	ering or throces. It is a study in the state of the state	charac rough A coml tudent	ammes): Technoloated) B	can also ual or d of these I subject ogies (wo	be carresign to is poss area ork-inter	grated) Service
5 6 7 8	Forms of Writter Participal Formal: Content Form of Condition Applicate Digital B.Eng., Engined Manage Importation accommodule - tba	of teaching: a composition assessment on for the award of the man assessment (wor ering (wor man assessment (wor more of the gradence with	on with faculty ments: rdinated topic: rard of credit point	tutor tion (g sould tutor tutor from ints: lowing d) B.E on (i B.E B.Eng	ering or throces. It is a study in the state of the state	charac rough A coml tudent	ammes): Technoloated) B	can also ual or d of these I subject ogies (wo	be carresign to is poss area ork-inter	grated) Service
5 6 7 8	Forms of Writter Participal Formal: Content Form of Condition Applicate Digital B.Eng., Engined Manage Importation accommodule - tba	of teaching: a composition of teaching: a composition require a composition require a composition of the away composition of the away composition of the manual composition (workering (wor	on with faculty ments: rdinated topic: rard of credit point	tutor tion (g sould tutor tutor from ints: lowing d) B.E on (i B.E B.Eng	ering or throces. It is a study in the state of the state	charac rough A coml tudent	ammes): Technoloated) B	can also ual or d of these I subject ogies (wo	be carresign to is poss area ork-inter	grated) Service

Pro	Procurement, Production and Logistics										
ID: Workload:			Credits:	Stud	y sem	ester:	Frequen	су:	Durat	ion:	
3333 150 h		150 h		5	2nd sem.			Annual (Summer)		1 sen	nester
1	Course:		Planned group sizes:			Volume:		Actual contact hours/face-to-face teaching:		Self-study	
	Lecture		60	50 students		2	SCH	0	h	56	h
	Seminai	tuition	30	30 students		0	SCH	0	h	0	h
	Exercise)	20) students		2	SCH	16	h	62	h
	Practical or seminar		15	15 students		0	SCH	0	h	0	h
	study	sed self-		0 students		1	SCH	16	h	0	h

Students can explain the functions of "procurement," "production" and "logistics" in a differentiated way and understand their interrelationships as well as the weaknesses of these functions. With the help of the selected contents and methods, they can recognise and properly assess real economic tasks and problem areas in particular and independently develop approaches to solutions. Students will be able to carry out a sound supplier evaluation and selection and, based on production planning, investigate suitable sourcing concepts and decide which scientific method is appropriate for sourcing and demand calculation. They can systematically analyse procurement markets to increase their transparency and recognise developments relevant to procurement.

Students learn about basic production systems and can evaluate their applicability for specific industries. They can independently calculate bottleneck-oriented production programmes and transfer the results to operational production planning and control.

In the field of logistics, students understand practice-relevant objects from intralogistics, transport logistics and supply chain management. They can also analyse complex logistical systems.

3 Contents:

- Procurement market research (objects and processes)
- Procurement planning (principles, routes, dates and quantities),
- Procurement execution (supplier selection, requesting and checking of quotes, selection of quotes and ordering),
- Procurement controlling (cost and process control)
- Demand assessment (programme-oriented, consumption-oriented and heuristic demand assessment),
- Inventory planning (inventory types, strategies, management and monitoring),
- Planning of logistics and production processes
- Systematisation of production factors
- Planning and management of production
- Logistics planning
- Logistics systems (intralogistics, transport logistics and storage systems)
- Distribution logistics
- 4 Forms of teaching:

	Learning ma	terials for self-study, classroom events in the form of exercises					
5	Participation re	equirements:					
	Formal:						
	Content:						
6	Form of assess	sment:					
	Term paper of	or written examination					
7	Condition for t	he award of credit points:					
	Module exam	nination pass					
8	Application of the module (in the following study programmes):						
	Digital Logist	ics (work-integrated) B.Eng. and Industrial Engineering and					
		(work-integrated) B.Eng.					
9	Importance of	the grade for the final grade:					
	in accordance	e with BRPO					
10	Module coordi	nator:					
	Prof. Dr. rer.	oec. Pascal Reusch					
11	Other informa	tion:					
12	Language:						
	German						

Dat	abases								DUD	
ID:		Workload:	Credits: Stud		ly semester:		Frequency:		Duration:	
301	3019 150 h		5	2nd	sem.		Annual (Summer)		1 semester	
1	Course:		Planned group sizes:	Planned group sizes:			Actual contact hours/face-to-face teaching:		Self-stu	dy
	Lecture		60 students		2	SCH	0	h	68	h
	Seminar	tuition	30 students		0	SCH	0	h	0	h
	Exercise		20 students		1	SCH	8	h	34	h
	Practical seminar		15 students		1	SCH	16	h	0	h
	Supervis study		60 students		1.5	SCH	24	h	0	h
2	Learning Studen		competences:							
	•	database sy acquire kn modelling in are able to a requirement are proficient well as cha gain the ab can plan a database a	owledge about a color owledge about a color own a colo	ut meanii omple ion I SQL s. te and	oderning of i te relate to per	(objectional	ect-orien lisation i databas simple a abase tec	ted) and rules e design and comp	d classic , starting lex queri	data g from es, as
3	•	Introduction modelling, Basics of database q Data "Datenvera "Datenbeso "Datenaufs Efficiency o	n to databas normalisation database sys ueries) Manipulatior rbeitungsspra chreibungsspra ichtsprache") of SQL queries on concepts	theor stems n che") ache")	y, dat (data La , Data , Dat	abase abase nguag a Defir a Cor	e languag design, e nition La ntrol Lar	ie SQL) databa: (DML, nguage	se defin Ge (DDL, Ge	itions, erman erman
4		f teaching:								
•		g units for	self-study, cla	issroo	m eve	ents in	the forn	n of exer	cises an	d
5		ntion require -	ments:							
6	Form of	assessment	: en examinatio	n, cor	nbine	d exan	nination.	project	work, or	al
7	examin	ation or ex	amination acc ard of credit po	ompa						
			on pass and co		asses	sment				
8			odule (in the fo							

	Digital Logistics (work-integrated) B.Eng., Digital Technologies (work-integrated) B.Eng., Product-Service Engineering (work-integrated) B.Eng. and Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Dr. rer. nat. Sabrina Proß
11	Other information:
	-
12	Language:
	German

_	litai B2B	Marketin	g						DBM		
ID:		Workload:	Credits:	Stud	y sem	ester:	Frequer	су:	Durat	Duration:	
336	362 150 h		5	5 6th s			Annual (Summer)		1 semester		
1	Course:		Planned grou	0	Volume:		Actual contact hours/face-to-face teaching:		Self-st	udy	
	Lecture		60 students		2	SCH	0	h	56	h	
	Seminar	tuition	30 students		0	SCH	0	h	0	h	
	Exercise)	20 students		2	SCH	16	h	62	h	
	Practica seminar		15 students		0	SCH		h	0	h	
	study	sed self-	60 students		1	SCH	16	h	0	h	
2	Learning	g outcomes/	competences:		•				•	•	
	 Identify key differences from traditional marketing approaches classify the different methods; Discuss digital marketing concepts and compare formats and cont taking into account the particularities of B2B markets; Apply basic analytical methods that enable them to compare and evaluate effectiveness of digital marketing measures; Formulate concepts for modern online communication channels again the background of the special circumstances of B2B-influenced production and services, taking into account the legal framework; Review the contents of the course independently and to discuss the learning groups and to present the results obtained. 									valuate agains	
				the co	urse	e legal indepe	framew ndently	ork; and to c	•		
3	Content	s: Fundament Relevance Planning th Digital mar E-business Social med Legal frame		marke irketing ence erce arketir	urse the ting i g mix	e legal indepe results n B2B	framew ndently obtaine	ork; and to c d.	•		
	Content: Forms of Learning	s: Fundament Relevance Planning th Digital mar E-business Social med Legal frame If teaching:	cals of digital of content make online mark keting intellige and e-commercial and app makework in onlings for self-studges.	marke irketing ence erce arketirie e B2B	ting i g mix	e legal indepe results n B2B	framew ndently obtaine markets	ork; and to d	discuss t	them in	
4	Content: Forms o Learnin	s: Fundament Relevance Planning th Digital mar E-business Social med Legal frame	cals of digital of content make online mark keting intellige and e-commercial and app makework in onlings for self-studges.	marke irketing ence erce arketirie e B2B	ting i g mix	e legal indepe results n B2B	framew ndently obtaine markets	ork; and to d	discuss t	them in	
4	Forms o Learnin Participa Formal:	s: Fundament Relevance Planning th Digital mar E-business Social med Legal frame f teaching: ag materials	cals of digital of content make online mark keting intellige and e-commercial and app makework in onlings for self-studges.	marke irketing ence erce arketirie e B2B	ting i g mix	e legal indepe results n B2B	framew ndently obtaine markets	ork; and to d	discuss t	them in	
4	Content Forms of Learning Participate Formal: Content	s: Fundament Relevance Planning th Digital mar E-business Social med Legal frame f teaching: ation require - : -	cals of digital of content make online mark keting intellige and e-commercia and app makework in onlings for self-study	marke irketing ence erce arketirie e B2B	ting i g mix	e legal indepe results n B2B	framew ndently obtaine markets	ork; and to d	discuss t	them i	
4	Forms of Learning Formal: Content Form of	s: Fundament Relevance Planning th Digital mar E-business Social med Legal frame f teaching: g materials ation require assessment	cals of digital in of content make online mark keting intellige and e-commercia and app makework in onlines for self-studyments:	marke irketing ence erce arketir e B2B	ting i g mix	e legal indepe results n B2B	framew ndently obtaine markets	ork; and to d	discuss t	them i	
5	Forms of Learning Formal: Content Form of Written	s: Fundament Relevance Planning th Digital mar E-business Social med Legal fram f teaching: g materials ation require assessment exam, pro	cals of digital in of content make online mark keting intellige and e-commercia and app makework in onlines for self-studyments:	marke arketing ence erce arketire B2B	ting i g mix	e legal indepe results n B2B	framew ndently obtaine markets	ork; and to d	discuss t	them i	
3 4 5 6 7	Forms of Learning Formal: Content Form of Written Condition	s: Fundament Relevance Planning th Digital mar E-business Social med Legal frame f teaching: ag materials ation require	cals of digital of content make online mark keting intellige and e-common and app makework in onling the for self-study ments:	marke arketing ence erce arketire B2B	ting i g mix	e legal indepe results n B2B	framew ndently obtaine markets	ork; and to d	discuss t	them i	
5	Forms of Learning Formal: Content Form of Written Condition Module	s: Fundament Relevance Planning th Digital mar E-business Social med Legal frame f teaching: g materials ation require - assessment exam, pro	cals of digital of content make online mark keting intellige and e-common and app makework in onling the for self-study ments:	marke inketing ence erce arketine B2B y, class oral expirits:	ting i g mix	e legal indepe results n B2B keting n sessi	framew ndently obtaine markets	ork; and to d	discuss t	them i	

	in accordance with BRPO
10	Module coordinator:
	Prof. Dr. Adam-Alexander Manowicz
11	Other information:
	Supplementary literature will be announced before the beginning of the course.
12	Language:
	German

Dig	Digital Technology										
ID:	ID: Workload:			Credits:	Stud	y sem	ester:	Frequen	cy:	Duratio	on:
311	3119 150 h			5	2nd or 6th sem.			Annual (Summer)		1 sem	ester
1	Course:		Planned group sizes:			Volume:		Actual contact hours/face-to-face teaching:		Self-study	
	Lecture		60	0 students		1	SCH	0	h	32	h
	Seminar	Seminar tuition 3		30 students		0	SCH	0	h	0	h
	Exercise)	20	20 students		3	SCH	24	h	70	h
	Practical or seminar		15	15 students		0	SCH	0	h	0	h
	study	sed self-		0 students		1.5	SCH	24	h	0	h

After successfully completing the course, students know the basics of analysing and designing simple digital circuits. Students will be able to describe and classify the basic interrelationships in the field of digital technology and control technology. They are able to identify the benefits of digital systems in a problemoriented manner and to select and develop solution approaches and strategies. The students can develop simple digital circuits to solve control engineering tasks from the various technical areas. Furthermore, they can justify and defend their solution to a given digital technology problem.

The students know the basics of programmable logic circuits and FPGAs and their text-based description with selected hardware description languages.

3 Contents:

Introduction to digital technology

- Terms
- Definitions
- Number systems
- Codes and coding

Analysis and synthesis of circuits

- Basic and derived links
- Calculation rules of circuit algebra
- Description of logical functions
- Simplification of logical circuits
- Code

converters Rear

derailleurs

- Bistable and monostable tilting stages
- Delay elements
- Astable tilt steps

Counters

- Asynchronous and synchronous counters
- Design procedures

Programmable Logic Circuits (PLD)

- Introduction of PLDs
- Programming PLDs
- FPGAs
- Hardware description languages
- 4 Forms of teaching:

	Learning materials for self-study, classroom sessions in the form of exercises.						
5	Participation r	equirements:					
	Formal:	None					
	Content:						
6	Form of assess	sment:					
	Term paper,	written exam, combination exam, performance exam or oral exam					
7	Condition for t	he award of credit points:					
	Module exam	nination pass					
8	Application of	the module (in the following study programmes):					
	Mechatronics	Automation (work-integrated) B.Eng. and Industrial Engineering					
		ment (work-integrated) B.Eng.					
9	Importance of	the grade for the final grade:					
	in accordanc	e with BRPO					
10	Module coordi						
	Prof. DrIng	. Christian Stöcker					
11	Other informa	• • • • • • • • • • • • • • • • • • • •					
	Supplementa	ry literature will be announced at the beginning of the course.					
12	Language:						
	German						

Doc	Documentation of Mechatronic Systems										
ID:	ID: Workload:			Credits:	Stud	y sem	ester:	Frequen	cy:	Durati	on:
3126 150 h		150 h		5	6th sem.		Annual (Summer)		1 sem	nester	
1	Course:		Planned group sizes:			Volume:		Actual contact hours/face-to-face teaching:		Self-study	
	Lecture		60	0 students		1	SCH	0	h	56	h
	Seminar	tuition	30	30 students		0	SCH	0	h	0	h
	Exercise)	20) students		3	SCH	24	h	54	h
	Practical or seminar		15	15 students		0	SCH	0	h	0	h
	study	sed self-		0 students		1	SCH	16	h	0	h

The students know the high requirements for technical documentation and are able to create such documents. They know the legal framework of a CE marking and can create the requirements for awarding a CE mark.

They can prepare a legally sound hazard analysis of production processes and have knowledge of hazard prevention. They know the most important principles of the currently valid Machinery Directive as well as important safety standards and the Low Voltage Directive.

They can draw up a specification sheet and, derived from it, a requirements specification and know the basic elements of product liability.

3 Contents:

- Fundamentals of machinery safety
- Harmonised European standards
- Conformity and presumption of conformity
- Machinery Directive
- Low Voltage Directive; Product Safety; EMC Directive
- Basics of Product Liability
- ISO 12100 "Safety of machinery"
- Protective devices: separating, non-separating, technical implementation
- Protective distances
- Basics of technical documentation:
- Specifications

4	Forms of teaching:							
	Learning uni	s for self-study, classroom sessions in the form of exercises						
5	Participation requirements:							
	Formal:							
	Content:							
6	Form of assess	sment:						
	Term paper,	written exam, combination exam, project work or oral exam						
7		he award of credit points:						
	Module exam	nination pass						
8	Application of the module (in the following study programmes):							
		Automation (work-integrated) B.Eng. and Industrial Engineering						
		nent (work-integrated) B.Eng.						
9	Importance of	the grade for the final grade:						
	in accordanc	e with BRPO						
10	Module coordi	nator:						
	Prof. DrIng	. Thomas Freund						
11	Other informa	tion:						
	Necessary su	ipplementary literature will be announced at the beginning of the						
	course.							
12	Language:							
	German							

Int	roductio	n to the P	rofessional l	rofessional Field						
ID:		Workload:	Credits:	Stud	dy semester:		Frequency:		Duration:	
3000		150 h	5	1st	sem.		Annual (Winter)		1 semester	
1	Course:		Planned group sizes:)	Volu	me:	hours/	contact face-to-	Self-stu	ıdy
	Lecture		60 students		1	SCH	0	eaching: h	35	h
	Seminar	tuition	30 students		0	SCH	0	h	0	h
	Exercise	<u> </u>	20 students		1	SCH	8	h	46	h
	Practica seminar		15 students		2	SCH	32	h	13	h
	Supervis		60 students		1	SCH	16	h	0	h
3	contents: Occupational profile, fields of work and development prospects for engineers in the field of industrial engineering and management: Basics of industrial engineering and management: Basics of industrial enterprises (objectives, structure, types of enterprises, corporate functions) Tasks of industrial engineers in industrial companies Basics for analysing relevant industries and markets Knowledge of project-related working methods Communication in the company Management soft skills Scientific work (presentation, scientific writing) Excursions to companies with a focus on company processes and areas of activity that are relevant for industrial engineering and management									
4			s for self-stud	y, clas	ssroor	n ever	nts in the	e form of	exercis	es and
5		ation require Non	Э							
6	Form of	assessment	:							
			en examinatio		ject v	vork o	r oral ex	aminatio	n	
7		examination	ard of credit po on pass	mits:						
8			odule (in the fo	llowing	g stud	y progr	ammes):			
Industrial Engineering and Management (work-integrated) B.Eng.										

9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. DrIng. Andrea Kaimann
11	Other information:
	Supplementary literature will be announced at the beginning of the course.
12	Language:
	German

Elec	Electrical Machines									ЕМ	
ID:		Workload:		Credits:	Stud	y sem	ester:	Frequer	ncy:	Duratio	on:
312	4	150 h		5	5th sem.		Annual (Winter)		1 sem	1 semester	
1	Course:		Planned group sizes:			Volu	me:	hours	contact /face-to- eaching:	Self-stu	dy
	Lecture		60	60 students		2	SCH	0	h	56	h
	Seminar tuition Exercise Practical or seminar Supervised self-study		30	30 students		0	SCH	0	h	0	h
			20	20 students		1	SCH	8	h	46	h
			15	15 students 60 students		1	SCH	16	h	0	h
			60			1.5	SCH	24	h	0	h

After successful completion of the course, the students have understood the functional principle of the DC motor, the three-phase synchronous motor and the three-phase asynchronous motor. The students can describe the function of the respective motor types in a few words and describe the steady-state operating behaviour using the steady-state motor equations they have worked out. In addition, the students can select suitable operating points for controlling the motor.

The students practically tested and evaluated the operating behaviour of a DC motor in small groups. In addition, the students worked in small groups to understand the functional principle of an inverter for controlling a three-phase motor and to create the control programme of a three-phase inverter in a common programming environment and tested and evaluated it on a three-phase motor.

3 Contents:

Introduction to drive technology

- Tasks of drive technology
- Basic structure of an electric drive
- Materials for building electric motors
- Cooling of electrical drives
- Losses in electrical drives

Basic electrotechnical laws

- Flow law
- Induction law
- Force action law

DC motor

- Design and operating principle
- Modelling
- Stationary operating behaviour
- Operation on a buck converter
- Inverter circuit
- Pulse width modulation

Synchronous motor

- Design and operating principle
- Modelling
- Stationary operating behaviour and operating point selection

Asynchronous motor

Design and operating principle

	l Mada	.llin a								
	Mode									
		Operating behaviour Forms of tooching:								
4	Forms of teaching:									
		its for self-study, classroom sessions in the form of exercises and								
	practicals.									
	D 11 1 11									
5		requirements:								
	Formal:									
	Content: None									
6	Form of asses	ssment:								
		written examination, project work or oral examination								
7		the award of credit points:								
	Module exar	mination pass and course assessment								
8	Application of	the module (in the following study programmes):								
	Mechatronic	s/Automation (work-integrated) B.Eng. and Industrial Engineering								
	and Manage	ment (work-integrated) B.Eng.								
9	Importance o	f the grade for the final grade:								
	in accordance	ce with BRPO								
10	Module coord	inator:								
	Prof. DrIng	g. Michael Leuer								
11	Other informa	ation:								
	Supplement	ary literature will be announced at the beginning of the course.								
12	Language:									
	German									

Ele	ctrical N	leasureme	nt						EMT		
ID:		Workload:	Credits:	Stud	ly semester:		Frequency:		Duration:		
3115 150		150 h	5	3rd sem	or	4th	each semester		1 semester		
1	Course:		Planned grou sizes:	p	Volui	me:	hours	contact face-to- eaching:	Self-stu	udy	
	Lecture		60 students		2	SCH	0	h	56	h	
	Seminai	tuition	30 students		0	SCH	0	h	0	h	
	Exercise	<u>,</u>	20 students		1	SCH	8	h	46	h	
	Practica seminar	l or	15 students		1	SCH	16	h	0	h	
		sed self-	60 students		1.5	SCH	24	h	0	h	
2	Learning	g outcomes/c	ompetences:								
3	definition	ons, calcula rement erro s.	odule is to ac ations and i rs as well as a	measu	remer	nts of	electri	cal mea	surands	, their	
	General basics of measurement technology are taught in order to then work out the basics of electrical measurement, preferably of electrical measurands. Essential teaching contents are: Basics of measuring electrical quantities Definitions and calculations of time averages Measurement deviations and measurement uncertainties Structure, function and properties of analogue electrical measuring instruments Digital storage oscilloscopes Power and energy measurement Differential arrangements										
4	Forms of Learnin		self-study, cla	assroo	m eve	ents in	the for	m of exe	rcises ar	nd	
5	practica Participa Formal:	ation requirer None									
	Content: None										
6	Form of	assessment:		nral ev	am						
7	Conditio	on for the awa	ard of credit po	oints:		c m c n t					
0			n pass and codule (in the fo								
8	Mechat	ronics/Auto	mation (work	c-integ	rated)				Engine	ering	
9	Importa	nce of the gr	work-integra	al grad	. <u>∟ng.</u> e:						
10	Module	rdance with coordinator:									
			nas Freund								
11											
	Supplementary literature will be announced at the beginning of the course.										
12	Languag		erature will be	e anno	uncec	at th	e beginr	ning of th	e course	J.	

Ent	Intrepreneurial Marketing								EMA		
ID:	ID: Workload:		Credits:	Stuc	ly semester:		Frequency:		Duration:		
336	1	150 h	5	5th	5th sem.			Annual (Winter)		1 semester	
1	Course:		Planned group sizes:)	Volu	me:	hours	contact /face-to- eaching:	Self-stu	ıdy	
	Lecture		60 students		2	SCH	0	h	56	h	
	Seminar	tuition	30 students		0	SCH	0	h	0	h	
	Exercise	<u> </u>	20 students		2	SCH	16	h	62	h	
	Practica seminar		15 students		0	SCH	0	h	0	h	
2	study	sed self-	60 students competences:		1	SCH	16	h	0	h	
2	 terms; Classify the contents of entrepreneurial marketing in the context of the knowledge of principles of marketing acquired in other courses and to identify differences; Identify the design options of digital customer contact management and compare the different approaches in terms of advantages and disadvantages. Apply the methods and concepts of entrepreneurial marketing to selected practice examples and case studies, develop their own solutions and present the results; Develop marketing mix concepts with a special focus on innovative product and services; Recapitulate the course content independently and enhance their knowledged during self-study. Ideally, they will form learning groups that last throughout the entire seminar. 						dentify nt and tages; elected present oducts wledge				
3	Contents: Basics of entrepreneurial marketing Opening up customers and markets Product innovation and digital branding Digital customer experience Customer journey management Innovative pricing models Multi-channel communication										
4		of teaching: ng materials	s for self-study	y, clas	sroor	n sess	ions in t	he form	of exerci	ses	
5	Participa Formal:	ation require									
	Content										
6		assessment									
			ject work or c		am						
7			ard of credit po	ints:							
	Module	examination	on pass								

8	Application of the module (in the following study programmes):
	Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. Dr. Adam-Alexander Manowicz
11	Other information:
	Supplementary literature will be announced at the beginning of the course.
12	Language:
	German

Accounting and Finance										ERF	
ID: Workload:		Credits:	Stud	ly sem	ester:	Frequency:		Dura	Duration:		
301	0	150 h	5	2nd	sem.		Annual (Summer)		1 ser	1 semester	
1	Course:		Planned group sizes:	0	Volu	me:	hours	contact face-to- eaching:	Self-st	udy	
	Lecture		60 students		2	SCH	0	h	56	h	
	Seminar	tuition	30 students		0	SCH	0	h	0	h	
	Exercise		20 students		2	SCH	16	h	62	h	
	Practical seminar	or	15 students		0	SCH	0	h	0	h	
	Supervis study	sed self-	60 students		1	SCH	16	h	0	h	
	They ur business and devunderst underst use of constant and determinating. Overall accounts	nderstand to s transaction yelop baland tand the batter tand the important capital and They will be and assess tine the cap	and the structure the system of ons in posting one sheet and asics of the anatements and aportance of fithe raising of a able to describility the raising of a their applical attail required the transplants.	double recommend for the recommend of th	e-entinds, mane stationanci rate that issual, income instance instance income i	ry bool nap the tement ial stat hem w les and luding trumer ctical of quidity	kkeeping e posting ts from ements with prace that the relative its impants and cases. In and und	g, they c g records the accord and the tical examationship act on the structuring addition derstand	an reproduction and accounts. The analysis mples. The between a between a balancing of call the basis of eacounts.	ounts bey can s of They en the ce spital can sics of	
3	Contents: • Fundamentals of Financial Accounting • Fundamentals of Accounting • Fundamentals of Financial Statement Analysis • Determining capital and liquidity requirements • Instruments of internal and external financing										
	•	Rating	s of self-finan	cing a	and de	ent ina	ancing				
4		f teaching: g materials	s for self-stud	y, clas	ssroor	n sessi	ions in t	he form	of exerc	cises.	
5	Participa Formal:	ntion require									
	Content										
6	Form of	Non- assessment	е	n or o	nral ev	amina	tion				

	Module examination pass
8	Application of the module (in the following study programmes):
	Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Economist Ulrike Franke
11	Other information:
12	Language:
	German

Pro	Production Engineering										
ID:		Workload:		Credits:	Stud	y sem	ester:	Frequer	ісу:	Duratio	on:
335	2	150 h		5	6th sem.		Annual (Summer)		1 sem	1 semester	
1	Course:		Planned group sizes:			Volu	me:	hours	contact face-to- eaching:	Self-stu	dy
	Lecture		60	o students		2	SCH	0	h	56	h
	Seminar	tuition	30	30 students		0	SCH	0	h	0	h
	Exercise Practical or seminar		20	20 students 15 students		1	SCH	8	h	46	h
			15			1	SCH	16	h	0	h
	Supervis study	sed self-	60	60 students		1.5	SCH	24	h	0	h

The students can critically evaluate the possibilities and limits of selected manufacturing processes (according to DIN 8580) and check/assess their use for concrete applications (components, workpieces), select suitable processes and design manufacturing solutions:

- They know the basics of industrial manufacturing of workpieces and can explain them.
- They can differentiate main groups of manufacturing processes.
- They have become familiar with selected, practically relevant manufacturing processes and can critically assess their suitability for the production of a specific workpiece/component.
- They will be able to assess the effect of the manufacturing parameters of selected manufacturing processes in terms of quality, costs and environmental impact.

3 Contents:

Today, manufacturing technology is an important tool in the efficient, resource-saving production of innovative, novel products with high utility value. Against this background, students gain a broad overview of the diversity and efficiency of selected, practice-relevant manufacturing processes and technologies. They understand the interrelationship between material/component properties and manufacturing processes with the necessary equipment in order to be able to independently select and apply manufacturing processes according to different product requirements. The professional assessment, selection and use of production technologies is based not only on technical feasibility but also on the economic profitability of production, so that in addition to cost awareness, sensitivity to economic, social and ecological aspects is also heightened.

- Introduction and overview of the manufacturing processes according to DIN 8580
- Primary forming production processes: Casting of semi-finished products, moulding and casting processes, design of castings, sintering
- Forming manufacturing processes: Basics and processes (massive and sheet metal forming), machines for forming technology
- Machining processes: Basics of machining, machining with geometrically defined and undefined cutting edges, machine tools
- Generative manufacturing processes or additive manufacturing: Overview
 Process fundamentals Components and systems Technology
- Advantages and disadvantages of the processes, process limits and examples of application

	 Overview of process-specific equipment (tools, machines, plants) Economic feasibility studies 									
4	Forms of teaching:									
	Lecture note	es, seminar-based teaching, practicals, exercises								
5	Participation	requirements:								
	Formal:	None								
	Content: None									
6	Form of assessment:									
	Term paper, written examination, project work or oral examination									
7	Condition for the award of credit points:									
	Module exar	nination pass								
8	• •	the module (in the following study programmes):								
	Industrial Er	ngineering and Management (work-integrated) B.Eng.								
9	•	f the grade for the final grade:								
	in accordance	ce with BRPO								
10	Module coord	inator:								
	,	g. Andrea Kaimann								
11	Other informa									
	Literature w	ill be announced at the beginning of the course.								
12	Language:									
	German									

Bus	iness P	roces	s Mode	elling and I	IT Sys	stems	5			GPM		
ID:		Work	load:	Credits: Study		ly semester:		Frequency:		Duration:		
321	3210 150		h	5	3rd	3rd sem.			Annual (Winter)		1 semester	
1	Course:			Planned grou sizes:	Volu	me:	hours/	contact face-to- eaching:	Self-st	udy		
	Lecture		(60 students		2	SCH	0	h	64	h	
	Seminar	tuitio	n ;	30 students		0	SCH	0	h	0	h	
	Exercise	<u>)</u>	- 1	20 students		1	SCH	8	h	46	h	
	Practica seminar			15 students		1	SCH	16	h	0	h	
	Supervis study	sed sel	f- (60 students		1	SCH	16	h	0	h	
2	Learning	goutco	mes/co	mpetences:			•					
	Studen	ts:										
	 standard software (ERP software). design and model processes in the company with the help of modern software architectures (e.g. SOA and BPMS). analyse processes and requirements of companies for the use, operation and maintenance of integrated software systems (adaptation options, interfaces to other IT systems, etc.) 											
	 Process modelling and data modelling using modelling tools such as ARIS Evaluation of concepts of integrated data processing Drafting reference models for designing the data, process and function models (e.g. Aachen PPS model) Analysis of ERP systems (architecture, structuring, database models, HANA) Overview of the core modules and applications of ERP systems in the process: e.g. order to cash process) Application-oriented use cases are used to demonstrate how business processes can be implemented consistently and across software modules. 											
4	Forms o	f teach	ning:									
	Learnin	ıg unit	s for se	elf-study, cla	assroo	m ev	ents in	the for	m of exe	rcises a	nd	
	practica											
5	Participa	ation re	equirem	ents:								
	Formal:		-									
	Content		-									
6		aper,	written	examinatio		ject v	vork or	oral ex	aminatio	n		
7				d of credit po								
				pass and c								
8				lule (in the fo								
	B.Eng.	and I	ndustria	rk-integrate al Engineeri	ng and	d Man						
9	•		_	de for the fin	ai grad	ie:						
	in acco	aanc	e with l	SKPU								

10	Module coordinator:
	Prof. DrIng. Jörg Nottmeyer
11	Other information:
	-
12	Language:
	German

Fun	Fundamentals of Electrical Engineering										GDE	
ID: Workload:			Credits:	Stud	y sem	ester:	Frequen	cy:	Duratio	on:		
3003 15		150 h		5	3rd sem.		Annual (Winter)		1 semester			
1	Course:		Planned group sizes:			Volume:		hours/	contact face-to- aching:	Self-stu	Self-study	
	Lecture		60	60 students		2	SCH	0	h	56	h	
	Exercise Practical or seminar Supervised selfstudy		30	30 students		0	SCH	0	h	0	h	
			20) students		1	SCH	8	h	46	h	
			15	15 students		1	SCH	16	h	0	h	
			60	60 students		1.5	SCH	24	h	0	h	

Students receive an introduction to the basics of electrical engineering and electronics. This lays the foundation for understanding electrical engineering laws and phenomena, which forms the basis for all fields of electrical engineering. The students are thus able to solve tasks from the field of electrical engineering

Students:

and electronics.

- are able to interpret and analyse direct current circuits.
- can calculate electric and magnetic fields for simple arrangements
- are able to analyse and calculate alternating current circuits
- know simple electronic components in terms of structure and application

3 Contents:

DC technology

- Fundamentals of electrical flow
- Calculation of direct current circuits

Electric and magnetic fields

- The electric field
- The magnetic field

AC technology

- Basic concepts of alternating current technology
- Simple alternating current circuits
- Power in AC circuit
- The calculation of AC circuits
- The transformer

Introduction to electronics

- Electricity conduction in semiconductors, pn junction structure
- Design, functionality and applications of diodes

4 Forms of teaching:

Learning units for self-study, classroom events in the form of exercises and practicals

5	Participation re	equirements:								
	Formal:									
	Content:									
6	Form of assess	sment:								
	Term paper, written examination, project work or oral examination									
7		he award of credit points:								
	Module examination pass and course assessment									
8	Application of the module (in the following study programmes):									
	Industrial Engineering and Management (work-integrated) B.Eng.									
9	Importance of	the grade for the final grade:								
	in accordance with BRPO									
10	Module coordinator:									
	Prof. Dr. Wer	ner Schwerdtfeger								
11	Other informa	tion:								
	Supplementa	Supplementary literature will be announced at the beginning of the course.								
12	Language:									
	German									

Bas	Basics of Mechanical Design										GDK	
ID:	ID: Workload:			Credits:	Stud	y sem	ester:	Frequer	icy:	Durat	ion:	
3120 150		150 h		5	4th sem.		Annual (Summer)		1 ser	1 semester		
1	1 Course:		Planned group sizes:			Volume:		hours/	contact face-to- eaching:	Self-st	Self-study	
	Lecture	ure 6		0 students	2 SCH 0		0	h	56	h		
	Seminar tuition 30		30) students		0	SCH	0	h	0	h	
	Exercise 2		20) students		2	SCH	16	h	62	h	
	Practical or seminar		15	15 students		0	SCH	0	h	0	h	
	Supervised self- study) students		1	SCH	16	h	0	h	

The students know the basics of technical drawing, can understand technical drawings and execute simple technical representations. They understand the basic procedure in the design process, know the basics of methodical design and can thus contribute to the design of products. From the application of the fundamentals of strength, the students can recognise essential connections of stress-appropriate design and carry out their own selected strength verifications. They understand the general procedure for the selection of design and machine elements and are able to select different design elements based on an understanding of the functional and stressing concerns and dimension them.

3 Contents:

General principles of mechanical design:

- Design methodology and systematics
- Technical drawing (types of drawings, structure of technical drawings, representation of components, tolerance specifications in drawings, drawing specifications for technical surfaces)

Introduction to strength of materials:

- Tasks of strength of materials
- External forces and internal stresses
- Basic types of stress
- Temporal load progression
- Strength parameters for material behaviour
- Influences on component strength
- Analytical strength calculation

Selected machine elements and connecting elements:

- Connecting Elements
- Bearing and transmission elements
- Exercises for creating and reading technical drawings as well as for the strength-compliant design of components and for strength verification
- 4 Forms of teaching:

Learning materials for self-study, classroom events in the form of exercises

5 Participation requirements:

	Formal: None							
	Content: None							
6	Form of assessment:							
	Term paper, written exam, combination exam, performance exam or oral exam							
7	Condition for the award of credit points:							
	Module examination pass							
8	Application of the module (in the following study programmes):							
	Industrial Engineering and Management (work-integrated) B.Eng.							
9	Importance of the grade for the final grade:							
	in accordance with BRPO							
10	Module coordinator:							
	Prof. DrIng. Klaus Dürkopp							
11	Other information:							
	Supplementary literature will be announced at the beginning of the course.							
12	Language:							
	German							

Bas	sics of Pro	ogrammir	ng						GDP		
ID:		Workload:	Credits:	Stud	Study semester:			ncy:	Duration:		
310	3104 150 h		5	1st	sem.		Annual (Winter)		1 semester		
1	Course:		Planned group sizes:)	Volu	me:	hours	contact face-to- eaching:	Self-stu	udy	
	Lecture		60 students		2	SCH	0	h	64	h	
	Seminar	tuition	30 students		0	SCH	0	h	0	h	
	Exercise		20 students		1	SCH	8	h	46	h	
	Practical seminar	or	15 students		1	SCH	16	h	0	h	
	Supervise study		60 students		1	SCH	16	h	0	h	
2	Learning Students		competences:								
	 to convert them into solution modules. are enabled to solve simple problems independently in a programming language. gain basic knowledge in the application and implementation of simple algorithms. acquire basic competences for the analysis of problems and the structured transfer into simple procedural and modularised system solutions. 										
3	Contents: Basic concepts Basic structure of computer systems and peripheral devices, functioning of computer systems Basic representation of data in computer systems, Boolean algebra Use of development environments Introduction to a programming language General structure of programmes Variable types, structures Functions for input and output Control structures Functions Vectors and pointers Recursion / iteration, modular programming Algorithms and data structures: Sorting algorithms, Q-Sort, Bubbel-Sort							a			
	е			Forms of teaching: Learning units for self-study, classroom events in the form of exercises and							
4	Forms of Learning	teaching: g units for	self-study, cla	assroc	m eve	ents in	the for	m of exe	rcises ar	nd	
4	Forms of Learning practical	teaching: g units for		assroc	m eve	ents in	the for	m of exe	rcises ar	nd	
	Forms of Learning practical	teaching: g units for ls		assroc	m eve	ents in	the for	m of exe	rcises ar	nd	
	Forms of Learning practical Participat Formal: Content:	teaching: g units for ls	ments:	assroc	m eve	ents in	the for	m of exe	rcises ar	nd	

7	Condition for the award of credit points:
	Module examination pass
8	Application of the module (in the following study programmes):
	Digital Logistics (work-integrated) B.Eng. and Industrial Engineering and
	Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. Dr. rer. oec. Pascal Reusch
11	Other information:
	-
12	Language:
	German

Fur	ndament	als of Eco	onomic Scien	ces					GWW	/		
ID:		Workload:	Credits:	Stuc	Study semester:		Frequency:		Durati	Duration:		
612	21	150 h	5	1st	sem.		Annual (Winter)		1 sen	1 semester		
1	Course:		Planned group sizes:	0	Volu	me:	hours	contact /face-to- eaching:	Self-stu	udy		
	Lecture		60 students		2	SCH	0	h	56	h		
	Seminai	tuition	30 students		0	SCH	0	h	0	h		
	Exercise	;	20 students		2	SCH	16	h	62	h		
	Practica seminar		15 students		0	SCH	0	h	0	h		
2	study	sed self-	60 students (competences:		1	SCH	16	h	0	h		
	of business administration and can apply this to business practice. They carecognise and assess the overall interrelationships between goods, services and finance. In this way, they understand the fundamental interrelationships of the individual sub-areas of business administration. Thus, students are able to thin in business terms. Students have the basic understanding to attend the modules "Accounting Investment, Financing and Taxes," "Personnel and Organisation," "Business Process Modelling and IT Systems," "Procurement, Production and Logistics "Digital Service Engineering and Services Marketing," "Accounting and Finance "Cost and Investment Accounting," "Controlling," "Marketing and Sales "Business Law," "Lean Production."						of the o think unting, usiness jistics,"					
3	Contents:											
4		f teaching: ng material	s for self-stud	y, clas	ssroon	n sessi	ons in t	he form	of exerc	ises		
5	Participa Formal: Content	ation require	ements:									
6	Form of	assessmen		n nro	niect w	vork or	· oral ev	aminatio	n			
7	Conditio	n for the av	Term paper, written examination, pro Condition for the award of credit points:									
	Module		on nocc									
8	Annlicat	llowin	a stud	v progr	ammes):							

9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Economist Ulrike Franke
11	Other information:
12	Language:
	German

Sen	Semiconductor Devices and Circuits										HBS	
ID:	ID: Workload:			Credits:	Stud	y sem	ester:	Frequen	cy:	Duration	on:	
3255 150		150 h		5	3rd sem.		5th	Annual (Winter)		1 sem	1 semester	
1	1 Course:		Planned group sizes:			Volume:		hours/	contact face-to- aching:	Self-stu	Self-study	
	Lecture		60 students			2	SCH	0	h	56	h	
	Seminai	Seminar tuition 30) students		0	SCH	0	h	0	h	
	Exercise	Exercise 2) students		1	SCH	8	h	46	h	
	Practical or seminar		15 students		1	SCH	16	h	0	h		
	Supervised self- study) students		1.5	SCH	24	h	0	h	

After successful completion of the course, students will be able to describe the operating behaviour of active and passive components of electronics in their own words. The students have understood the function of the components and can select suitable components for a corresponding application and determine the operating point by means of characteristic curve fields and the descriptive equations. In small groups, the students gained their first experience with measuring components and evaluating the results.

The students are able to interpret electronic circuits, understand the functional principle and determine the current and voltage curves in the circuits.

In small groups, the students gained their first experience of calculation, design, construction and testing of basic electrical circuits.

3 Contents:

Semiconductor diodes

- Construction and designs
- Characteristic curves and values
- Circuit examples

Bipolar transistors

- Types:
- Construction and designs
- Characteristic curves and values
- Circuit examples

Unipolar thyristors

- Construction and designs
- Characteristic curves and values
- Circuit examples

Operational amplifier (OPA)

- Functional principle
- Analogue OPA circuits

Optoelectronic components

Semiconductor circuits

- Digital circuits
- Transistor as switch
- Toggle circuits
- Basic logic circuits

4	Forms of teaching:								
	Learning uni	ts for self-study, classroom events in the form of exercises and							
	practicals.	•							
5	Participation r	equirements:							
	Formal:								
	Content:								
6	Form of assessment:								
	Term paper, written examination, combination examination or oral examination								
7 Condition for the award of credit points:									
	Module examination pass and course assessment								
8	8 Application of the module (in the following study programmes): Mechatronics/Automation (work-integrated) B.Eng. and Industrial Engineeri								
	and Management (work-integrated) B.Eng.								
9	•	the grade for the final grade:							
	in accordanc	e with BRPO							
10	Module coordi	nator:							
		. Michael Leuer							
11	Other informa	tion:							
12	Language:								
	German								

Industrial Communication											
ID:	D: Workload:			Credits: Study semester: Frequency:					Dura	tion:	
312				5	5th	sem.		Annual (Winte	^)	1 ser	mester
1	Course:			anned group zes:		Volu	me:	hours/	contact face-to- eaching:	Self-st	udy
	Lecture		60) students		2	SCH	0	h	56	h
	Seminar tuition Exercise Practical or seminar		30	30 students		0	SCH	0	h	0	h
			20	20 students		1	SCH	8	h	46	h
			15	15 students		1	SCH	16	h	0	h
	Supervis study	sed self-	60) students		1.5	SCH	24	h	0	h

The students know the ISO-OSI layer model and can classify different industrial fieldbuses. They know the importance of the individual layers and their role in industrial communication. They learn the importance of real-time systems and their technical background. They can match technological and technical boundary conditions of fieldbuses with technical requirements.

They know the advantages and disadvantages of network topologies and can assign these user requirements.

3 Contents:

The ISO-OSI layer model

- 1. Physical layer: Copper, fibre, radio, signal sampling and synchronisation
- 2. Data link layer: MAC & LLC, access procedures, multiplexing, protocols and their security, collision management, error detection and its correction, coding, redundancy, traffic shaping, function of bridges and switches
- 3. Network layer: Routing algorithms, addressing, connectionless and connection-oriented services, error identification, IP, DHCP, NAT, function of routers
- 4. Transport layer: Quality of Service (QoS); communication endpoints (socket), connection establishment and termination, TCP, UDP,
- 5. Session layer: Transaction security from unreliable channels
- 6. Presentation layer: Character representation, encoding, compression, zip, mpeg, jpg, png, \dots
- 7. Application layer: Application protocols and services, client-server models

Industrially used examples of layers 1 and 2:

- Synchronous and asynchronous BUS technologies
- Real-time communication capability
- Requirement of real-time systems
- Measures for the realisation of real-time
- Structure and usability of the Ethernet protocol
- Industrial fieldbuses: with own protocol
- o AS-Interface, CAN, CANOpen; Profibus, HART, ...
- o Measures for explosion protection
- Ethernet-based fieldbuses: EtherCAT, ProfiNet, ...
- · Bus technologies with single master; multi-master and masterless buses

4	Forms of teaching:
	Learning units for self-study, classroom events in the form of exercises and practicals
5	Participation requirements:
	Formal: None
	Content: None
6	Form of assessment:
	Term paper, written examination, project work or oral examination
7	Condition for the award of credit points:
	Module examination pass and course assessment
8	Application of the module (in the following study programmes):
	Mechatronics/Automation (work-integrated) B.Eng. and Industrial Engineering
	and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. DrIng. Thomas Freund
11	Other information:
	Supplementary literature will be announced at the beginning of the course.
12	Languago
12	Language: German
1	German

Ind	Industrial Control Technology										
ID:	O: Workload:			Credits:	Stud	y sem	ester:	Frequenc	:y:	Duratio	n:
311	7	150 h		5	4th sem	or	6th	Annual (Summe	er)	1 sem	ester
1	Course:		Planned group sizes:			Volui	me:	Actual of hours/f face tea	ace-to-	Self-stu	dy
	Lecture		60) students		2	SCH	0	h	56	h
	Seminar	tuition	30) students		0	SCH	0	h	0	h
	Exercise		20 students		1	SCH	8	h	46	h	
	Practica seminar	-	15	students		1	SCH	16	h	0	h
	study	sed self-) students		1.5	SCH	24	h	0	h

After successful completion of the course, the students have a basic knowledge of the essential components of an automation system and can select and use them in a solution-oriented manner. They know how conventional and PC-based controls work and can program these controls with different programming languages. They know the basics of bus systems and can name different bus systems and their areas of application. They can formally describe controls as discrete systems by means of automata, Petri nets and UML state diagrams and use these models for the methodical design of logic controllers, sequence controllers, control systems and diagnostic units.

3 Contents:

Introduction to control technology

- Terms
- Definitions

Sensors and Actuators

- Standard sensors and their application (inductive, optical)
- Basics of FI and servo technology, pneumatics
- Safety functions (ST0; SS1; SS2; SOS...)

Bus technology

- Basics of industrial communication
- Comparison of different bus systems and their areas of application

Design and structures of industrial controls

- PLC and PC-based control
- Information processing

Structured programming according to IEC 61131

- Graphics- and text-based programming languages
- Basics of object-oriented PLC programming

Linkage controls

- Description of discrete systems by deterministic automata
- Model-based control design
- Practical implementation in ST and UML state diagram

Sequence controls and schedule controls Description of discrete systems Model-based design and practical implementation of the control system Error management Fault diagnosis and detection Preventive diagnosis Forms of teaching: Learning units for self-study, classroom events in the form of exercises and practicals Participation requirements: 5 Formal: Content: Form of assessment: 6 Written exam, project work or oral exam Condition for the award of credit points: 7 Module examination pass and course assessment Application of the module (in the following study programmes): 8 Digital Technologies (work-integrated) B.Eng., Mechatronics/Automation (workintegrated) B.Eng., Product-Service Engineering (work-integrated) B.Eng. and Industrial Engineering and Management (work-integrated) B.Eng. Importance of the grade for the final grade: in accordance with BRPO Module coordinator: 10 Prof. Dr.-Ing. Thomas Freund Other information: 11 Language: 12

German

Innovation and Project Management											IPM	
ID:	D: Workload:			Credits: Study semester: Frequency:						Duratio	n:	
321	3211 150h			5		4th/5 sem.	th/	each sei	mester	1 sem	ester	
1	Course:			Planned group sizes:		Volume:		Actual contact classroo teachin	om	Self-stu	dy	
	Lecture		60) students		2	SCH	0	h	56	h	
	Exercise		30	30 students 20 students 15 students		0	SCH	0	h	0	h	
			20			2	SCH	16	h	62	h	
			15			0	SCH	0	h	0	h	
	study	sed self-) students		1	SCH	16	h	0	h	

Students:

- are prepared to lead product development and innovation projects and teams to success in terms of holistic and strategically oriented project management (also including agile methods).
- understand the basics of project management and can use the elementary technical vocabulary.
- can explain the most important instruments of project management.
- are able to lead/manage a project in a given process-organisational project organisation.
- are able to develop and specifically use control options for different project phases (controlling of the degree of completion, cost controlling).
- can explain the specifics of team building and project management.
- can carry out the moderation of team meetings projects.
- know instruments of IT-supported project management.
- can explain the importance of corporate goals and are able to distinguish between different leadership cultures.
- can name essential aspects of industrial property protection.

3 Contents:

- Basics of project management (terms/methods/instruments)
- Project phase models and planning systems (project preparation, project planning, project implementation, project completion)
- Agile project management
- Project organisation forms
- Innovation and change management, self-management
- Project planning (project structure plan/cost plan/resource plan/schedule)
- Project documentation/project controlling
- Risk management

	prepara projects Leading commu problen Stakeho of proje Method Training Basic as	project and innovation teams (social structures, special nication situations in projects, real and virtual project work, n analysis and concepts for action) older management (factors influencing the successful management ects) s of idea generation (creativity techniques etc.) gs and workshops on selected technical examples spects of industrial property protection
4	Forms of teachir	ng:
	Study units for	self-study, face-to-face teaching in the form of exercises
5	Participation req	ujrements:
5		-
5	Formal: -	
6	Formal: - Content: - Form of assessn	nent:
	Formal: - Content: - Form of assessn Term paper, w	nent: vritten examination, project work or oral examination
6	Formal: Content: Form of assessn Term paper, w Condition for the Module examir	nent: vritten examination, project work or oral examination e award of credit points: nation pass
6	Formal: Content: Form of assessn Term paper, w Condition for the Module examir	nent: vritten examination, project work or oral examination e award of credit points:
6 7 8	Formal: Content: Form of assessn Term paper, w Condition for the Module examir Application of th Digital Logistic B.Eng., Mecha Engineering Management (nent: vritten examination, project work or oral examination e award of credit points: nation pass le module (in the following study programmes): s (work-integrated) B.Eng., Digital Technologies (work-integrated) atronics/Automation (work-integrated) B.Eng., Product-Service (work-integrated) B.Eng. and Industrial Engineering and (work-integrated) B.Eng.
6	Formal: Content: Form of assessn Term paper, w Condition for the Module examin Application of th Digital Logistic B.Eng., Mecha Engineering Management (Importance of th	nent: vritten examination, project work or oral examination e award of credit points: nation pass ne module (in the following study programmes): s (work-integrated) B.Eng., Digital Technologies (work-integrated) atronics/Automation (work-integrated) B.Eng., Product-Service (work-integrated) B.Eng. and Industrial Engineering and (work-integrated) B.Eng. the grade for the final grade:
6 7 8	Formal: Content: Form of assessn Term paper, w Condition for the Module examir Application of th Digital Logistic B.Eng., Mecha Engineering Management (Importance of th in accordance	nent: vritten examination, project work or oral examination e award of credit points: nation pass he module (in the following study programmes): s (work-integrated) B.Eng., Digital Technologies (work-integrated) atronics/Automation (work-integrated) B.Eng., Product-Service (work-integrated) B.Eng. and Industrial Engineering and work-integrated) B.Eng. he grade for the final grade: with BRPO
6 7 8	Formal: Content: Form of assessn Term paper, w Condition for the Module examir Application of th Digital Logistic B.Eng., Mecha Engineering Management (Importance of th in accordance Module coordina	nent: rritten examination, project work or oral examination e award of credit points: nation pass ne module (in the following study programmes): s (work-integrated) B.Eng., Digital Technologies (work-integrated) atronics/Automation (work-integrated) B.Eng., Product-Service (work-integrated) B.Eng. and Industrial Engineering and work-integrated) B.Eng. ne grade for the final grade: with BRPO
6 7 8 9 10	Formal: Content: Form of assessn Term paper, w Condition for the Module examir Application of th Digital Logistic B.Eng., Mecha Engineering Management (Importance of th in accordance Module coordinal Prof. DrIng.	nent: rritten examination, project work or oral examination e award of credit points: nation pass le module (in the following study programmes): s (work-integrated) B.Eng., Digital Technologies (work-integrated) atronics/Automation (work-integrated) B.Eng., Product-Service (work-integrated) B.Eng. and Industrial Engineering and (work-integrated) B.Eng. he grade for the final grade: with BRPO litor: Michael Fahrig
6 7 8	Formal: Content: Form of assessn Term paper, w Condition for the Module examir Application of th Digital Logistic B.Eng., Mecha Engineering Management (Importance of th in accordance Module coordina	nent: rritten examination, project work or oral examination e award of credit points: nation pass le module (in the following study programmes): s (work-integrated) B.Eng., Digital Technologies (work-integrated) atronics/Automation (work-integrated) B.Eng., Product-Service (work-integrated) B.Eng. and Industrial Engineering and (work-integrated) B.Eng. he grade for the final grade: with BRPO litor: Michael Fahrig

Language:

German

12

50.	st and Ir	nvestment	t Accounting						IRI	
D:		Workload:	Credits:	Study	sem	ester:	Frequer	Frequency:		ion:
301	5	150 h	5	4th sem.			Annual (Summ		1 ser	nester
1	Course:		Planned group sizes:		Volu	me:	hours	contact face-to- eaching:	Self-st	udy
	Lecture		60 students		2	SCH	0	h	56	h
	Seminar	r tuition	30 students		0	SCH	0	h	0	h
	Exercise	<i>5</i>	20 students		2	SCH	16	h	62	h
	Practical or seminar		15 students	+	0	SCH	0	h	0	h
		sed self-	60 students		1	SCH	16	h	0	h
2		g outcomes/	competences:			I.		L		
			ounting as a d			•				
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33	and ter practica	ave a basic ms of cost al application ss: Fundamen Static inve	tals of financia tals of busines stment calcula	g of cos hey are counting Il mathe is inves ition me	emarktmen	tics nt decids	ing and itically a			
}	Content	ave a basic ms of cost al application ss: Fundamen Fundamen Static inve Dynamic in Cost type, Standard of	tals of financia tals of busines stment calcula rvestment calcula cost centre, cost	g of coshey are counting all mathe s investition meaulation cost unit	emarethoe	tics nt decids	ing and itically a			
3	and ter practical	ave a basic ms of cost al application s: Fundamen Static inver Dynamic in Cost type, Standard of Planned co Contribution Target cos Fundamen	tals of financia tals of busines stment calcular cost accounting sting on margin accounting tals of product	g of coshey are counting a mathe s investition metallation cost unit	emarethor met	tics nt decids thods	ing and itically a isions			
3	and ter practical	ave a basic ms of cost al application s: Fundamen Static inver Dynamic in Cost type, Standard of Planned co Contribution Target cos Fundamen Activity-ba	tals of financial tals of business stment calculativestment calculativestment calculations accounting on margin accounting tals of producting tals of producting tals of producting	g of coshey are counting all mathes investion meast unit grounting and conting	emarethoristacc	tics nt decids thods	ing and itically a . isions	assess an	nd evalu	
	Content	ave a basic ms of cost al application s: Fundamen Static inve Dynamic in Cost type, Standard of Planned co Contribution Target cos Fundamen Activity-ba Short-term	tals of financia tals of busines stment calcular cost accounting sting on margin accounting tals of product	g of coshey are counting all mathes investion meast unit grounting and conting	emarethoristacc	tics nt decids thods	ing and itically a . isions	assess an	nd evalu	
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4	Content Content Forms of Learning Participate Formal: Content	ave a basic ms of cost al application required to the cost of the	tals of financial tals of business stment calcular tals of business stment calcular tals of business stment calcular tals of cost accounting on margin accounting tals of producting tals.	g of coshey are counting all mathes investion mestion and ment or ment	emarethor met	tics nt decids thods thods thods thods	ing and itically a . isions g partial c	ost basis	nd evalu	ate
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	Module examination pass
8	Application of the module (in the following study programmes):
	Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Economist Ulrike Franke
11	Other information:
12	Language:
	German

Col	loquium	ı								KOL	
ID:		Workload:	Credits	: Stu	Study semester:			requenc	y:	Duratio	on:
313	34	90 h	3	7tl	n sem.			Annual (Summer)		1 sem	ester
1	Course:		Planned gi sizes:	Planned group Volume sizes:				Actual c time/cla teaching	ssroom	Self-stu	dy
	Lecture		60 studen	0	SCH		0	h	90	h	
	Seminar	tuition	30 studen	ts	0	SCH		0	h	0	h
	Exercise)	20 studen	ts	0	SCH		0	h	0	h
	Practical or seminar		15 studen	ts	0	SCH		0	h	0	h
		Supervised self- study 60 students		ts	0	SCH		0	h	0	h
2		g outcomes/o	competence	S:		•					
	the bachelor thesis, its subject-related foundations, its interdisciplinary connections and its extra-subject-related references orally and to justify them themselves. Students can critically question the results of their work and are able to assess their significance for practice.							them			
3	Contents:										
	indeper Defence	loquium condently. Cone of the pro	ntent of th cedure use	e thesis ed in wi	accord	ding to	t	he topic			estions
1		in the work f teaching:	environm	ent.							
4		amination									
5		ation require	ments:								
J	Formal:	All m	nodules of pleted. The	e bache	lor the	sis mu					ted.
	Content	assessment	tment of t	ne bacr	leior th	esis					
6		assessment									
7		n for the aw	ard of credi	t points:							
8	Application of the module (in the following study programmes): Digital Logistics (work-integrated) B.Eng., Digital Technologies (work-integrated) B.Eng., Mechatronics/Automation (work-integrated) B.Eng., Product-Service Engineering (work-integrated) B.Eng. and Industrial Engineering and Management (work-integrated) B.Eng.										
9	Importa	nce of the gr	ade for the	final gra	ade:						
		rdance with	BRPO								
10	Module of the the	coordinator:									
11	Other in	formation:									
12	Languag										
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Lea	n Produ	ction							LPM	
ID:		Workload:	Credits:	Study s	eme	ster:	Frequenc	:y:	Duratio	on:
321	5	150 h	5	4th sem.	or	6th	Annual (Summe	er)	1 sem	ester
1	Course:		Planned group sizes:) V	olum	ne:	Actual of time/clast teaching	assroom	Self-stu	dy
	Lecture		60 students	2		SCH	0	h	56	h
	Seminar	tuition	30 students	0		SCH	0	h	0	h
	Exercise		20 students	2		SCH	16	h	62	h
	Practical seminar		15 students	C		SCH	0	h	0	h
	Supervis study		60 students	1		SCH	16	h	0	h
2	Learning Student		ompetences:							
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			f-study, face-	to-face t	eacl	ning i	n the for	m of exe	ercises	
5	Formal: Content:		ments:							
6		assessment:							_	
7			n examinatio ard of credit po		T W	ork or	oral exa	minatio	n	
•		examinatio	•							
8	Applicati Digital I	on of the mo Logistics (w	odule (in the fo ork-integrate	d) B.Eng	_	-		ngineeri	ng and	
	Digital Logistics (work-integrated) B.Eng. and Industrial Engineering and Management (work-integrated) B.Eng.									

	in accordance with BRPO
10	Module coordinator:
	Prof. Dr. rer. oec. Pascal Reusch
11	Other information:
	-
12	Language:
	German

3 (C) (S) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A	Course: Lecture Seminar tuit Exercise Practical or seminar Supervised study Learning out The module and the power able to describe controlling Contents: General Asp Switching of	ion 3 ion 3 ion 3 ion 3 ion 4 ion 3 ion 4 ion 4 ion 5 ion 6 ion 7 ion 6 ion 7	es knowledgerter circuits ne physical asic circuits ching electri inductive loser semicono	ge of the strategy of the stra	can be oning semice ergy.	SCH SCH SCH SCH ost ime realis	time/cl teachir 0 0 8 16 24 portant sed with	contact assroom h h h h power s them. Sectors and	Self-st 56 0 46 0 emicon tudents I, in par	h h h h ductors					
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F S S S S S S S S S S S S S S S S S S S	Practical or seminar Supervised study Learning out The module and the pount of describe controlling Contents: General Asponential	self- 6 ccomes/core e provide wer conve explain the the ba and switce pects of ohmic-i n to power	15 students 60 students mpetences: es knowledgerter circuits ne physical asic circuits ching electri	s that functions of socal en	1.5 the m can be oning semico	SCH SCH ost ime realist	16 24 portant sed with niconduction	h h power s them. S	0 emicon tudents	h h ductors should					
3 (C S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I S I I	seminar Supervised s study Learning out The module and the poor be able to to describe controlling Contents: General Asp Switching of	self- comes/cor e provide wer conve explain the the ba and switce pects of ohmic-i n to power	mpetences: es knowledgerter circuits ne physical asic circuits ching electri	s that functions of socal en	the m can be oning semicoergy.	SCH ost ime realist	24 portant sed with	h power s them. Stors and	0 emicon tudents	h ductors should					
2 L 2 L 3 C 3 C 5 N E 1 T	Supervised s study Learning out The module and the power be able to describe controlling Contents: General Asp Switching of	comes/core provide wer converse the base and switce pects of ohmic-into power.	mpetences: es knowledgerter circuits ne physical asic circuits ching electri	s that functions of socal en	the m can bo oning semico ergy.	ost im e realis of sem	portant sed with	power s them. S	emicon tudents I, in par	ductors should					
2 L 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Learning out The module and the power be able to to describe controlling Contents: General Asp Switching of	e provide wer conve explain the e the ba and switc pects pects of ohmic-i n to powe	es knowledgerter circuits ne physical asic circuits ching electri inductive loser semicono	s that functions of socal en	can be oning semice ergy.	e realis of sem	sed with	them. Stors and	tudents I, in par	should ticular					
S F S M E E H	General Asp Switching of Introduction	of ohmic-i n to powe	er semicond		3										
(Switching of Introduction	of ohmic-i n to powe	er semicond		6										
F E	Switching be Power conviously Single-pulse Multi-pulse Boost/buck H-Bridge in Three-phas Inverter cire Harmonics Application Switching pulse Electronic as Electronic as Switching as Switching as Electronic as Switching a	pehaviour verter circ e rectifier converte everter se inverter and powe circuits in power sup switches actuators	of power scuits r rs er automatic	on	nducto	ors									
ŗ		Forms of teaching: Learning materials for self-study, classroom events in the form of exercises and							exercis	es and					
	Learning m practicals	aterials fo		y, cias					Participation requirements:						
F	Learning m practicals Participation	aterials fo		y, cias											

6	Form of assessment:
	Term paper, written examination, project work or oral examination
7	Condition for the award of credit points:
	Module examination pass and course assessment
8	Application of the module (in the following study programmes):
	Mechatronics/Automation (work-integrated) B.Eng. and Industrial Engineering
	and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. DrIng. Michael Leuer
11	Other information:
	Supplementary literature will be announced at the beginning of the course.
12	Language:
	German

Mar	keting a	and Techni	ical Sales						MUV	
ID:		Workload:	Credits:	Stud	y sem	ester:	Frequen	ıcy:	Durati	on:
335	5	150 h	5	4th sem	or	6th	Annual (Summer)		1 semester	
1	Course:		Planned group sizes:	0	Volume:		Actual contact time/classroom teaching		Self-study	
	Lecture		60 students		2	SCH	0	h	56	h
	Seminar	tuition	30 students		0	SCH	0	h	0	h
	Exercise	<u> </u>	20 students		2	SCH	16	h	62	h
	Practica seminar		15 students		0	SCH	0	h	0	h
	Supervis		60 students		1	SCH	16	h	0	h
	On t curre digitAppl andDiscontinuo	he basis of ent marke alisation an y the desig case studie uss in learni	efine the conc acquired and t development d international n options of the s, compare the ng groups que ducts, develo	alysis ents alisation the manem ar estion	and again on; arketi nd de s abo	olannir st th ng mix cide w ut stru	ng skills e back k to sele hich me ctures a	, to refle ground cted prac thod to u nd conce	ect critic of incr ctice exa se; pts in th	reasing amples e sales
3	•	Business-to Buyer beha Market rese Product pol Instrument Classic forn Establishing Aspects of t	b-business ma viour in busin earch and mai icy in the indi is and strategi ns of sales an g and controlli the marketing	ness market see vidual ies of longing a see the see th	egmen prod price ne sal	s ntatior uct life and co es organi	e cycle pommunic sation	ation pol	licy	
4		f teaching: g materials	for self-study	y, clas	sroon	n sessi	ions in tl	he form (of exerci	ises
5	Participa Formal: Content	ation requirer Form Conte	al:							
6	Form of	assessment:		ral ov	am					
7	Conditio	n for the awa	ard of credit po		uili					
0		examinatio		- جناب مال	1 C+1 · d·	/ pros:	ommes)			
8	Digital	Technologie	odule (in the fo es (work-integ <-integrated)	grated) B.Er			rial Engir	neering a	and

9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. Dr. Adam-Alexander Manowicz
11	Other information:
	Literature will be announced before the start of the course.
12	Language:
	German

Mat	themati	cs I							MATH	1 1		
ID:		Workload:	Credits:	Stud	ly sem	ester:	Frequer	ісу:	Durati	on:		
321	8	150 h	5	1st	sem.		Annual (Winter)		1 semester			
1	Course:		Planned group sizes:	Volume:		Actual contact time/classroom teaching		Self-study				
	Lecture		60 students		2	SCH	0	h	56	h		
	Seminar	tuition	30 students		0	SCH	0	h	0	h		
	Exercise)	20 students		2	SCH	16	h	62	h		
	Practica seminar		15 students		0	SCH	0	h	0	h		
	Supervis	60 students		1	SCH	16	h	0	h			
2	Learning	g outcomes/o	competences:		<u> </u>	1	<u> </u>	<u> </u>	l			
3	algebra	ı, which t logy, natura	ic terms and hey can als al science and	so ap	ply t	o pra						
	 General basics (set theory, inequalities, propositional logic, methods of proof) Functions of one variable (limit and continuity, polynomial functions, rational functions, trigonometric functions, exponential function, logarithm function) Differential calculus for functions of one variable (differentiability, derivation rules, applications) Linear algebra (vectors, matrices, determinants, systems of linear equations, eigenvalues and eigenvectors) 											
4	Forms of teaching:											
	Study (units for sel	f-study, face-	to-fac	e tea	ching i	n the fo	rm of exe	ercises			
Е	Darticing	ation require	monts:									
5	Participation requirements: Formal: -											
	Content											
6		assessment										
	Written	examination	on, combinati	on exa	am, o	ral exa	m or ex	am accor	mpanyin	g the		
	course											
7			ard of credit po	oints:								
		examination										
8			odule (in the fo	•		,	•		and a land a			
			ork-integrate									
			ics/Automatic -integrated) E							ice		
	_	•	-integrated) t k-integrated)	_		muust	ııaı Eliği	neering a	iiIU			
9	Importa	nce of the a	rade for the fin	al grad	le:							
-		rdance with		J								
10		coordinator:										
		nat. Sabrii	na Proß									
11	Other in	formation:										
	1											

12	Language:
	German

Mat	hematic	s I I							MAT	H2		
ID:		Workload:	Credits:	Stud	y sem	ester:	Frequer	ıcy:	Durat	ion:		
325	7	150 h	5	5 2nd			Annual (Summ		1 semester			
1	Course:		Planned group sizes:	Planned group sizes:		me:	Actual contact time/classroom teaching		Self-study			
	Lecture		60 students		2	SCH	0	h	56	h		
	Seminar	tuition	30 students		0	SCH	0	h	0	h		
	Exercise		20 students		2	SCH	16	h	62	h		
	Practical seminar	or	15 students		0	SCH	0	h	0	h		
	Supervise study		60 students		1	SCH	16	h	0	h		
2	_		competences:									
	Students	S:										
	• n fc • h	naster the or functior ave an ov ifferential	n their knowled essential prind ns of several volverview of the equations and actice-oriented	ciples ariabl meth d syst	of int es. nods f ems c	egral of for the of diffe	calculus e analyti	and diffei cal soluti	on of o	rdinary		
3	Contents:											
	 Contents: Complex numbers (definition and representation, complex calculus) Integral calculus for functions of one variable (fundamental theorem of differential and integral calculus, integration rules, integration methods, improper integrals, applications) Differential calculus for functions of several variables (functions of several variables, partial differentiation) Ordinary differential equations (differential equations of the 1st order, linear differential equations of the 2nd or nth order with constant coefficients, systems of linear differential equations) 											
4	Forms of	teaching:					•					
ļ	Study ur	nits for se	lf-study, face-	to-fac	e tead	ching i	n the fo	rm of exe	ercises			
5	Participat	ion require	ments:									
ļ	Formal:	-										
	Content:		ules: 8 Mathematics	: 1;								
	Form of assessment: Written examination, combination exam, oral exam or exam accompanying the											
6												
	course Condition		vard of credit po	ints:								
7	course Condition Module	examinatio	on pass		n study	v progr	ammes).					
	course Condition Module (Application Digital T integrate	examination of the mechnological echnological (echnological)	on pass odule (in the fol es (work-integ ., Product-Serv	llowing rated vice E) B.Er ngine	ng., Me ering	echatror (work-in	tegrated))			
7	Course Condition Module (Application Digital Tintegrate B.Eng. a	examination of the mechnological ed) B.Engund Indust	on pass odule (in the fol es (work-integ	llowing rated vice E ng and) B.Er ngine d Man	ng., Me ering	echatror (work-in	tegrated))			

	Dr. rer. nat. Sabrina Proß
11	Other information:
	-
12	Language:
	German

Mea	asuring	Systems a	nd Sensors						MUS			
ID:		Workload:	Credits:	Stud	ly seme	ester:	Frequen	ісу:	Duratio	Duration:		
312	8	150 h	5	6th	sem.		Annual (Summer)		1 semester			
1	Course:		Planned grou sizes:	р	Volui	me:		contact lassroom	Self-stu	ıdy		
	Lecture		60 students		2	SCH	0	h	56	h		
	Seminar	tuition	30 students		0	SCH	0	h	0	h		
	Exercise	<u>,</u>	20 students		1	SCH	8	h	46	h		
	Practica seminar		15 students		1	SCH	16	h	0	h		
	Supervis study		60 students		1.5	SCH	24	h	0	h		
2	Learning outcomes/competences: This module covers the basics of important sensor principles, analogue selectronics (signal pre-processing) and the most common sensor types students learn about known sensor technology in the industrial environmen									s. The		
3	Should	master its a	ipplication.									
	 Basics of measurement signal processing Sensors and measuring systems in industrial application Components of measuring signal acquisition and processing systems Temperature measurement Pressure measurement Flow measurement Level measurement Measurement of substance properties Measurement of geometric quantities (especially position detection) Optical inspection systems Power and energy measurement 											
4		•	for self-stud	y, clas	sroom	n sess	ions in tl	he form (of exercis	ses		
5		ation requirer None										
6	Form of	assessment:	n examinatio	n, pro	iect w	ork o	r oral ex	aminatio	n			
7	Conditio	n for the awa	ard of credit po n pass and c	oints:				a.r.m.a.tio				
8	Applicat Mechat and Ma	ion of the mo ronics/Auto nagement (odule (in the fo mation (work work-integra	ollowing c-integ ited) E	g study grated) B.Eng.	progr	ammes):	ndustrial	Enginee	ring		
9		nce of the gr rdance with	ade for the fin BRPO	al grac	le:							
10		coordinator: rIng. Thor	nas Freund									
11	Other in Supple:	formation: mentary lite	rature will be	e anno	unced	l at th	e beginr	ning of th	e course).		
12	Languag	je:			5 5							

Met	hodical	Design an	d (CAD						МКС	
ID: Workload:			Credits:	Study semester:			Frequen	cy:	Duration:		
3354 150 h			5	5th sem.			Annual (Winter)		1 semester		
1	1 Course:			Planned group sizes:		Volume:		Actual contact time/classroom teaching		Self-study	
	Lecture		60	0 students 0 students		2	SCH	0	h	56	h
	Seminar	tuition	30			0	SCH	0	h	0	h
	Exercise)	20	20 students		1	SCH	8	h	46	h
	Practica seminar	-	15	15 students		1	SCH	16	h	0	h
	study	sed self-) students		1.5	SCH	24	h	0	h

Students are able to plan and structure design projects. They distinguish between the different design phases and apply selected methods and tools in a goal-oriented manner. They establish measurable requirements, derive functions, generate partial solutions, create overall solutions, estimate the cost effects of design work, evaluate, select and optimise.

With regard to CAD, students are able to:

- Describe the functions and possibilities of common 3D CAD systems
- Classify CAD with regard to product lifecycle management
- Create and manipulate simple 3D models
- Derive 2D drawings from 3D models

3 Contents:

Methodical construction:

- Introduction to methodical procedures and the sequence of the design process
- VDI guidelines for methodical development
- Task clarification, requirements management, requirements lists
- Creativity techniques
- Via functions to operating mechanisms and construction elements
- Series and construction kits
- Technical-economic design (according to VDI 2225)
- Value analysis

CAD systems and techniques:

Definition of terms, equipment technology, software systems, data exchange, input techniques, coordinate systems, construction methods for geometric models (corner, edge, surface, solid models), methods for structuring CAD data, variant construction by parametrisation, solid modelling

Practical training on a CAD system

4 Forms of teaching:

Learning materials for self-study, classroom events in the form of exercises and practicals.

5 Participation requirements:

Formal:

	Content:	Modules:
		3253 Basics of Mechanical Design;
6	Form of asses	sment:
	Term paper,	written examination, combined examination, project work, oral
		or examination accompanying the course
7	Condition for t	the award of credit points:
	Module exam	nination pass and course assessment
8	Application of	the module (in the following study programmes):
	Mechatronics	s/Automation (work-integrated) B.Eng. and Industrial Engineering
	and Manager	ment (work-integrated) B.Eng.
9	Importance of	the grade for the final grade:
	in accordanc	e with BRPO
10	Module coordi	nator:
		. Klaus Dürkopp
11	Other informa	tion:
	Supplementa	ary literature will be announced at the beginning of the course.
12	Language:	
	German	

	rocontro	oller Prog	ramming						МСР	
ID:		Workload:	Credits:	Stud	y sem	ester:	Frequen	cy:	Duratio	on:
322	20	150 h	5			Annual (Summer)		1 semester		
1	Course:		Planned group sizes:)	Volui	me:		contact assroom	Self-stu	dy
	Lecture		60 students		2	SCH	0	h	56	h
	Seminai	rtuition	30 students		0	SCH	0	h	0	h
	Exercise	<i>5</i>	20 students		1	SCH	8	h	46	h
	Practica seminar	•	15 students		1	SCH	16	h	0	h
2	Supervised self- study Learning outcomes/		60 students		1.5	SCH	24	h	0	h
 get hands-on experience in designing hardware-based mid product architectures and cloud solutions, low-power M2M cor as well as sensor networks. are capable of implementing their own small hardware project can evaluate and make judgements about systems or product embedded systems. can translate customer requirements into viable technical comproduct architectures, taking into account efficiency and model. 							communi ects. ducts bas concep	sed on		
										<i>1</i> .
3	Contents: Basics Embedded Systems 'Internet of Things' (IoT) Network technologies (Ethernet, Wifi, Bluetooth, etc.). Identification technology (barcode scanners, RFID systems) Concepts and aids (tools) of embedded systems and IoT Embedded systems platforms (e.g. Arduino/Energia, Raspberry PI, ARM microcontrollers, etc.) Communication via bus systems (e.g. I2C, SPI, UART) Reading out sensors Special components (A/D converter, D/A converter) Integration into overall systems									/.
3	•	Basics Emb Network te Identification Concepts a Embedded microcontro Communica Reading ou Special cor	chnologies (Et on technology nd aids (tools systems platf ollers, etc.) ation via bus s it sensors nponents (A/E	therne (bard) of er orms systen	et, Wiff code so mbedo (e.g. / ns (e.o	i, Blue canner led sy Arduin g. 12C,	etooth, e rs, RFID stems ar o/Energi	c.). systems nd IoT a, Raspb RT)		
3	Forms of Learning practices	Basics Emb Network te Identification Concepts and Embedded microcontro Communication Reading out Special con Integration of teaching: and units for als	chnologies (Et on technology nd aids (tools systems platfollers, etc.) ation via bus s it sensors inponents (A/E into overall s	therne (bard) of er orms system convystem	et, Wiff ode sombedo (e.g. / ns (e.g. rerter,	i, Blue canner led sy Arduin g. I2C,	etooth, ends, RFID stems ar o/Energi	cc.). systems nd IoT a, Raspb RT)	perry PI,	ARM
	Forms of Learning practices	Basics Emb Network te Identification Concepts a Embedded microcontro Communica Reading ou Special cor Integration of teaching:	chnologies (Et on technology nd aids (tools systems platfollers, etc.) ation via bus s it sensors inponents (A/E into overall s	therne (bard) of er orms system convystem	et, Wiff ode sombedo (e.g. / ns (e.g. rerter,	i, Blue canner led sy Arduin g. I2C,	etooth, ends, RFID stems ar o/Energi	cc.). systems nd IoT a, Raspb RT)	perry PI,	ARM
4	Forms of Learning practical Participal Formal:	Basics Emb Network te Identification Concepts and Embedded microcontrous Communication Reading out Special con Integration of teaching: ing units for als ation required	chnologies (Et on technology nd aids (tools systems platfollers, etc.) ation via bus s it sensors inponents (A/E into overall s	therne (bard) of er orms system convystem	et, Wiff ode sombedo (e.g. / ns (e.g. rerter,	i, Blue canner led sy Arduin g. I2C,	etooth, ends, RFID stems ar o/Energi	cc.). systems nd IoT a, Raspb RT)	perry PI,	ARM
4	Forms of Learning practical Participals Content Form of	Basics Embeded Identification Concepts a Embedded microcontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontr	chnologies (Eton technology nd aids (tools systems platfollers, etc.) ation via bus set sensors nponents (A/E into overall self-study, claments:	therne (barc) of er orms system) conv ystem	et, Wiff ode sombedo (e.g. / ns (e.g. verter, ns	i, Blue canner led sy Arduin g. I2C, D/A c	etooth, errs, RFID stems ar o/Energi SPI, UA	ec.). systems nd IoT a, Raspb RT) n of exer	erry PI,	ARM
5	Forms of Learning practices Participals: Content Form of Term p	Basics Embeded Identification Concepts a Embedded microcontrology (Communication Communication Integration Integra	chnologies (Eton technology nd aids (tools systems platfollers, etc.) ation via bus set sensors inponents (A/E into overall self-study, claments:	therne (barc) of er orms system) conv ystem assroo	et, Wiff ode sombedo (e.g. / ns (e.g. verter, ns	i, Blue canner led sy Arduin g. I2C, D/A c	etooth, errs, RFID stems ar o/Energi SPI, UA	ec.). systems nd IoT a, Raspb RT) n of exer	erry PI,	ARM
4	Forms of Learning practical Formal: Content Form of Term production of Condition of	Basics Embeded Identification Concepts a Embedded microcontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontrocontr	chnologies (Eton technology nd aids (tools systems platfollers, etc.) ation via bus set sensors nponents (A/E into overall self-study, claments:	therne (barc) of er orms system) conv ystem assroo n, pro ints:	et, Wiff ode sombedo (e.g. / ns (e.g. rerter, ns m eve	i, Bluecanner led sy Arduin J. 12C, D/A contents in	the form	ec.). systems nd IoT a, Raspb RT) n of exer	erry PI,	ARM

	Digital Logistics (work-integrated) B.Eng., Mechatronics/Automation (work-integrated) B.Eng. and Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. DrIng. Christian Stöcker
11	Other information:
	-
12	Language:
	German

Per	sonnel	and Organ	isa	tion						PUO	
ID: Workload:			Credits:	Study semeste			Frequer	ncy:	Durat	Duration:	
301	3011 150 h			5	7th sem.			Annual (Winter)		1 semester	
1				lanned group zes:		Volume:		Actual contact time/classroom teaching		Self-study	
	Lecture 60) students		2	SCH	0	h	56	h
	Seminar	Seminar tuition 30		0 students		0	SCH	0	h	0	h
	Exercise	<u> </u>	20	0 students		2	SCH	16	h	62	h
	Practica seminar		15	5 students		0	SCH	0	h	0	h
	Supervis study	sed self-	60	0 students		1	SCH	16	h	0	h
2	Learning outcomes/competences:										

suitability and applicability.

They are familiar with essential theoretical concepts on communication, understand

the problems that can occur during the communication process and have practised possible solutions.

They understand the importance of learning for change processes and can design the conditions for successful learning.

They can explain the principles of organisational theory and have checked their significance using practical examples.

They can use primary and secondary organisational forms with regard to their applicability.

They are familiar with important topics of organisational change and can assess their significance for entrepreneurial activity.

They have basic knowledge about the characteristics and significance of key qualifications and have demonstrated this with examples, e.g. regarding the conflict resolution and motivational skills.

Contents: 3

- Significance, goals and tasks of human resource management
- Fundamentals of labour law
- Fundamentals of communication
- Fundamentals of Learning Theory
- Environmental conditions, learning control, strategies for lifelong learning
- Organisational structure and process organisation, forms of primary and secondary organisation
- Organisational change
- Personnel management and conflict resolution

Forms of teaching:

Learning materials for self-study, classroom events in the form of exercises

Participation requirements:

Formal:	None
Content:	None

6	Form of assessment:
	Term paper, written exam, performance exam, project work or oral exam
7	Condition for the award of credit points:
	Module examination pass
8	Application of the module (in the following study programmes):
	Digital Logistics (work-integrated) B.Eng., Mechatronics/Automation (work-integrated) B.Eng. and Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Economist Ulrike Franke
11	Other information:
12	Language:
	German

Phy	sics								РН	
ID:		Workload:	Credits:	Stud	y sem	ester:	Frequenc	:y:	Duratio	n:
310	1	150 h	5	1st s	sem.		Annual (Winter)		1 sem	ester
1	Course:		Planned group sizes:)	Volui	me:	Actual of time/clasteachin	assroom	Self-stu	dy
	Lecture		60 students		2	SCH	0	h	56	h
	Seminar	tuition	30 students		0	SCH	0	h	0	h
	Exercise	<u>)</u>	20 students		1	SCH	8	h	46	h
	Practica seminar	l or	15 students		1	SCH	16	h	0	h
	study	sed self-	60 students		1.5	SCH	24	h	0	h
2	The stu They a laws. T results for the for the the frai	udents know re able to a he students in solving p scientific ir verification mework of	competences: If the importance the importance of the importance of the importance of theoretical research and research of gies.	cal pr ility to ms. F n, eva l facts devel	ocesso o use furthe lluatio s, a co lopme	es and formumer formore formore formore formation for the following formation for the following formation formation for the following formatio	d relate tallas, devi they po documer ence that bjects. Th	hem to ces and essess the tation of its required to the tation of the ta	basic pheasure measure ne compe of experi red e.g. ledge acc	nysical ement etence ments within quired
3	Content	S:								
	movem Dynam rotation Optics Light at instrum Thermo	atics: one and an antics: Newton an angular number of the angular	refraction an	oes of d disp	force	s, wor n, geo r of ga	k-energy metrical (-power,	moment	tum,
4	Forms o	f teaching: ig materials	for self-study					form of	exercise	s and
5		ation require	ments:							
	Formal:	None	9							
	Content									
6		assessment:			· • • • • • • • • • • • • • • • • • • •					
7			en examination ard of credit po		iorma	nce ex	xam or or	aı exam	1	
7			on pass and co		asses	sment				
8	Applicat	ion of the mo	odule (in the fo	llowing	g study	progr	ammes):			
			mation (work (work-integrat) B.En	g. and In	dustrial	Enginee	ring

9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	- tba
11	Other information:
	Supplementary literature will be announced at the beginning of the course.
12	Language:
	German

Cor	ntrolling								PUC	
ID:		Workload:	Credits:	Study	, sem	ester:	Frequen	cy:	Durati	on:
301	7	150 h	5	5th s	sem.		Annual (Winter)	1 sem	nester
1	Course:		Planned group sizes:	p	Volu	me:		contact assroom	Self-stu	udy
	Lecture		60 students		2	SCH	0	h	56	h
	Seminar	tuition	30 students		0	SCH	0	h	0	h
	Exercise		20 students		2	SCH	16	h	62	h
	Practical seminar		15 students		0	SCH	0	h	0	h
2	Supervis study		60 students competences:		1	SCH	16	h	0	h
	instrum carrying		ıdents can u II as instrume omnany simu	nts fror	m coi		ng (e.g. b	alanced		rd). By
	the con	ndent conti text of inte	rol processes ernational coo	in com	npani					
3	Contents Contents I	s: Fundament Schools of Strategic a Manageme Operationa	rol processes	in comperation g and strategic strategools	strate mana	egic m ageme	l also to anageme	use this		
3	Contents Contents Forms of	s: Fundament Schools of Strategic at Manageme Operational Internation	tals of plannin thought in str pproaches nt concepts II, tactical and II controlling to	in comperation g and stategic strategools all perspensions.	strate mana gic p	egic m ageme lanning	anagement	use this	s knowle	
	Contents Contents Forms of Lecture	s: Fundament Schools of Strategic at Manageme Operational Operational Internation for teaching: notes, ser	tals of plannin thought in str pproaches nt concepts I, tactical and I controlling to al/intercultura minar-based to ements:	in comperation g and stategic strategools all perspensions.	strate mana gic p	egic m ageme lanning	anagement	use this	s knowle	
4	Contents Contents Forms of Lecture Participa Formal:	s: Fundamen Schools of Strategic a Manageme Operationa Operationa Internatior f teaching: notes, ser	tals of plannin thought in str pproaches nt concepts I, tactical and I controlling to al/intercultura minar-based to ements:	in comperation g and stategic strategools all perspensions.	strate mana gic p	egic m ageme lanning	anagement	use this	s knowle	
4	Contents Contents Forms of Lecture	s: Fundament Schools of Strategic at Manageme Operational Internation for teaching: notes, serition required Non According to the According to	tals of plannin thought in str pproaches nt concepts I, tactical and I controlling to al/intercultura minar-based to ements:	in comperation gand stategic strategools all perspeaching nance	strate mana gic p pectiv	egic mageme	anagement g tools	ent	s knowle	
4	Contents Contents Forms of Lecture Participal Formal: Content:	s: Fundament Schools of Strategic a Manageme Operational Internation for teaching: notes, serition require Non Accordansessment	tals of plannin thought in str pproaches nt concepts l, tactical and l controlling to al/intercultura minar-based to ments:	in comperation g and strategic strategic strategic al perspeaching mance mental	strate mana gic p pectiv g, exe	egic mageme	anagement g tools a, busines	ent ss simula	ation	
4 5	Contents Contents Forms of Lecture Participa Formal: Content: Form of Term participal Condition	s: Fundament Schools of Strategic at Manageme Operational Operational Internation for teaching: Non Accordance	tals of plannin thought in str pproaches nt concepts al, tactical and al/intercultural minar-based to ments: e Dunting and Fi punting Fundation of credit power of credit pow	in comperation g and strategic strategic ools al perspeaching mance mental on, proj	strate mana gic p pectiv g, exe	egic mageme	anagement g tools a, busines	ent ss simula	ation	
4 5 6 7	Contents Contents Forms of Lecture Participa Formal: Content: Form of Term pa Conditio Module	s: Fundament Schools of Strategic at Manageme Operational Operational Internation for teaching: Non Accordance Acco	tals of plannin thought in str pproaches nt concepts al, tactical and al/intercultural minar-based to ments: e Dunting and Fi punting Fundation of credit point pass	in comperation gand strategic strategic strategic eaching eaching mance mental en, projoints:	strate mana gic p pectiv Cost Is of	egic mageme	anagement g tools nvestment r oral exa	ent ss simula	ation	
5	Forms of Lecture Participal Formal: Contents Form of Term participal Module Application	s: Fundament Schools of Strategic at Manageme Operational Internation of teaching: Non Accordance Accordance Written for the award examination of the montes	tals of plannin thought in str pproaches nt concepts I, tactical and I controlling to hal/intercultura minar-based to ments: e punting and Fi punting Funda it controlling funda	in comperation grands and strategic strategic strategic eaching eaching mance mental en, projoints:	strate mana gic poperation g, exe	egic magemed lanning ves ercises and Ir Econor	anagement g tools nvestment r oral exa	ent ss simula	ation	
4567	Forms of Lecture Participal Formal: Content: Form of Term participal Module Application Industricity Importants	s: Fundament Schools of Strategic a Manageme Operational Internation feaching: notes, ser Ition require Non Accordance Accordance Accordance Accordance Accordance Management M	tals of plannin thought in str pproaches nt concepts al, tactical and al controlling to hal/interculturation and Figure 1 conting and Figure 2 conting and Figure 2 control for pass odule (in the format and for the fin and Manarade for the fin	in comperation grands and strategic strategic strategic strategic all perspeaching mance mental sin, projoints:	strate mana gic plopective g, executed study nt (w	egic magemed lanning ves ercises and Ir Econor	anagement g tools nvestment r oral exa	ent ss simula	ation	

	Economist Ulrike Franke
11	Other information:
	Literature will be announced at the beginning of the course.
12	Language:
	German

Pra	ctical M	odule	e I								PX1	
ID:		Work	load:	Credits:	Stud	y sem	ester:	Fr	equency	y :	Duratio	n:
311	2	150	h	5	3rd	sem.			nnual Vinter)		1 sem	ester
1	Course:			anned group zes:		Volu	me:	t	Actual c time/cla teaching	ssroom	Self-stu	dy
	Lecture		6	0 students		0	SCH	(C	h	150	h
	Seminar	tuitio	n 3	0 students		0	SCH)	h	0	h
	Exercise	;	2	0 students		0	SCH	(C	h	0	h
	Practica seminar		1	5 students		0	SCH	(C	h	0	h
	Supervis	sed sel	f- 6	0 students		0	SCH	(C	h	0	h
2	study	. a t -		npetences:								
3	options the studit furthe Contents The top orientee	are d dents er. s: pics to d towa	evelope acquire o be wo	itions during independent the ability of the abilit	ently. of wor nust kents	In additions the second	dition scienti	to t	the prod ally and engined lum. Th	fessional d succes ering so ne topic	al compe ssively de cience a is coord	tence, evelop nd be inated
	univers	ity.		, the faculty	y tuto	r in t	he cor	npa	any and	d the ex	kaminer	at the
4	Forms o Work-re		ning: module									
5	Participa	ation re	equireme	nts:								
	Formal:		-									
	Content	:	-									
6	Form of		sment:									
	Term p											
7			he award iination	l of credit po pass	ints:							
8	Applicat	ion of	the modu	ule (in the fol	lowing	ı study	v progr	amı	mes):			
8				ule (in the fol k-integrate		_				aies (w	ork-intec	rated)
8	Digital	Logist	ics (wor	k-integrate	d) B.E	ng., I	Digital	Те	chnolo			
8	Digital B.Eng.,	Logist Mech	ics (wor atronics		d) B.E n (wo	ng., I rk-int	Digital egrate	Te ed)	chnolo B.Eng.	, Produ	ct-Servi	
	Digital B.Eng., Engined Manage	Logist Mech ering (ement	ics (wor atronics (work-in (work-i	k-integrate /Automatio tegrated) B ntegrated)	d) B.E n (wo .Eng. B.Eng	ing., I rk-int and I	Digital egrate	Te ed)	chnolo B.Eng.	, Produ	ct-Servi	
9	Digital B.Eng., Engined Manage Importa	Logist Mech ering (ement nce of	ics (wor atronics (work-in (work-i the grad	k-integrated /Automatio tegrated) B ntegrated) e for the fina	d) B.E n (wo .Eng. B.Eng	ing., I rk-int and I	Digital egrate	Te ed)	chnolo B.Eng.	, Produ	ct-Servi	
9	Digital B.Eng., Enginee Manage Importa in accord	Logist Mechering (ement nce of	ics (wor atronics (work-in (work-i the grad e with B	k-integrated /Automatio tegrated) B ntegrated) e for the fina	d) B.E n (wo .Eng. B.Eng	ing., I rk-int and I	Digital egrate	Te ed)	chnolo B.Eng.	, Produ	ct-Servi	
	Digital B.Eng., Enginee Manage Importa in accord Module	Logist Mech ering (ement nce of rdance coordin	ics (wor atronics (work-in (work-i the grad e with B nator:	k-integrated /Automatio tegrated) B ntegrated) e for the fina RPO	d) B.E n (wo .Eng. B.Eng	ing., I rk-int and I	Digital egrate	Te ed)	chnolo B.Eng.	, Produ	ct-Servi	
9	Digital B.Eng., Enginee Manage Importa in accor Module Prof. Di	Logist Mechering (ementer) nce of rdance coording (rIng	ics (wor atronics (work-in (work-i the grad e with B nator:	k-integrated /Automatio tegrated) B ntegrated) e for the fina	d) B.E n (wo .Eng. B.Eng	ing., I rk-int and I	Digital egrate	Te ed)	chnolo B.Eng.	, Produ	ct-Servi	
9	Digital B.Eng., Enginee Manage Importa in accord Module	Logist Mechering (ementer) nce of rdance coording (rIng	ics (wor atronics (work-in (work-i the grad e with B nator:	k-integrated /Automatio tegrated) B ntegrated) e for the fina RPO	d) B.E n (wo .Eng. B.Eng	ing., I rk-int and I	Digital egrate	Te ed)	chnolo B.Eng.	, Produ	ct-Servi	
9	Digital B.Eng., Enginee Manage Importa in accor Module Prof. Di	Logist Mechering (ement nce of rdance coordirIng formate)	ics (wor atronics (work-in (work-i the grad e with B nator:	k-integrated /Automatio tegrated) B ntegrated) e for the fina RPO	d) B.E n (wo .Eng. B.Eng	ing., I rk-int and I	Digital egrate	Te ed)	chnolo B.Eng.	, Produ	ct-Servi	

Pra	ctical M	odule II								PX2	
ID:		Workload:	Credits:	Stud	y sem	ester:	F	Frequenc	y:	Duratio	on:
312	2	150 h	5	5th	sem.			Annual (Winter)		1 sem	ester
1	Course:		Planned group sizes:	p	Volu	me:		Actual c time/cla teaching	issroom	Self-stu	dy
	Lecture		60 students		0	SCH		0	h	150	h
	Seminar	tuition	30 students		0	SCH		0	h	0	h
	Exercise	!	20 students		0	SCH		0	h	0	h
	Practical seminar		15 students		0	SCH		0	h	0	h
	Supervis study	sed self-	60 students		0	SCH		0	h	0	h
3	under poptions the studit further Contents	oractical co are develo dents acqu er. s:	his purpose, in productions during the ped independ ire the ability worked on r	ng the ently. of woi	worl In add	c term dition scienti	tc ifi	at the control the process the process the control the	compan fessiona d succes	y and so al compe ssively de	olution tence, evelop
	oriented betwee univers	d towards n the stud ity.	the module co ent, the facult	ntents	of th	e curri	ic	ulum. Tł	ne topic	is coord	inated
4	Work-re	f teaching: elated mod									
5		ation require									
	Formal:		lule examinati	on pas	ss in F	ractic	al	Module	1		
	Content										
6		assessment	1:								
7	Term p		ard of credit po	nints:							
/		examinati		/II IL3.							
8			odule (in the fo	llowing	g stud	/ progr	ar	nmes):			
_			work-integrate	•	, ,			•	gies (w	ork-intec	grated)
			nics/Automatio								
			k-integrated) E			ndust	ria	al Engin	eering a	ınd	
	Manage	ement (wor	k-integrated)	B.Eng	J .						
9			rade for the fin	ai grad	ie:						
10		rdance witl									
10			rea Kaimann								
11		formation:									
	-										
12	Languag										
	Germar	1									

Pra	ctical M	odule	111								РХ3	
ID:		Worklo	oad:	Credits:	Stud	y sem	ester:	F	Frequency	y:	Duratio	on:
312	9	150 h		5	6th	sem.			Annual (Summe	r)	1 sem	ester
1	Course:			anned group zes:		Volu	me:		Actual c time/cla teaching	ssroom	Self-stu	dy
	Lecture		60) students		0	SCH		0	h	150	h
	Seminar	tuition	30) students		0	SCH		0	h	0	h
	Exercise	!	20) students		0	SCH		0	h	0	h
	Practical seminar		1!	5 students		0	SCH		0	h	0	h
	Supervis	sed self-	- 60) students		0	SCH		0	h	0	h
3	program under proprious the studit further Contents	nme. Foractical are de dents a er. s: coics to	or this al cond veloped acquire be wo	nd deepen purpose, in itions durin d independe the ability of orked on m	ndividung the ently. of wor	ual properties work In add king s	oblem k term dition scienti	s tc ifi	are work at the control the pro- cally and engine	ked on company fessional successional succes	holistical y and so al compe ssively de cience a	ly and bearing and be
	betwee univers	n the s ity.	student	module cor , the faculty								
4	Forms of Work-re		-									
5	Participa		•									
	Formal:		<u>Module</u>	examinatio	on pas	s in F	ractic	al	Module	П		
	Content		-									
6	Form of		ment:									
	Term pa											
7				of credit po	ints:							
	Module			pass ile (in the fol	lowin	v Ctuck	/ proce		mmos).			
8	Digital I B.Eng., Enginee Manage	Logistic Mecha ering (v ement	cs (wor itronics work-in (work-i	k-integrated /Automatio tegrated) B ntegrated)	d) B.E n (wo .Eng. B.Eng	ng., I rk-int and I	Digital egrate	T ec	echnolo I) B.Eng	., Produ	ct-Servi	
9			_	e for the fina	ıl grad	e:						
	in accor			RPO								
10	Module of			IZ a lana a sa sa								
4.1	Other in			Kaimann								
11	other in	rormatt	UII:									
10	Languag	IO.										
12	German											
	Germal	1										

Qua	ility Mar	nagement							QMG	
ID:		Workload:	Credits:	Stud	y sem	ester:	Frequer	ıcy:	Durati	on:
320	1	150 h	5	4th sem	or	6th	Annual (Summ		1 sem	nester
1	Course:		Planned group sizes:)	Volu	me:		contact lassroom	Self-stu	ıdy
	Lecture		60 students		2	SCH	0	h	56	h
	Seminar	tuition	30 students		0	SCH	0	h	0	h
	Exercise	1	20 students		2	SCH	16	h	62	h
	Practical seminar		15 students		0	SCH	0	h	0	h
	Supervis study		60 students		1	SCH	16	h	0	h
2	Learning Student		competences:							
	•	can determ and can und understand models and manner.	ine/assess the derstand the c and distingu d can apply te quality ma ny.	develo iish b qualit	opmer etwee y ma	nt of q en the anager	uality m existin nent sy	anageme g quality stems in	nt. manag a puri	gement poseful
	Prereque	OMS in the Terms and Analysis of Strategies foycle) Tools, proceinspection autisites for thement in the	uality manage company definitions in the costs/ben for increasing edures, means and improvem	quality efits of and e s, propent ent use of	y mar of a Q ensurio cesse	nagem M syst ng 'qu s of qu ageme	ent tem ality' in uality pla ent syste	the comp anning, co ems for q	any (PD ontrol, uality	OCA
4	Forms o	f teaching:								
		-	f-study, face-t	to-fac	e tead	ching i	n the fo	rm of exe	ercises	
5	Formal: Content:									
6	Term pa		en examination		ject v	vork o	oral ex	aminatio	n	
7	Conditio		ard of credit po		-					
,	modalo	Chairmand	лі разз							
8			odule (in the fol	llowing	g study	y progr	ammes):			

	in accordance with BRPO
10	Module coordinator:
	Prof. Dr. rer. oec. Pascal Reusch
11	Other information:
	-
12	Language:
	German

	dback C	ontrol Eng	gineering						RTK	
ID:		Workload:	Credits:	Stud	y sem	ester:	Frequen	су:	Durat	ion:
312	5	150 h	5	4th/ sem	/5th/6	th	each se	emester	1 ser	nester
1	Course:		Planned group sizes:)	Volu	me:		contact lassroom	Self-st	udy
	Lecture		60 students		2	SCH	0	h	56	h
	Seminar	tuition	30 students		0	SCH	0	h	0	h
	Exercise	!	20 students		1	SCH	8	h	46	h
	Practica seminar		15 students		1	SCH	16	h	0	h
	Supervis study		60 students competences:		1.5	SCH	24	h	0	h
1			on the basis	of a m	nather	dents (natica	l circuit ı		ehaviou n small	r of the groups
	the stu	dents have le controls		of a m expe ocesse	nather rience es and	dents of the dents	l circuit i the desi implem	ict the be model. Ir gn and ir ented ar	ehaviou n small : mpleme	r of the groups, entation
3	the stu	dents have le controls ommon sim	on the basis gained initial for simple pro	of a m expe ocesse	nather rience es and	dents of the dents	l circuit i the desi implem	ict the be model. Ir gn and ir ented ar	ehaviou n small : mpleme	r of the groups, entation
3	the stu of simp using co Content: Introdu Transm The cor	dents have ble controls ommon simes: action to Control loop loop loop loop loop loop loop l	on the basis gained initial for simple production software and the sams analysis te and dynam response and g mathematic ture of the corp structures shaviour of corpear controllerign procedure	ic beh	nather rience es and as lach as lach as dels foop	dents of matical entire with distributed matter mat	I circuit i the desi implem AB Simu	ict the be model. Ir gn and in ented ar link.	ehaviou n small : mpleme	r of the groups entation
3	the stu of simp using co Content Introdu Transm The cor Forms o Learnin	dents have ble controls ommon simes: action to Contents Definitions Block diagraission link and steady-star petermining trol loop Basic struct Control loop Stability be Classical ling Simple des Parameterf teaching: In units for	on the basis gained initial for simple production software and service and dynam response and g mathematic ture of the corp structures chaviour of corpear controller	ic behintrol less	nather rience es and ach as diagradels foop	r am or tech	I circuit i the desi implem AB Simu	ict the bemodel. Ir gn and ir ented ar link.	ehaviou n small mpleme nd teste	er of the
	the stu of simp using contents. Introduced Transmonth of the contents of the c	dents have ble controls ommon simes: action to Contents Definitions Block diagraission link and steady-star petermining trol loop Basic struct Control loop Stability be Classical ling Simple des Parameterf teaching: In units for	on the basis gained initial for simple production software and sanalysis te and dynam response and gmathematic ture of the corp structures chaviour of conear controller ign procedure optimal control self-study, classes	ic behintrol less	nather rience es and ach as diagradels foop	r am or tech	I circuit i the desi implem AB Simu	ict the bemodel. Ir gn and ir ented ar link.	ehaviou n small mpleme nd teste	er of th groups entation ed ther

Content:

Form of assessment:

	Term paper, written examination, project work or oral examination
7	Condition for the award of credit points:
	Module examination pass and course assessment
8	Application of the module (in the following study programmes):
	Digital Technologies (work-integrated) B.Eng., Mechatronics/Automation (work-integrated) B.Eng., Product-Service Engineering (work-integrated) B.Eng. and Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. DrIng. Michael Leuer
11	Other information:
	-
12	Language:
	German

Sta	tistics									STAT		
ID:		Workload	d:	Credits:	Stud	y sem	ester:	Frequen	ıcy:	Durati	on:	
322	4	150 h		5	3rd sem	or 4th		each semester		1 semester		
1	Course:			lanned group izes:	Volume:				contact lassroom	Self-study		
	Lecture		6	0 students		2	SCH	0	h	56	h	
	Seminar tuition			0 students		0	SCH	0	h	0	h	
	Exercise	!	2	0 students		2	SCH	16	h	62	h	
	Practical seminar		1	5 students		0	SCH	0	h	0	h	
	Supervis study			0 students		1	SCH	16	h	0	h	
2	Learning Student		s/con	npetences:								
	• (probability theory.										
3	Contents											
4	• !	measures	s, mu y the I infe ccel/s		tatisti	cs, re	gressi	on analy	rsis)	OHS,		
	Study u	inits for s	elf-s	tudy, face-t	to-fac	e tead	hing i	n the fo	rm of exe	ercises		
5		ition requi	reme	ents:								
	Formal:	-										
	Content:	assessme	nt:									
6	Term pa	aper, wri	tten exam	examination	ompai				, project	work, or	al .	
7				d of credit po pass	ints:							
8	Module examination pass Application of the module (in the following study programmes): Digital Logistics (work-integrated) B.Eng., Digital Technologies (work-integrated) B.Eng., Mechatronics/Automation (work-integrated) B.Eng., Product-Service Engineering (work-integrated) B.Eng. and Industrial Engineering and Management (work-integrated) B.Eng.											
9	Importa		grad	le for the fina								
10	Module of	coordinate nat. Sab	r:									
11		formation		נוטו ו								
	-											
12	Languag											
	Germar	1										

_	jineering	Mechanic	s – Statics	and S	treng	th of	Materia	ıls	TMA	
ID:	\	Workload:	Credits:	Credits: Study semester: Frequency:						on:
310	8	150 h	5	2nd	sem.		Annual (Summer)		1 semester	
1	Course:		Planned grou sizes:	Volu	me:		contact lassroom	Self-stu	Self-study	
	Lecture		60 students		2	SCH	0	h	56	h
	Seminar t	uition	30 students		0	SCH	0	h	0	h
	Exercise		20 students		1	SCH	8	h	46	h
	Practical of seminar	or	15 students		1	SCH	16	h	0	h
2	Supervise study		60 students ompetences:		1.5	SCH	24	h	0	h
3	The students know and understand the basic relationships of statics as the study of the balance of forces in and on mechanical structures at rest and can apply these independently to simple examples from practice. Furthermore, they know the basic relationships between the external loads and the resulting internal stresses and deformations, so that they can carry out strength verifications for simple statically stressed components using relevant material parameters. Contents: Basic concepts of mechanics: Force – Balance – Rigid Body Statics: Introduction – Plane system of forces – Centre of gravity – Static equilibrium of bodies – Freeing – Determination of support and intermediate reactions – Friction Strength of materials: Introduction to strength theory – Internal forces –									
	Tensile or pressure load – Shear – Bending load – Torsional stress – Buckling stress – Composite stress Forms of teaching:									
4		_	ealf_study_cl			ante in	the form	n of ever	rciene an	
4	Learning	units for s	self-study, cla			ents in	the forr	n of exe	rcises an	
4	Learning practicals	units for s				ents in	the forr	n of exe	rcises an	
	Learning practicals	units for s	nents:			ents in	the forr	n of exei	rcises an	
	Learning practicals Participati Formal: Content:	units for s s ion requirer None None	nents:			ents in	the forr	n of exer	rcises an	
	Learning practicals Participati Formal: Content: Form of a Written 6	units for s s ion requirer None None ssessment: examinatio	nents:	assroo on exa	m eve					
5	Learning practicals Participati Formal: Content: Form of a Written & Condition Module e	units for s s ion requirer None None ssessment: examinatio for the awa examinatio	n, combination of credit por pass and c	on exa	m eve	tion or	oral exa			
5 6 7 8	Learning practicals Participati Formal: Content: Form of a Written & Condition Module & Application Mechatro and Management of the process of	units for s sion requirer None None ssessment: examinatio for the awa examinatio on of the mo	n, combinati ord of credit po n pass and c dule (in the fo mation (work work-integra	on exactions on exactions ourse abiliowing actinited ted) B	m eve	tion or sment	oral exa	aminatio	n	d
5 6 7	Learning practicals Participati Formal: Content: Form of a Written & Condition Module & Application Mechatro and Manalimportance in according	units for s sion requirer None None ssessment: examinatio for the awa examinatio on of the mo	n, combination of credit por pass and compation (workwork-integrated for the find th	on exactions on exactions ourse abiliowing actinited ted) B	m eve	tion or sment	oral exa	aminatio	n	d

11	Other information:
	Supplementary literature will be announced at the beginning of the course.
12	Language:
	German

Tec	hnical E	nglis	h							TCE		
ID:		Work	cload:	Credits: Stud			ester:	Frequency:		Durat	Duration:	
312	1	150	h	5	1st, 3rd sem	or 5th	1	Annual (Winter)		1 ser	nester	
1	Course:			Planned grou sizes:	р	Volu	me:	Actual contact time/classroom teaching		Self-st	udy	
	Lecture			60 students		2	SCH	0	h	56	h	
	Seminai	tuitio	n	30 students		0	SCH	0	h	0	h	
	Exercise	<u>)</u>		20 students		0	SCH	0	h	0	h	
	Practica seminar			15 students		2	SCH	32	h	46	h	
	Supervi: study	sed se	lf-	60 students		1	SCH	16	h	0	h	
	general language competence from B1.2 and achieved a B2.1 level. They possess a sound basic vocabulary of Technical English and master the contextually relevant grammar. They communicate spontaneously and fluently in engineering job situations. They formulate issues confidently, clearly and in detail in English both in speaking and writing. • Social competence: They try out and consolidate communicative key skills in English presentations, teamwork and project work. • Methodological competence: They use targeted strategies for content acquisition and critical analysis of technical texts and for solving contextual tasks. They can present technical issues in a way that is appropriate for the target group. • Personal competence: They assume responsibility for their learning process; they research and structure authentic material, organise workloads and meet deadlines.											
3	 Students master the core terminology of the technical and organisational content of their study programme (e.g. dimensions and shapes; numbers, symbols and mathematical operations; materials and manufacturing; automated systems and Industry 4.0; logistics; international trade, etc.). They possess interdisciplinary skills (e.g. e-mailing; writing reports and abstracts; project pitches; discussing readings and trends; designing conference posters). 											
4	Forms of teaching: Seminar-based teaching / individual and group work, etc. Project task (Assignment)											
5	Participa	ation r	equirem	ents:								
Formal:												
	1											
	Content	:		sh language ence Framev					ling to th	ne Europ	ean	

	Combination exam
7	Condition for the award of credit points:
	70% attendance and active participation; passed semester project and written
	exam
8	Application of the module (in the following study programmes):
	Digital Logistics (work-integrated) B.Eng., Digital Technologies (work-integrated)
	B.Eng., Mechatronics/Automation (work-integrated) B.Eng., Product-Service
	Engineering (work-integrated) B.Eng. and Industrial Engineering and
	Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	OStR Cornelia Biegler-König
11	Other information:
	-
12	Language:
	English

Pro	Process Engineering												
ID: Workload:				Credits:	Stud	y sem	ester:	Frequen	су:	Duratio	on:		
3013 150 h			5	6th sem.			Annual (Summ	er)	1 sem	ester			
1	1 Course:			Planned group sizes:			me:		contact assroom ng	Self-stu	dy		
	Lecture		60	0 students		2	SCH	0	h	56	h		
	Seminar	tuition	30	30 students		0	SCH	0	h	0	h		
	Exercise		20 students			2	SCH	16	h	62	h		
	Practical or seminar		15	15 students		0	SCH	0	h	0	h		
	Supervised self- study			students		1	SCH	16	h	0	h		

2 Learning outcomes/competences:

Instrumental competence:

Application of the acquired basic knowledge on the example of simple process engineering equipment and machines with regard to thermodynamics and fluid mechanics

Systematic competence:

Independent recognition of the interrelationships, introduced by comprehension of the process engineering processes carried out (mixing, separating, heat exchanger).

The technical issues that arise should be reliably recognised, described, evaluated and solved.

To derive scientifically sound judgements about the mode of action from this, to substantiate them in further new applications, to recognise interface problems

Communicative competence:

Work on tasks in interdisciplinary teamwork.

3 Contents:

- 1. Introduction to process engineering
 - Development of process engineering The process engineering process Balancing – Economic consideration
- 2. Mechanical process engineering: Fluid mechanics and stirring technology
 - Fluid mechanics basics Pumps and compressors Stirring technology
- 3. Mechanical process engineering: Disperse systems and mechanical processes Disperse systems Shredders and classifiers Grain enlargement Substance separation
- 4. Thermal process engineering
 - Energy balance Heat and mass transfer Thermal separation processes

Exercise: Calculation tasks for the above-mentioned areas of process engineering using practical examples. Working out the solutions in small groups

4 Forms of teaching:

Learning materials for self-study, classroom sessions in the form of exercises.

5	Participation re	equirements:
	Formal:	None
	Content:	None
6	Form of assess	sment:
		written examination, project work or oral examination
7	Condition for t	he award of credit points:
	Module exam	nination pass
8	Application of	the module (in the following study programmes):
	Industrial En	gineering and Management (work-integrated) B.Eng.
9	Importance of	the grade for the final grade:
	in accordance	e with BRPO
10	Module coordi	nator:
	Prof. DrIng	. Jürgen Hermeler
11	Other informa	tion:
	Supplementa	ry literature will be announced at the beginning of the course.
12	Language:	
	German	

ID:	egrated)	Workload:	d: Credits: Stu			y sem	ester:	Freque	ncy:	Durat	ion:	
900)9	150 h			5th sem.	or 6th		each s	emester	1 semester		
1	Course:			anned group zes:)	Volu	me:		I contact classroom ing	Self-st	udy	
	Lecture		60) students			SCH		h		h	
	Seminar	tuition	30) students			SCH		h		h	
	Exercise)	20) students			SCH		h		h	
	seminar	Practical or seminar		5 students		0	SCH	0	h	0	h	
	study	sed self-) students			SCH		h		h	
2	Learning	g outcomes/	com/	npetences:								
3	Content	S:										
4	Forms o	f teaching:										
5	Participa	ation require	eme	nts:								
	Formal:											
	Content											
6	Form of	assessmen	t:									
7	Conditio	n for the av	vard	of credit po	ints:							
8				lle (in the fo	_	-						
9				e for the fina				<u> </u>				
10		coordinator										
		rIng. And	irea	Kaimann								
11	Other in	formation:										
12	Languaç	ge:										
	German											

Ma	terials E	ngineering	g						WT W	/IG
ID:		Workload:	Credits:	Stud	y sem	ester:	Frequen	cy:	Duration	on:
300)7	150 h	5	5th se			Annual (Winter)		1 semester	
1	Course:		Planned group sizes:	Planned group sizes:				contact lassroom	Self-study	
	Lecture		60 students		2	SCH	0	h	56	h
	Seminar tuition		30 students		0	SCH	0	h	0	h
	Exercise	<u> </u>	20 students		1	SCH	8	h	46	h
	Practica seminar	l or	15 students		1	SCH	16	h	8	h
	Supervis		60 students		1	SCH	16	h	0	h
2		g outcomes/o	competences:							
	 acquiring knowledge about the microstructural composition and it modification by alloying elements, understanding the deformation behaviour as well as the transformation behaviour and phase reactions, developing skills to apply material parameters to different set condition and to transfer these to the component design acquiring competences to measure and assess material properties within the framework of a material test and to bring about changes in material behaviour in a targeted manner through heat treatments or mechanical deformation. 									
3	Selecte	Structure of Lattice deference Deformation Alloying: statime-temper Influence of Hardening Steel design Properties astructural station and allowers.	of metallic matects and their and fracture transforms are tempering nations and material between the material testing	effecte: streamd in and in ormat ying e oehaviordene	on mength, ron-cation are lemented and one men men men men men men men men men m	tough arbon on and aust nts f select tool s	ness, du diagrams cenitisati ted stee steels, ca	uctility 5, on I materia ast iron.		
4		of teaching: ments for se	elf-study, prac	ticals	, exer	cises,	supervis	sed self-s	study	
5	Particina	ation require	ments:							
	Formal:	None								
5		1								
J	Content	: None	е							
6	Form of	assessment	:							
6	Form of Written	assessment examination	: on or oral exai		ion					
	Form of Written Conditio	assessment examination	: on or oral exal ard of credit po		ion					

	Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. DrIng. Thomas Kordisch
11	Other information:
	Literature will be announced at the beginning of the course.
12	Language:
	German

the most important operational areas. can appropriately consider legal aspects in the context of their own decisions. can assess which persons can conclude contracts, how contracts are concluded and how their content is determined. can decide how contractual clauses can be effectively included in a contract and assess the permissibility of the clauses. understand how the choice of the legal form of a company affects business practice, especially in questions of representation and liability. know the legal basis of personnel selection in labour law, the special duties of the employer and the employees as well as the possibilities of terminating the employment relationship. can apply the fundamentals they have learned to simple issues themselves and make well-founded decisions. Contents: Basic principles of contract law (conclusion and execution of contracts general terms and conditions, liability, purchase contract and contract for work and services) Basic features of commercial and company law (prerequisites and consequences of being a merchant, choice of legal form, representation liability) Principles of employment law Exercises through case studies and application examples from the business sector Forms of teaching: Lecture notes, seminar-based teaching, exercises Participation requirements: Formal: None Content: None Form of assessment:	Bus	iness La	aw							WR	
Course: Planned group Sizes: Volume: Actual contact time/classroom teaching Lecture 60 students 2 SCH 0 h 56 h Seminar tuition 30 students 0 SCH 0 h 0 h Exercise 20 students 2 SCH 16 h 62 h Practical or Superior Superi	ID:		Workload:	Credits:	Stud	y sem	ester:	Frequen	су:	Durati	on:
Lecture 60 students 2 SCH 0 h 56 h Seminar tuition 30 students 0 SCH 0 h 0 h Exercise 20 students 2 SCH 16 h 62 h Practical or 15 students 0 SCH 0 h 0 h Supervised self-students 1 SCH 16 h 0 h Supervised self-students 1 SCH 16 h 0 h Supervised self-students 1 SCH 16 h 0 h Learning outcomes/competences: The students • know the principles of legal thinking and working methods. • know the basics of German contract, commercial, corporate and employment law and understand the importance of legal structuring for the most important operational areas. • can appropriately consider legal aspects in the context of their own decisions. • can assess which persons can conclude contracts, how contracts are concluded and how their content is determined. • can decide how contractual clauses can be effectively included in a contract and assess the permissibility of the clauses. • understand how the choice of the legal form of a company affects business practice, especially in questions of representation and liability. • know the legal basis of personnel selection in labour law, the special duties of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of terminating the employment relationship. • can apply the fundamentals they have learned to simple issues themselves and make well-founded decisions. 3 Contents: • Basic principles of contract law (conclusion and execution of contract for work and services) • Basic features of commercial and company law (prerequisites and consequences of being a merchant, choice of legal form, representation liability) • Principles of employment law • Exercises through case studies and application examples from the business sector 5 Participation requirements: Formal: None Content: None Content: None	302	6	150 h	5	7th	sem.				1 semester	
Lecture	1	Course:)	Volu	me:	time/c	lassroom	Self-study	
Exercise		Lecture		60 students		2	SCH		-T	56	h
Practical or seminar Supervised self-study Learning outcomes/competences: The students • know the principles of legal thinking and working methods. • know the basics of German contract, commercial, corporate and employment law and understand the importance of legal structuring for the most important operational areas. • can appropriately consider legal aspects in the context of their own decisions. • can assess which persons can conclude contracts, how contracts are concluded and how their content is determined. • can decide how contractual clauses can be effectively included in a contract and assess the permissibility of the clauses. • understand how the choice of the legal form of a company affects business practice, especially in questions of representation and liability. • know the legal basis of personnel selection in labour law, the special duties of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the make well-founded decisions. Contents: • Basic principles of contract law (conclusion and execution of contracts general terms and conditions, liability, purchase contract and contract for work and services) • Basic features of commercial and company law (prerequisites and consequences of being a merchant, choice of legal form, representation liability) • Principles of employment law • Exercises through case studies and application examples from the business sector 4 Forms of teaching: Lecture notes, seminar-based teaching, exercises		Seminar	tuition	30 students		0	SCH	0	h	0	h
Seminar Supervised self-study Competences: The study Supervised self-study Learning outcomes/competences: The students • know the principles of legal thinking and working methods. • know the basics of German contract, commercial, corporate and employment law and understand the importance of legal structuring for the most important operational areas. • can appropriately consider legal aspects in the context of their own decisions. • can assess which persons can conclude contracts, how contracts are concluded and how their content is determined. • can decide how contractual clauses can be effectively included in a contract and assess the permissibility of the clauses. • understand how the choice of the legal form of a company affects business practice, especially in questions of representation and liability. • know the legal basis of personnel selection in labour law, the special duties of the employer and the employees as well as the possibilities of terminating the employment relationship. • can apply the fundamentals they have learned to simple issues themselves and make well-founded decisions. 3		Exercise	1	20 students		2	SCH	16	h	62	h
study Learning outcomes/competences: The students • know the principles of legal thinking and working methods. • know the basics of German contract, commercial, corporate and employment law and understand the importance of legal structuring for the most important operational areas. • can appropriately consider legal aspects in the context of their own decisions. • can assess which persons can conclude contracts, how contracts are concluded and how their content is determined. • can decide how contractual clauses can be effectively included in a contract and assess the permissibility of the clauses. • understand how the choice of the legal form of a company affects business practice, especially in questions of representation and liability. • know the legal basis of personnel selection in labour law, the special duties of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employees as well as the possibilities of the employer and the employer				15 students		0	SCH	0	h	0	h
The students • know the principles of legal thinking and working methods. • know the basics of German contract, commercial, corporate and employment law and understand the importance of legal structuring for the most important operational areas. • can appropriately consider legal aspects in the context of their own decisions. • can assess which persons can conclude contracts, how contracts are concluded and how their content is determined. • can decide how contractual clauses can be effectively included in a contract and assess the permissibility of the clauses. • understand how the choice of the legal form of a company affects business practice, especially in questions of representation and liability. • know the legal basis of personnel selection in labour law, the special duties of the employer and the employees as well as the possibilities of terminating the employment relationship. • can apply the fundamentals they have learned to simple issues themselves and make well-founded decisions. Contents: • Basic principles of contract law (conclusion and execution of contracts general terms and conditions, liability, purchase contract and contract for work and services) • Basic features of commercial and company law (prerequisites and consequences of being a merchant, choice of legal form, representation liability) • Principles of employment law • Exercises through case studies and application examples from the business sector 4 Forms of teaching: Lecture notes, seminar-based teaching, exercises			sed self-	60 students		1	SCH	16	h	0	h
 know the principles of legal thinking and working methods. know the basics of German contract, commercial, corporate and employment law and understand the importance of legal structuring for the most important operational areas. can appropriately consider legal aspects in the context of their own decisions. can assess which persons can conclude contracts, how contracts are concluded and how their content is determined. can decide how contractual clauses can be effectively included in a contract and assess the permissibility of the clauses. understand how the choice of the legal form of a company affects business practice, especially in questions of representation and liability. know the legal basis of personnel selection in labour law, the special duties of the employer and the employees as well as the possibilities of terminating the employment relationship. can apply the fundamentals they have learned to simple issues themselves and make well-founded decisions. 3 Contents: Basic principles of contract law (conclusion and execution of contracts general terms and conditions, liability, purchase contract and contract for work and services) Basic features of commercial and company law (prerequisites and consequences of being a merchant, choice of legal form, representation liability) Principles of employment law Exercises through case studies and application examples from the business sector 4 Forms of teaching: Lecture notes, seminar-based teaching, exercises 5 Participation requirements: Formal: None Content: None 6 Form of assessment:	2		g outcomes/c	competences:			1		· ·	I	
Basic principles of contract law (conclusion and execution of contracts general terms and conditions, liability, purchase contract and contract for work and services) Basic features of commercial and company law (prerequisites and consequences of being a merchant, choice of legal form, representation liability) Principles of employment law Exercises through case studies and application examples from the business sector Forms of teaching: Lecture notes, seminar-based teaching, exercises Participation requirements: Formal: None Content: None Form of assessment:		 can appropriately consider legal aspects in the context of their own decisions. can assess which persons can conclude contracts, how contracts are concluded and how their content is determined. can decide how contractual clauses can be effectively included in a contract and assess the permissibility of the clauses. understand how the choice of the legal form of a company affects business practice, especially in questions of representation and liability. know the legal basis of personnel selection in labour law, the special duties of the employer and the employees as well as the possibilities of terminating the employment relationship. can apply the fundamentals they have learned to simple issues themselves 									
Lecture notes, seminar-based teaching, exercises Participation requirements:		 Basic principles of contract law (conclusion and execution of contracts, general terms and conditions, liability, purchase contract and contract for work and services) Basic features of commercial and company law (prerequisites and consequences of being a merchant, choice of legal form, representation, liability) Principles of employment law Exercises through case studies and application examples from the 									
5 Participation requirements: Formal: None Content: None 6 Form of assessment:	4		_								
Formal: None Content: None 6 Form of assessment:		Lecture	notes, sem	ninar-based te	eachin	g, ex	ercises	5			
Content: None 6 Form of assessment:	5										
6 Form of assessment:											
Term paper, written examination, project work or oral examination	6										

7	Condition for the award of credit points:
	Module examination pass
8	Application of the module (in the following study programmes):
	Industrial Engineering and Management (work-integrated) B.Eng.
9	Importance of the grade for the final grade:
	in accordance with BRPO
10	Module coordinator:
	Prof. DrIng. Andrea Kaimann
11	Other information:
	Literature will be announced at the beginning of the course.
	Ç Ç
12	Language:
	German