

Main Focus: Engineering Design

1st Semester	2nd Semester	3rd Semester	4th Semester	5th Semester	6th Semester
Engineering Mechanics 240 h, 8 Credits 120 h		Measurement and Control Technology 300 h, 10 Credits 150 h		Energy Conversion Machines 240 h, 8 Credits 120 h	
	Physics 300 h, 10 Credits 150 h	Thermo Dynamics and Fluid Dynamics 300 h, 10 Credits 150 h		Drive Engineering 240 h, 8 Credits 120 h	
Computer Science 300 h, 10 Credits 150 h		Business Management 270 h, 9 Credits 180 h		Production Technology II 120 h, 4 Credits	Quality Management 150 h, 5 Credits
Chemics and Material Science 240 h, 8 Credits 120 h		Engineering Mechanics II 120 h, 4 Credits	English 150 h, 5 Credits	Elective I 120h, 4 Credits	Elective II 120h, 4 Credits
Mathematics I 300 h, 10 Credits	Mathematics II 150 h, 5 Credits	Engineering Materials 120 h, 4 Credits	Production Technology I 120 h, 4 Credits	Product Engineering and Construction Systematics 120h, 4 Credits	Bachelor Thesis 330 h, 11 Credits
	Electrical Engineering 120 h, 4 Credits		Higher Engineering Design 150h, 5 Credits		
Professional Studies 60 h, 2 Credits	Engineering Design 210 h, 7 Credits 90 h		Internship 420 h, 14 Credits 150 h		Colloquium 90 h, 3 Credits
Total Workload: 900 h	Total Workload: 900 h	Total Workload: 840 h	Total Workload: 960 h	Total Workload: 870 h	Total Workload: 930 h
Total Credits: 30	Total Credits: 30	Total Credits: 28	Total Credits: 32	Total Credits: 29	Total Credits: 31

Legend

1 Semester Module

Module Name
Workload, ECTS Credits

2 Semester Module

Module Name	
Workload, ECTS Credits	
Workload in First Semester	Workload in Second Semester

Total Semesters 6
Total ECTS Credits 180
Total Workload (h) 5400
 see §4 BPO Maschinenbau (examination regulations)

Main Focus: Production Engineering

1st Semester	2nd Semester	3rd Semester	4th Semester	5th Semester	6th Semester
Engineering Mechanics 240 h, 8 Credits 120 h		Measurement and Control Technology 300 h, 10 Credits 150 h		Production Planning and Control 240 h, 8 Credits	Industrial Automation 120 h, 4 Credits
	120h		150 h		Production Technology III 120 h, 4 Credits
Physics 300 h, 10 Credits 150 h		Thermo Dynamics and Fluid Dynamics 300 h, 10 Credits 150 h		Elective I 120h, 4 Credits	Quality Management 150 h, 5 Credits
Computer Science 300 h, 10 Credits 150 h		Business Management 270 h, 9 Credits 180 h			Elective II 120h, 4 Credits
Chemics and Material Science 240 h, 8 Credits 120 h		Engineering Mechanics II 120 h, 4 Credits	English 150 h, 5 Credits		
Mathematics I 300 h, 10 Credits	Mathematics II 150 h, 5 Credits	Engineering Materials 120 h, 4 Credits	Production Technology I 120 h, 4 Credits	Production Technology II 120 h, 4 Credits	Bachelor Thesis 330 h, 11 Credits
	Electrical Engineering 120 h, 4 Credits			Manufacturing Systems 270 h, 9 Credits 150 h	
Professional Studies 60 h, 2 Credits	Engineering Design 210 h, 7 Credits 90 h		Internship 420 h, 14 Credits 150 h	270 h	Colloquium 90 h, 3 Credits
Total Workload: 900 h	Total Workload: 900 h	Total Workload: 840 h	Total Workload: 960 h	Total Workload: 870 h	Total Workload: 930 h
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1 Semester Module

Module Name
Workload, ECTS Credits

2 Semester Module

Module Name	
Workload, ECTS Credits	
Workload in First Semester	Workload in Second Semester

Total Semesters

Total ECTS Credits

Total Workload (h)

see §4 BPO Maschinenbau (examination regulations)

6

180

5400

Main Focus: Computer Science in Production

1st Semester	2nd Semester	3rd Semester	4th Semester	5th Semester	6th Semester
Engineering Mechanics 240 h, 8 Credits 120 h		Measurement and Control Technology 300 h, 10 Credits 150 h		Production Planning and Control 240 h, 8 Credits	Industrial Automation 120 h, 4 Credits
	120h		150 h		Databases 120 h, 4 Credits
Physics 300 h, 10 Credits 150 h		Thermo Dynamics and Fluid Dynamics 300 h, 10 Credits 150 h		Elective I 120h, 4 Credits	Quality Management 150 h, 5 Credits
Computer Science 300 h, 10 Credits 150 h	150 h	Business Management 270 h, 9 Credits 180 h	90 h		Elective II 120h, 4 Credits
Chemics and Material Science 240 h, 8 Credits 120 h	120 h	Operating Systems and Microprocessor Technology 120 h, 4 Credits	English 150 h, 5 Credits		Bachelor Thesis 330 h, 11 Credits
Mathematics I 300 h, 10 Credits	Mathematics II 150 h, 5 Credits	Programming Techniques 120 h, 4 Credits	Production Technology I 120 h, 4 Credits	Rechnernetze 120 h, 4 Credits	
Professional Studies 60 h, 2 Credits	Electrical Engineering 120 h, 4 Credits		Manufacturing Systems 270 h, 9 Credits 150 h	120 h	Colloquium 90 h, 3 Credits
	Engineering Design 210 h, 7 Credits 90 h		Internship 420 h, 14 Credits 150 h	270 h	
Total Workload: 900 h	Total Workload: 900 h	Total Workload: 840 h	Total Workload: 960 h	Total Workload: 870 h	Total Workload: 930 h
Total Credits: 30	Total Credits: 30	Total Credits: 28	Total Credits: 32	Total Credits: 29	Total Credits: 31

Legend

1 Semester Module

Module Name
Workload, ECTS Credits

2 Semester Module

Module Name
Workload, ECTS Credits
Workload in First Semester Workload in Second Semester

Total Semesters 6
Total ECTS Credits 180
Total Workload (h) 5400
 see §4 BPO Maschinenbau (examination regulations)

Total Semesters 6
 Total ECTS Credits 180 see §4 BPO Maschinenbau (examination regulations)
 Total Workload (h) 5400

Module	Abbr.	Description	Credits	Workload (h)	Semester	Type	h/week
Mathematics I	MA1	Functions and equations, differential and integral calculus, vector analysis	10	300	1st	required	8
Mathematics II	MA2	Analytic geometry, matrix calculus (linear equation systems, eigenvalues and eigenvectors, rotation matrix), partial derivatives and multiple integrals, scalar and vector fields, differential equations, Laplace transformation, statistics	5	150	2nd	required	4
Physics	PH	Mechanics (kinematics and kinetics of particles, work and energy), elektromagnetism, mechanical and electrical vibrations, waves, optics	10	300	1st & 2nd	required	8
Computer Science	IN	Web technologies, spreadsheets, microcontrollers, databases, programming in Java	10	300	1st & 2nd	required	8
Engineering Mechanics	TM	Statics (statics of rigid bodies, plane truss, statically determined and indeterminate systems, center of gravity, static friction, internal forces and moments), solid mechanics (stress and strain, equilibrium, Hooke's law, principal stresses, Mohr's circle, bending of beams, torsion, failure theories), kinematics and kinetics (particles and rigid bodies, plane motion and Euler's formula, mass and acceleration, linear and angular momentum, work, power, energy)	9	270	1st & 2nd	required	8
Foundations of Material Science	CW	Solid state chemistry and physics, basic principles of physical, inorganic and organic chemistry	8	240	1st & 2nd	required	8
Electrical Engineering	ET	Fundamentals of direct and alternating current, complex AC calculations, 3-phase systems, semi conductors	4	120	2nd	required	4
Engineering Design	KL	Technical drawings, machine components, systematic approach, principles of embodiment design, embodiment calculation	8	240	2nd & 3rd	required	8
Programming Techniques	PT	Object oriented programming, inheritance, recursion, multithreading, GUI programming, datastructures, complexity	4	120	3rd	required (I)	4
Engineering Mechanics II	MV	Stress and deformations, failure theories, elastic energy, FEM, vibrations	4	120	3rd	required (F, K)	4
Engineering Materials	WM	Steel and wrought iron, aluminium-, nickel- and copper-based alloys, ceramics, polymers	4	120	3rd	required (F, K)	4
Operating Systems and Microprocessor Technology	BM	Architectures, resource management, communications, microprocessors and microcontrollers	4	120	3rd	required (I)	4
Measuring and Control Technology	MSR	Measuring and instrumentation engineering, binary data processing, switching functions, logic controls with memory facilities, control circuit components, transfer elements, mathematical parametric models, Laplace transformation, transfer function, stability	10	300	3rd & 4th	required	8
Thermo Dynamics and Fluid Dynamics	TF	Fundamentals, first and second law of thermodynamics, power cycles with gasses, power and refrigeration vapour cycles, gas mixtures, gas-vapour mixtures, flow processes (nozzle flow), introduction to fluid dynamics, hydrostatics, aerostatics, conservation laws, fluid element theory, boundary layer theory, pipe flow, external flows, flow of incompressible and compressible fluids	10	300	3rd & 4th	required	8
Business Management	MA	Company organisation, investment and costing, project management, Six Sigma, business studies	9	270	3rd & 4th	required	8
Higher Engineering Design	KV	Strength calculation, bolted connections, axles and shafts, gearing, welding connections	5	150	4th	required (K)	4
English	EN	Professional English, communication competency, technical terminology	5	150	4th	required	4
Production Technology I	FV1	Fundamentals of cutting, machining processes, electrochemical machining, electrical discharge machining	4	120	4th	required	4
Manufacturing Systems	FS	Manual and computerized programming of NC-controlled manufacturing systems and handling systems, drive systems, machine elements of machine tools, static, dynamic and thermal loads, calculation and design, classification and construction of metal-cutting machine tools	9	270	4th & 5th	required (F, I)	8
Internship	PP	Industry internship, report and presentation	14	420	4th & 5th	required	1
Production Technology II	FV2	Metal casting, powder processing, forging and drawing of metals, sheet metal forming processes	4	120	5th	required (F, K)	4
Production Planning and Control	APS	Operations planning, principles of shop-floor control, PPC systems	8	240	5th	required (F, I)	8
Product Engineering and Construction Systematics	PKS	Development planning and realization, design systems, application of methods, cost-efficient design	4	120	5th	required (K)	4
Computer Networks	RN	Network programming, OSI model, protocol stacks, TCP/IP networks, transmission media, network services, case Studies (Linux, Windows, Mac OS X)	4	120	5th	required (I)	4
Energy Conversion Machines	EWM	Function, calculation and design of piston pumps and compressors, basics of turbomachinery, design of pumps and turbines, moving and stationary blades, cavitation, similarity laws, operating curves of pumps	8	240	5th & 6th	required (K)	8
Drive Engineering	AT	Systematics and analysis of mechanisms	8	240	5th & 6th	required (K)	8
Industrial Automation	FA	digital information processing, programmable logic control (PLC), numerical control (NC), assembly and manufacturing transfer lines, circular assembly and manufacturing systems, robots and handling systems, computer integrated manufacturing (CIM), bus systems, communication	4	120	6th	required (F, I)	4
Production Technology III	FV3	Technical bases and terms, welding, brazing, adhesive bonding, thermal cutting	4	120	6th	required (F)	4
Quality Management	QM	Quality management systems, statistical methods, statistical process control, engineering methodology	5	150	6th	required	4
Databases	DB	Data models, relational algebra, transactions, SQL	4	120	6th	required (I)	4
Bachelor Thesis	BA	Final thesis	11	330	6th	required	
Colloquium	KOL	Presentation of bachelor thesis, exam on thesis topics	3	90	6th	required	
Tribology	TR	Analysis of tribosystems, friction and wear, lubricants, lubrication conditions and service life	4	120	5th	elective	4
Professional Studies	SW	Literature search, citations, rhetorics, communication, self marketing, creativity techniques, conflict and stress handling	2	60	5th	elective	2
Computer Aided Fluid Dynamics	CFD	Character of fluid flows, conservation laws, types of fluid flows, solution methods, boundary conditions, design of calculation mesh, turbulence	4	120	5th	elective	4
3D CAD	CAD	Basics of computer aided design, virtualising of product development, basic handling of a 3D CAD system	4	120	5th	elective	4
Optical Measuring Technique	OM	LASER, interferometrical measuring techniques, digital image processing, 3D coordinate recording, industrial applications	4	120	5th	elective	4
Combustion Engines	VM	Function, calculation and design of Otto and Diesel engines	4	120	5th	elective	4
Industrial Information Systems / Integration	IIS	Types of system, system integration, data interchange	4	120	5th	elective	4
Specialities of Material Science	SWK	Families of materials: Selected steel types, high-temperature alloys, ceramic, carbon and composite materials; Corrosion: electro-chemical basics, occurrence and inspection; Testing of materials: scanning electron microscopy, X-ray diffractometry, measuring of eigen stresses	4	120	5th	elective	4
Finite Element Method	FEM	Principle of virtual work, Castigliano's theorem, Ritz method, finite element method	4	120	6th	elective	4
Software Engineering	SE	Software requirements, models and phases of software engineering, design patterns, CASE tools, object-oriented design	4	120	6th	elective	4
Higher Engineering Mechanics	HTM	Machine dynamics, vibration, damping	4	120	6th	elective	4
Fluid Technology	FTV	Basics of compressed air technology, generation, processing and distribution of compressed air, control elements, pneumatic drives and servos	4	120	6th	elective	4
Surface Technology	OT	Surfacing and coating techniques, corrosion- and wear-resistant coatings and layers	4	120	6th	elective	4

K: Engineering Design
 F: Production Engineering
 I: Computer Science in Production