

Course Title	Study Program	ECTS	Winter Semester	Summer Semester	English	English/German
A Ab initio Phase Prediction of Solid-State Materials	MSSiSc	10	irreg.	irreg.		
Additive Manufacturing 2	MSCAME, MSPSE	6	x		x	
Adjoint Compilers	MSCES, MSVT	4	x		x	x
Advanced Methods in Automatic Speech Recognition	MSSiSc	6		x	x	
Advanced Control Systems	MSAT	4	x		x	
Advanced Finite Element Methods for Engineers	MSMMECAME	5	x		x	
Advanced Molecular Dynamics Simulations	MSSiSc	3	x		x	
Advanced Pattern Recognition Methods	MSSiSc	6	irreg.	irreg.	x	
Advanced Software Engineering	MSAT, MSCAME, MSCES, MS-MMECAME,	5	x		x	
Advanced Topics in Statistical Natural Language Processing	MSSiSc	6	irreg.	irreg.	x	
Advanced Topics in Transport Theory	MSCES, MSSiSc	5	irreg.	irreg.	x	
Aerothermal Design of Space Transportation Systems	MSSiSc	4	x	x		x (depends on number of students)
Alternative Vehicle Propulsion Systems	MSAE, MSSiSc	5		x	x	
Applications of Laser Technology	MSAE	6		x	x	
Applied Molecular Thermodynamics	MSAIgMB, MSCES, MSeNT, MSVT	4	x			x script available in English
Applied Numerical Optimization	MSAIgMB, MSAT, MSCES, MSeNT, MSVT,	4	x		x	x (in MSSiSc)
Applied Quantum Chemistry for Engineers	MSCES, MSVT, MSWIMB	4		x	x	
Applied Quantum Mechanics	MSSiSc	6	x		x	
Approval and Usability of Technical Medical Devices	MSSiSc	4	x			x (depends on number of students)
Approximation Theory	MSSiSc	9	irreg.	irreg.		x (depends on number of students)
Atomistic Simulation of Defects in Solids	MSSiSc	10	irreg.	irreg.		x
Automatic Generation and Analysis of Algorithms	MSSiSc	6		x	x	
Automatic Speech Recognition	MSAE	8	x		x	
Automotive Engineering - Practical Course I & II	MSAE	6	x	x		x
Automotive Engineering III	MSAE	5	x		x	
Automotive Engineering IV - Automated Driving	MSFzTuT, MSAE, MSWIMB	5		x	x	
Automotive System Evaluation	MSAE	5		x	x	
Automotive Software Engineering	MSVT	4		x		x
B Basic Physics of Medical Imaging	MSSiSc	6		x	x	
Biological & Medical Fluid Mechanics I	MSSiSc	3		x	x	
Biological & Medical Fluid Mechanics II	MSSiSc	3	x		x	
Boundary-Layer Theory	MSSiSc, MStExE	3		x	x	
C Calculus of Variations I	MSSiSc	9	x			x (depends on number of students)
Chemical Process Engineering	MSSiSc	6		x	x	
Combinatorial Problems in Scientific Computing	MSCES, MSSiSc, MSVT	4	irreg.	irreg.	x	x
Combustion and Gasification of Pulverised Fuel in a Mixture of Oxygen and Carbon Dioxide	BSCES, BSMB, BSWIMB, MSCES, MSeNT, MSVT, MS-WIMB	3	x		x	
Combustion Chemistry	MSCES, MSeNT, MSSiSc, MSVT	4	x		x	
Combustion I	MSCAME, MSSiSc	5		x	x	
Combustion II	MSSiSc	5	x		x	
Composites	MStExE	6		x	x	
Computational and Statistical Inverse Problems	MSCES, MSSiSc	5		x	x	
Computational Chemistry for the investigation and/or prediction of the properties of Homogeneous Catalysts	MSSiSc	10	x	x		x
Computational Chemistry - Quantum Monte Carlo Methods	MSSiSc	10	x	x	x	
Computational Contact Mechanics	MSSiSc	5	x		x	

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	Computational Fluid Dynamics I	MSSiSc, MSTexE	4		x	x	
	Computational Fluid Dynamics II	MSSiSc, MSTexE	3	x		x	
	Computational Magnetochemistry	MSSiSc	4	x		x	x
	Computational Many-Body Theory	MSSiSc	5	x		x	
	Computational Modeling of Membranes and Shells	MSAlgMB, MSCAME, MSCES, MSPT, MSSiSc	5		x	x	
	Computational Quantum Theory for Strong Interactions	MSSiSc	10	irreg.	irreg.	x	
	Computational Radiation Protection and Shielding	MSSiSc	4	x		x	
	Computational Systems Biotechnology II	MSAlgMB, MSCES, MSSiSc, MSVT, MSWIMB	5	x			x
	Computer Assisted Surgical Technology	MSSiSc	6		x		x (depends on number of students)
	Computer Vision	MSCES, MSSiSc, MSVT	6	x		x	
	Computer-Aided Process Design	MSSiSc,	3		x	x	x (depends on number of students)
	Computational Differentiation	BSCES	6	x			x
	Computer Graphics	BSCES	6	x			x
	Continuum Mechanics	MSAlgMB, MSCAME, MSCES, MSEuK, MSWIMB MSMMECAME, MSSiSc, MSVT	6		x	x	
	Control Engineering	MSAE, MSCAME, MSPSE, MSTexE	5	x		x	
	Control Theory	MSSiSc	9	irreg.	irreg.		x
	Cooperative Product Design	MSEuK, MSWIMB	6		x	x	
	Cryptography	MSSiSc	4		x	x	
D	Data Analysis and Visualization	MSSiSc, BSCES	4	x		x	
	Data Mining Algorithms	MSCES, MSVT	4	x		x	
	Derivative Code Compilers	MSSiSc	4		x	x	
	Dynamic Systems for Computer Scientist	MSCES, MSVT	6	x			x
	Dynamics of Multi Body Systems	MSSiSc	6		x	x	
	Data Mining Algorithms	BSCES	6	x			x
E	Economics for Managers	MSMME, MSMMECAME	5	x		x	
	Electric Drives and Storage Systems	MSAE	5		x	x	
	Embedded systems	MSCES, MSVT, MSSiSe	6		x		x
	Energy from biofuels	MSAlgMB, MSeNT, MSVT	3	x		x	
	Energy Systems Engineering	MSSiSc	5		x		x
	Entrepreneurial Strategy	MSMME, MSMMECAME	5	x		x	
	Environmental Sustainability in Transport Engineering	MSAE	6	x		x	
F	Factory Planning	MSMMECAME, MSPSE, MSTexE	6		x	x	
	Failure of Structures and Structural Elements	MSAlgMB, MSCAME, MSCES, MSTexE, MSVT	5		x	x	
	Fast Algorithms for Boundary Integral Equations	MSCES	6	irreg.	irreg.	x	
	Fast Iterative Solvers	MSSiSc	4		x	x	
	Fatigue Design of Lightweight Structures	MSAlgMB, MSAE, MSEuK, MS-FzTuT, MSLRT, MSWIMB	5		x	x	
	Finance and Accounting	MSMME, MSMMECAME	5		x	x	
	Finite Element and Volume Techniques II	MSSiSc	5		x		x
	Finite Element Methods in Lightweight Design	MSCAME, MSTexE	5	x		x	
	Finite Elements in Fluids	MSAlgMB, MSCES, MSSiSc	4	x		x	x
	Finite-Element-Technology	MSSiSc	6	x			x (depends on number of students)
	Finite Element Methods and Fast Iterative Solvers	MSSiSc	6		x	x	
	Fluid Dynamics	MSTexE	5		x		

English-taught lectures at the Faculty of Mechanical Engineering

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	Forward Error Correction and Digital Modulation	MSSiSc	4		x	x	
	Foundations of Finite Element Methods	BSCES, MSAE, MSAIlgMB, MSCES, MSFzTuT, MSWIMB, MSVT, MSCAME	5	x		x	
	From Molecular to Continuum Physics I	MSSiSc	6	x		x	
	From Molecular to Continuum Physics II	MSCES, MSSiSc	5		x	x	x (in MSCES)
	Functions of Matrices with Applications	MSSiSc	6		x	x	
	Fundamentals of Fluid Power (Hydraulics and Pneumatics)	MSAE	6	x		x	
	Fundamentals of Lightweight Design	MSCAME, MSSiSc, MSTexE	5	x		x	
	Fundamentals of Patent and Utility Model Law	MSSiSc	5	x		on request	x
G	Gear and Transmission Technology	MSAE, MSPSE, MSTexE	6	x		x	
	Global Illumination and Image-Based Rendering	MSCES, MSVT	6		x		x
	Group Theory in Solid State Physics	MSSiSc	4	x		x	
H	Heat and Mass Transfer	MSSiSc	7	x		x	
	High-Performance Computing	MSCES, MSVT	9	irreg.	irreg.		x
	High-Performance Fibres	MSTexE	4		x	x	
	High-Performance Matrix Computations	MSCES, MSSiSc	6		x	x	
	Hydrogeophysics	MSSiSc	8	x			x
I	Identification and Control of Mechatronic Systems	MSCES, MSAT, MSAIlgMB	4		x		x
	Industrial Engineering and Ergonomics	MSCAME	3	x		x	
	Industrial Environmental Engineering	MSSiSc	5	x			x (depends on number of students)
	Industrial Logistics	MSMME, MSPSE, MSFzTuT, MSPT	5		x		x
	Information Theory and Source Coding	MSSiSc	5	x		x	
	Internal Combustion Engine Fundamentals	MSSiSc	3	x			x
	Internal Combustion Engines I	MSSiSc, MSAE	4		x	x	x (in MSSiSc)
	Internal Combustion Engines II	MSAE, MSSiSc	6	x			x
	Introduction to Hyperbolic Conservation Laws	MSSiSc	6	x			x
	Introduction to Quantum Field Theory for Strong Interactions	MSSiSc	10	irreg.	irreg.	x	
	Introduction to Transport Theory	MSCES, MSSiSc	5		x	x	
	Introduction to Model Checking	BSCES	6		x		x
	iPodia - Global Innovation Processes	MSPT, MSWIMB	5	x		x	
	Isogeometric Analysis	MSAIlgMB, MSCES, MSSiSc	6		x	x	
	Iterative Solvers	MSSiSc	9		x		x
L	Languages for Scientific Computing I	MSSiSc	6	x		x	
	Lattice-Boltzmann Methods	MSSiSc	5	x			x (depends on number of students)
M	Machine Design Process	MSPSE, MSSiSc, MSTexE	6	x		x	
	Machine Design Process and Practical Applications of CAET	MSCAME	7	x		x	
	Machine Dynamics of Rigid Systems	MSAE, MSSiSc	6	x (MSAE)	x (MSSi-Sc)	x	
	Machine Tools	MSCAME, MSMME, MSPSE	5	x		x	
	Machine Tools I	MSCAME	5	x		x	
	Machine Tools II	MSCAME	5		x	x	
	Manufacturing Technology I	MSCAME, MSMME	6	x		x	
	Manufacturing Technology II	MSCAME, MSMME, MSM-MECAME, MSPSE	6		x	x	
	Mathematical Models in Atomistic Simulations / Mathematische Modelle in Atomistischen Simulationen	MSCES, MSSiSc	3		x	x	
	Mathematical Models in Science and Engineering (PDEs)	MSSiSc	6		x	on request	
	Mechanics of Engineering Materials	MSMMECAME, MSCAME	5		x	x	

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Mechanics of Forming Processes	MSAE, MSAlgMB, MSCAME, MSCES, MSEuK, MSFzTuT, PSPSE, MSSiSc, MSWIMB	5	x		x	
Mechanics of Living Tissues	MSAlgMB, MSCES	5	x		x	
Mechanics of Materials	MSSiSc	8	x		x	
Mechanics of Soft Engineering Materials: Rubbers, Textiles and Non-Crimp Fabrics	MSAlgMB, MSCAME, MSCES, MSEuK, MSKuTT, MSSiSc, MSWIMB	3		x	x	
Mechatronics and Control Techniques for Production Plants	MSCAME, MSPSE	6	x		x	
Medical Process Engineering	MSSiSc	4		x	x	
Medical Technology I	MSSiSc	6	x			x (depends on number of students)
Membrane Processes / Membranverfahren	MSSiSc	4	x		x	
Micro- and Macrosimulation of Casting Processes	MSCAME	4	x		x	
Mobility Research and Transportation Modeling	MSAE	6		x	x	
Model Based Estimation Methods	MSSiSc	5		x	x	
Model Order Reduction Techniques	MSSiSc	9		x		x
Modeling of Mechatronic Systems	MSCES, MSAT, MSAlgMB	4	x			x
Model Order Reduction Techniques in Structural Analysis	MSALLGMB, MSCES, MSLRT, MSSiSc	5		x	x	
Modeling Flow and Transport Processes in Terrestrial Systems	MSSiSc	4		x	x	
Modeling Technical Systems	MSSiSe	6		x	x	
Modeling, Model Reduction and Simulation in Laser Processing - Design	MSMMECAME, MSCAME	5		x	x	
Modeling, Model Reduction and Simulation in Laser Processing I	MSPSE	5		x	x	
Modeling, Model Reduction and Simulation in Laser Processing II	MSPSE	5	x		x	
Model Order Reduction Techniques	BSCES	9	irreg.	irreg.		x
Molecular Mechanics and Multiscale Modelling of Materials	MSAE, MSAlgMB, MSCAME, MSCES, MSPSE, MSSiSc	5	x		x	
Molecular Thermodynamics	MSSiSc	4	x		x	
Multibody Dynamics	MSCAME, MSMMECAME, MSPSE	6		x	x	
Multiphase Flow	MSCES, MSSiSc	6	x		x	
Multiscale Techniques I	MSSiSc	5		x		x
Multiscale Techniques II	MSSiSc	5	x			x
N Nonlinear Finite Element Methods for Solids	MSCES, MSAlgMB, MSPT, MSSiSc	5		x		x (depends on number of students)
Nonlinear Functional Analysis	MSSiSc	9		x		x (depends on number of students)
Nonlinear Structural Mechanics	MSAlgMB, MSCES, MSCAME, MSMMECAME, MSSiSc, MSTexE, MSVT	5		x	x	
Numerical Analysis III	MSSiSc	9	x			x
Numerical Analysis IV	MSSiSc	9	x			x
Numerical Methods for Fluid-Structure Interaction	MSSiSc	9		x		x
Numerical Methods for Lubricated Contact Problems	MSAlgMB, MSCES, MSSiSc	4	x		x	
Numerical Methods for PDEs	MSSiSc	5	x		x	
Numerical Methods in Mechanical Engineering	MSAlgMB, MSCAME, MSMMECAME, MSTexE, MSVT, MSCES	8	x		x	
O Object Oriented Software Construction	MSCES, MSVT	7	x		x	
Optimization A	MSSiSc	5	x			x
Optimization B	MSSiSc	9		x		x (depends on number of students)
Optimization C	MSSiSc	9	x			x (depends on number of students)
P Parallel Computing in Simulation Sciences	MSSiSc	9		x		x (depends on number of students)
Parallel Computing Methods in Computational Mechanics	MSAlgMB, MSCES	6		x	x	
Parallel Programming I	MSSiSc	4		x	x	
Parallel Programming II	MSCES	6	x		x	
Partial Differential Equations II	MSSiSc	4	irreg.	irreg.		

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	Plasticity and Fracture Mechanics	MSSiSc	6	x			x
	Porous Media Mechanics / Mechanik poröser Medien	MSAE, MSCES	6		x		x (depends on number of students)
	Practical Introduction to FEM-Software I	MSAllgMB, MSKuTT, MSCAME, MSCES, MSEuK, MSSiSc, MSTexE, MSWIMB	6		x	x	
	Practical Introduction to FEM-Software II	MSAllgMB, MSEuK, MSCAME, MSKuTT, MSWIMB	5	x		x	
	Process Control Engineering	MSSiSc	3		x	x	
	Process Measurement	MSSiSc	4		x	x	
	Processes and Principles for Lightweight Design	MSAE	3	x		x	
	Product Design in Chemical Engineering	MSSiSc	6	x		x	
	Production Management A	MSMME	5	x		x	
	Production Management B	MSMME, MSPSE	5	x		x	
	Production Metrology	MSCAME, MSPSE, MSTexE	5		x	x	
Q	Quality Management	MSAE, MSCAME, MSMME, MSPSE, MSTexE	6	x		x	
	Quantum Chemical Modelling of Small and Medium Sized Molecules	MSSiSc	10	irreg.	irreg.	x	
	Quantum Information	MSSiSc	10		x	x	
	Quantum Theory of Condensed Matter I	MSSiSc	10	x		x	
	Quantum Theory of Materials	MSSiSc	5		x	x	
	Quantum-Chemical Modeling of Complex Intermetallics	MSSiSc	10	irreg.	irreg.	x	
R	Reliable Simulation in the Mechanics of Materials and Structures	MSAllgMB, MSCAME, MSMME, MSCAME, MSSiSc, MSTexE	6		x	x	
	Renewable Fuels	MSAllgMB, MSVT, MSeNT	5	x			x
	Rheology	MSSiSc	6		x		x (depends on number of students)
S	Selected Topics of Inelasticity Theory	BSMB, MSAllgMB, MSCAME, MSPSE	6	x		x	
	Self-Driving Lab – Programming Automated Vehicle	MSFzTuT, MSAE, MSWIMB	2		x	x	
	Seminar: Topics in Automation, Compilers and Code-Generation	MSSiSc	4		x	x	
	Seminar: Topics in High-Performance and Scientific Computing	MSSiSc	4	x		x	
	Seminar Computerbased Mathematical Modeling	MSCES, MSSiSc	5		x		x
	Simulation Methods in Nuclear Engineering	MSSiSc	4		x	x	
	Simulation of Discrete Event Systems	MSCAME, MSMME, MSCAME	5	x		x	
	Simulation of Interactions in Molecular Crystals	MSSiSc	10	irreg.	irreg.	x	
	Simulation Sciences Seminar	MSSiSc	5	x		x	
	Simulation and Optimization in Aerodynamics	BSCES	5	irreg.	irreg.		x
	SiSc Laboratory	MSSiSc	6	x	x	x	
	Software Project Management	MSCES, MSVT	7		x	x	
	Software Quality Assurance	BSCES	7		x		x
	Statistics and Dynamics of Macromolecules and Biopolymers	MSSiSc	3		x	x	
	Structural Design of Vehicles	MSAE, MSCAME	5		x	x	
	Sustainable Manufacturing / Nachhaltige Fertigungstechnik	MSWMB	3		x	x	
T	Tensor Algebra and Tensor Analysis for Engineers I	MSALLGMB, MSCES, MSEuK, MSVT, MSWIMB	6	x		x	
	Tensor Algebra and Tensor Analysis for Engineers II	MSALLGMB, MSCES, MSVT	6		x	x	

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Theoretical Solid State Physics	MSSiSc	10	x		x	
Theory of Magnetic Resonance	MSSiSc	4	x		x	
Thermal Separation Processes	MSSiSc	6		x		x (depends on number of students)
Thermodynamics of Mixtures	MSSiSc	4	x			x (depends on number of students)
Thermodynamik I, II oder Thermodynamik I & Computer Simulation of Materials	BSCES	10	x			x
Seminar: Topics in Automation, Compilers and Code-Generation	MSSiSc	4		x	x	
Seminar: Topics in High-Performance and Scientific Computing	MSSiSc	4	x		x	
Tribology	MSAE, MSPSE	6	x		x	
Turbulent Flows	MSCES, MSeNT, MSSiSc, MSLRT, MSWIMB	4	x		x	
U Ultra-Precision Technology I / Ultrapräzisionstechnik I	MSAllgMB, MSEUK, MSPT, MSWIMB	6		x	on request!	x
Uncertainty Quantification	MSCES, MSSiSc	5	irreg.	irreg.	x	
V Vehicle Acoustics	MSAE	5		x	x	
W Welding and Joining Technologies	MSCAME, MSMME, MSM-MECAME, MSPSE	6		x	x	

Study Program	Level	Code
Maschinenbau	Science of Bachelor	BSMB
Wirtschaftsingenieurwesen (Maschinenbau)		BSWIMB
Computational Engineering Science		BSCES
Technik-Kommunikation		BSTK
Allgemeiner Maschinenbau	Master of Science	MSALLGMB
Energietechnik		MSeNT
Entwicklung und Konstruktion		MSEuK
Fahrzeugtechnik und Transport		MSFzTuT
Kunststoff- und Textiltechnik		MSKuTT
Luft- und Raumfahrttechnik		MSLRT
Produktionstechnik		MSPT
Verfahrenstechnik		MSVT
Wirtschaftsingenieurwesen (Maschinenbau)		MSWIMB
Computational Engineering Science		MSCES
Automatisierungstechnik		MSAT
Technik-Kommunikation		MSTK
Automotive Engineering		MSAE
Simulation Sciences		MSSiSc
Computer-Aided Conception and Production in Mechanical Engineering		MSCAME
Production System Engineering		MSPSE
Management and Engineering		MSMME
Textile Engineering		MSTexE
Robotic Systems Engineering		MSRoboSys