

**Masterstudiengang Simulation Science an der RWTH Aachen
PO 2010**

Compulsory Courses										
Responsible for Module	Lecturers	Module	CP	L	P/L	Σ SWS	Summer / Winter	Module ID	Σ CP	Σ SWS
Koch	Koch	Applied Quantum Mechanics	6	3	3	6	w	1310579	66	51
Carloni	Carloni / Rossetti	From Molecular to Continuum Physics I	6	3	2	5	w	1314951		
May	May	Numerical Methods for PDEs	8	4	2	6	w	4011695		
Pavarini	Pavarini	Computational Many-Body Theory	5	3	2	5	s	1311131		
Kobbelt	Kobbelt	Data Analysis and Visualization	4	2	1	3	w	1212372		
Behr	Behr	Fast Iterative Solvers	4	2	1	3	s	4011721		
Kowalski	Kowalski	From Molecular to Continuum Physics II	5	4	1	5	s	4012554		
Mhamdi	Mhamdi / Reusken	Model Based Estimation Methods	5	2	2	4	s	1113665		
Behr	Behr	Parallel Computing in Simulation Sciences	6	2	1	3	s	4014438		
Müller M.	Müller M.	High-Performance Computing	6	3	1	4	w	1215720		
Blügel	Blügel	Quantum Theory of Materials	5	2	2	4	s	1311132		
Naumann	Naumann	SiSc Laboratory	6	0	3	3	w	1212320		

Elective Courses												
Responsible for Module	Lecturers	Module	CP	L	P/L	Σ SWS	Summer / Winter	Module ID	Σ CP	Σ SWS		
Energy Engineering												
Pischinger	Pischinger	Alternative Vehicle Propulsion Systems	5	2	1	3	s	4011731				
Pitsch	Pitsch / Hemshandra	Combustion I	4	2	1	3	s	4011729				
Pitsch	Pitsch / Beekmann / Chu / Niemietz	Combustion II	5	2	1	3	w	4011730				
Nabbi / Allelein	Nabbi / Allelein	Computational Radiation Protection and Shielding	4	2	1	3	w	5112561				
Müller D.	Müller D.	Energy Economics	4	2	1	3	s	4011726				
von der Aßen	von der Aßen	Energy Systems Engineering	5	2	2	4	w	4011725				
Stolten	Stolten	Fuel Cells: Today's Challenges in Modeling	5	2	2	4	w	4015710				
Kneer	Kneer / Rohlf's	Heat and Mass Transfer	7	3	2	5	w	4011727				
Pischinger	Pischinger	Mobile Propulsion Fundamentals	4	2	1	3	w	4011723				
Pischinger	Pischinger	Internal Combustion Engines: Design and Mechanics	6	2	2	4	s	4011417				
Pischinger	Pischinger	Internal Combustion Engines: Thermodynamics and Emissions	6	2	2	4	w	4011415				
Leonhard	Leonhard	Molecular Thermodynamics	4	2	1	3	w	4011724				
Nabbi / Allelein	Nabbi / Allelein	Simulation Methods in Nuclear Engineering	4	2	1	3	s	5112562				
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696				
Pitsch	Pitsch	Turbulent Flows	4	2	1	3	w	4011728				
Process Engineering												
Wessling	Wessling	Angewandte Chemische Verfahrenstechnik	5	0	3	3	w	4014357				
Mitsos	Mitsos	Applied Numerical Optimization	4	2	2	4	w	4012274				
Wessling	Wessling	Chemical Process Engineering	6	2	1	3	s	4011733				
Mitsos	Mitsos	Computer-Aided Process Design	3	s	2	3	s	4012275				
Wintgens	Wintgens	Industrial Environmental Engineering	5	2	1	3	w	4011734				
Wessling	Yüce	Medical Process Engineering	4	2	1	3	s	4011735				
Wessling	Wessling	Membrane Processes	4	2	2	4	w	4011736				
Mitsos	Mitsos	Modeling Technical Systems	6	2	1	3	s	4012277				
Wessling	Wessling	Product Design in Chemical Engineering	4	2	1	3	s	4011737				
Zang	Zang	Rheology	6	2	1	3	s	4012271				
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696				
Jupke	Jupke	Thermal Separation Processes	6	2	1	3	s	4012272				
Leonhard	Leonhard	Thermodynamics of Mixtures	4	2	1	3	w	4013359				
Control Engineering												
Liauw	Liauw	In situ-Spektroskopie zur Prozessführung	3	2	1	3	s	1515595				
Kleinert	Keinert	Process Control Engineering	4	2	1	3	s	5212563				
Kleinert	Kleinert / Miny	Process Measurement	3	3	0	3	w/s	5212564				
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696				
Benigni	Benigni	Energy Systems Simulation	5	2	1	3	s	4022638				
Fluid Mechanics												
Schröder	Schröder	Aero Thermal Design of Space Transportation Systems	4	3	0	3	s	4012284				
Schröder	Schröder	Boundary-Layer Theory	3	2	0	2	s	4012280				
Schröder	Meinke	Computational Fluid Dynamics I	4	2	1	3	s	4012278				
Schröder	Meinke	Computational Fluid Dynamics II	3	1	1	2	w	4012279				
Behr	Behr	Finite Elements in Fluids	4	2	1	3	w	4011664				
May	May	Lattice-Boltzmann Methods	5	2	2	4	w	4012281				
Pitsch	Pitsch	Multiphase Flows	6	2	2	4	w	4017887				
Reinartz	Reinartz	Numerical Methods for Fluid-Structure Interaction	4	2	0	2	w	4012283				
Jeschke P.	Jeschke P. / Benetschik	Numerische Integrationsverfahren für Strömungen in Turbomaschinen und Strahlantrieben I	6	2	2	4	w	4016378				
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696				

Structural Mechanics								
Sauer	Sauer	Computational Contact Mechanics	5	2	2	4	w	4012291
Markert	Markert, Koeppel, Hesser	Computational Intelligence in Engineering	5	2	1	3	w	4021493
Markert	Markert	Computational Modeling of Membranes and Shells	5	2	1	3	s	4012293
Itskov	Itskov	Continuum Mechanics	6	2	2	4	s	4013360
Corves	Corves / Cleven	Dynamics of Multi Body Systems	6	2	2	4	s	4012286
Reese	Reese	Finite-Element-Technology	6	2	1	3	s	3013263
Schröder	Schröder	Fundamentals of Lightweight Design	5	2	1	3	w	4011452
Jacobs	Jacobs	Machine Design Process	6	2	3	5	w	4012285
Corves	Corves	Machine Dynamics of Rigid Systems	6	2	2	4	s	4017428
Reese	Reese	Mechanics of Materials	8	3	2	5	w	3014045
Itskov	Itskov	Mechanics of soft engineering materials: rubbers, textiles and non-crimp fabrics	3	2	0	2	s	4011569
Markert	Bamer	Model Order Reduction in Mechanics	5	2	2	4	s	4011493
Reese/Sauer/Behr	Reese/Sauer/Waimann	Nonlinear Finite Element Methods for Solids	5	2	2	4	s	3013261
Schmidt	Schmidt	Nonlinear Structural Mechanics	5	2	1	3	s	4012290
Reese	Brepols	Plasticity and fracture mechanics	6	2	1	3	s	3013262
Itskov	Itskov	Practical Introduction to FEM-Software I	5	1	2	3	w	4012292
Markert	Markert / Heider	Reliable Simulation in the Mechanics of Materials and Structures	6	2	2	4	s	4011496
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
Itskov	Itskov	Tensor Algebra and Tensor Analysis for Engineers	6	2	2	4	w	4012288
Itskov	Itskov	Tensor Algebra and Tensor Analysis for Engineers II	6	2	0	2	s	4012289
Biomedical Engineering								
Brook	Brook / Lampert / Thiebes	Anatomy and Physiology	5	2	2	4	w/s	9010671
Mottaghy	Herren / Jansen / Steinseifer	Artificial Organs I	5	2	1	3	w/s	9010685
Mottaghy	Jansen / Steinseifer	Artificial Organs II	5	2	1	3	w/s	9010686
Schmitz-Rode / Shah	Schmitz-Rode / Franke / Kießling / Schulz	Basic Physics of Medical Imaging	6	2	2	4	s	9010774
Schröder	Klaas	Biological & Medical Fluid Mechanics I	3	2	1	3	s	4012298
Schröder	Klaas	Biological & Medical Fluid Mechanics II	3	2	1	3	w	4012299
Jahnen-Dechent	Jahnen-Dechent / Neuß-Stein / Hieronymus	Cell Culture and Tissue Engineering	5	2	1	3	s	9010687
Wiechert	Noack	Computational Systems Biotechnology II	5	3	2	5	w	4016359
Radermacher	Radermacher	Computer Assisted Surgical Technology	6	2	2	4	s	4012296
Rossetti / Carloni	Rossetti / Carloni	Computer simulation and machine learning for molecular medicine	6	2	2	4	w	0
Itskov	Itskov	Mechanics of soft engineering materials: rubbers, textiles and non-crimp fabrics	3	2	0	2	s	4011569
Kießling	Franke / Kießling / Schmitz-Rhode / Schulz	Medical Imaging	5	2	2	4	w/s	9010677
Radermacher	de la Fuente Klein	Medical Software Engineering	4	1	2	3	s	4012300
Radermacher	Radermacher	Medical Technology I	6	2	2	4	w	4012295
Radermacher	Radermacher	Medizintechnisches Labor (Projektarbeit)	8	1	5	6	sw	4022008
Mottaghy	Brook / Lampert / Thiebes	Physiology	4	2	0	2	w	9010775
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
Schuppert	Schuppert	Systems Biology	3	2	0	2	w	4011203
Production Engineering								
Schleifenbaum	Schleifenbaum	Additive Manufacturing: Technologies and Processes	6	2	2	4	w	4017421
Schleifenbaum	Schleifenbaum	Additive Manufacturing 2	6	2	2	4	s	4020490
Markert	Markert	Mechanics of Forming Processes	5	2	2	4	w	4011512
Lauster	Lauster	Security research and future research	5	0	2	2	s	4024158
Lauster	Lauster / Mohn	Data Driven Foresight - Quantitative Methoden der Zukunftsforschung	3	0	2	2	w	4025605
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
Communication Engineering								
Jax	Antweiler	Information Theory and Source Coding	2	2	1	3	w	6010403
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
Material Science								
Koch	Koch	Electron Correlations	5	1	1	3	w/s	1311103
Pischinger	Pischinger	Fundamentals of Patent and Utility Model Law	5	1	1	4	w/s	4012301
Markert	Markert	Molecular Mechanics and Multiscale Modelling of Materials	5	2	2	4	w	4011511
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
Physics								
Winkler	Winkler	Advanced Molecular Dynamics Simulations	3	2	2	4	w	1314152
N.N.	N.N.	Computational Quantum Theory for Strong Interactions	10	3	3	6	w/s	1315982
Sauer	Sauer	Computational Multiphysics	5	1	2	3	w	4020384
Koch	Koch	Electron Correlations	5	1	1	3	w/s	1311103
Pavarini	Pavarini	Group Theory in Solid State Physics	10	6	0	6	w/s	1310623
N.N.	N.N.	Introduction to Quantum Field Theory for Strong Interactions	10	3	3	6	unregel.	1314153
DiVincenzo	Müller M. / Wegewijs	Quantum Information	10	4	2	6	s	1310608
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
Mazzarello / Blügel	Pavarini	Theoretical Solid State Physics	10	4	2	6	w/s	1310607
Chemistry								
Dronskowski	Dronskowski	ab initio Phase Prediction of Solid-State Materials	10	0	12	12	w/s	1515598
Leonhard / Fernandes	Leonhard / Fernandes	Combustion Chemistry	4	2	1	3	w	4012507
Lüchow	Lüchow	Computational Chemistry: Quantum Monte Carlo Methods	10	0	12	12	w/s	1515603
Kögerler	Kögerler	Computational Magnetochemistry	10	0	12	12	w/s	1515601
Dronskowski	Dronskowski	Quantum-Chemical Modeling of Complex Intermetallics	10	0	12	12	w/s	1515599
Englert	Englert	Simulation of Interactions in Molecular Crystals	10	0	12	12	w/s	1515600
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
Appelt	Appelt	Theory of Magnetic Resonance	4	2	0	2	w	1515597
Geoscience								
van der Kruk	van der Kruk	Hydrogeophysics	3	2	0	2	w	5312565
Hendricks-Franssen	Hendricks-Franssen	Modeling flow and transport processes in terrestrial systems	4	1	1	2	s	5312968
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696

Computer Sciences								
Ney	Schlüter	Advanced Methods in Automatic Speech Recognition	6	3	1	4	w/s	1211904
Ney	Ney / Schlüter	Advanced Statistical Classification	6	4	2	6	w/s	1212684
Ney	Ney	Advanced Topics in Statistical Natural Language Processing	6	3	1	4	unregel.	1212685
Svendsen	Svendsen	Application of Artificial Neural Networks in Computational Material Modeling / Simulation	5	3	2	5	w	0
Stoffel	Stoffel	Artificial Neural Networks in Structural Mechanics	6	2	2	4	w	4021387
Bientinesi	Bientinesi	Automatic Generation and Analysis of Algorithms	6	3	1	4	w/s	1212693
Ney	Schlüter	Automatic Speech Recognition	8	4	2	6	w/s	1215750
Kobbelt	Kobbelt	Computer Graphics	6	3	2	5	w	1212310
Naumann	Naumann	Combinatorial Problems in Scientific Computing	4	2	1	3	unregel.	1215721
Noll / Katoen	Noll	Compilerbau	6	3	2	5	w	1211978
Leibe	Leibe	Computer Vision	6	3	1	4	s	1215724
Bender	Bender	Physikalische Simulation im Visual Computing	6	2	2	4	s	1212692
Kobbelt	Kobbelt	Geometrieverarbeitung	6	3	2	5	s	1215696
Andert	Bergheim / Fiedler / Winkler	Hardware-in-the-Loop für mobile Antriebe	3	0	2	2	w	4027315
Bientinesi	Napoli / Naumann	High-Performance Matrix Computations	6	4	1	5	w	1211911
Naumann	Naumann	Introduction to Algorithmic Differentiation	6	2	2	4	w	1221327
Kowalewski	Kowalewski	Embedded Systems	6	3	3	6	s	1215690
Lichter	Lichter	Object Oriented Software Construction	6	3	2	5	w	1212354
Müller M.	Müller M.	Leistungs- und Korrektheitsanalyse paralleler Programme	6	3	1	4	s	1215722
Bender	Bender	Physikalisch basierte Animation	6	2	2	4	w	1215862
Trimpe	Trimpe	Seminar: Learning-based control	4	0	2	2	s u. w	4023501
Trimpe	Trimpe / Solowjow	Seminar: Mathematical Concepts of Machine Learning	4	1	2	3	s	0
Bientinesi	Bientinesi	Seminar: Topics in High-Performance and Scientific Computing	4	0	2	2	w/s	1215728
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
Lichter	Lichter	Software Quality Assurance	6	3	2	5	s	1212356
Ney	Ney	Statistical Methods in Natural Language Processing	8	4	2	6	w/s	1215695
Kobbelt	Kobbelt	Subdivision Kurven und Flächen	6	3	2	5	w/s	1215697
Kowalski	Zhao / Yildiz	Sustainable Computational Engineering	5	2	1	3	s	4026630
Kuhlen	Kuhlen	Virtuelle Realität	6	2	1	3	w/s	1211909
Mathematics								
May	May	Adaptive Methoden für Partielle Differentialgleichungen	6	2	2	4	s	4013869
N.N.	Torrihlon	Advanced Topics in Transport Theory	5	2	1	3	unregel.	1113513
Bemelmans	von der Mosel	Calculus of Variations I	9	4	2	6	w/s	1113671
Zerz / Niemeyer	Zerz	Control Theory	9	4	2	6	unregel.	1113595
Maier-Paape / Walcher	Hryniewicz	Dynamische Systeme	9	4	2	6	w/s	1113588
Müller S.	Müller S.	Finite Element and Volume Methods	9	4	2	6	unregel.	1121392
Müller S.	Noelle / Dahmen / Reusken	Finite Element and Volume Methods I	5	2	1	4	unregel.	1118272
Müller S.	Noelle / Dahmen / Reusken	Finite Element and Volume Methods II	5	2	1	3	unregel.	1118273
Noelle	Noelle	Introduction to Hyperbolic Conservation Laws	6	2	1	3	w	1113005
Herty	Steffensen	Introduction to Transport Theory	5	2	1	3	s	1113439
Behr / Elgeti	Behr / Elgeti	Isogeometric Analysis	6	2	1	3	w	4012302
Reusken	Reusken	Iterative Löser	9	4	2	6	s	1113473
Stamm	Stamm	Mathematical Aspects in Computational Chemistry	5	3	1	4	s	1113574
Torrihlon	Torrihlon	Mathematical Models in Science and Engineering (PDEs)	6	3	1	4	s	1113673
Stamm	Stamm	Mathematical Models in Atomistic Simulations	3	0	2	2	s	1114995
Grepl	Bamer	Model Order Reduction Techniques	9	2	2	4	w/s	1113674
Müller S.	Müller S.	Multiscale Techniques	9	4	2	6	unregel.	1121391
Müller S.	Müller S.	Multiscale Techniques I	5	2	1	3	w/s	1118163
Müller S.	Müller S.	Multiscale Techniques II	5	2	1	3	w/s	1118165
Bemelmans	Bemelmans	Nonlinear Functional Analysis	9	4	2	6	w/s	1113667
Dahmen / Reusken	Dahmen / Reusken	Numerical Analysis III	9	4	2	6	w/s	1113668
Reusken	Reusken	Numerical Analysis IV	9	4	2	6	w/s	1113669
Tempone	Tempone	Numerical methods for Stochastic Differential Equations with connections to Machine Learning	9	4	2	6	unregel.	1121357
Günzel	Günzel / Herty	Optimization A	9	4	2	6	unregel.	1111033
Büsing / Koster	Büsing	Optimierung B	9	4	2	6	unregel.	1112717
Grepl / Herty	Herty	Optimization C	9	4	2	6	w/s	1113482
Bemelmans / Wiegner	Bemelmans / Wiegner	Partial Differential Equations II	9	4	2	6	w/s	1113670
Stamm	Stamm	Seminar Computer-based Mathematical Modeling	3	0	2	2	s	1113581
Behr	Behr	Simulation Sciences Seminar	5	2	1	3	w	4011696
N.N.	N.N.	Uncertainty Quantification	5	2	1	3	w/s	1113510
Tempone, Krumscheid	Tempone, Krumscheid	Seminar: Uncertainty Quantification, Partial Differential Equations, and Neural Networks	5	0	2	2	unregel.	1125043
Wagner	Westdickenberg / von der Mosel	Variationsrechnung II	9	4	2	6	s	1113649

* = Offered irregularly