

Master's Program Computational Engineering

Curriculum

		Code	Module Name	hours per week	CP	Semester
1 st & 2 nd semester	P Compulsory Courses 39 CP	CE-Po1	Mathematical Aspects of Differential Equations and Numerical Mathematics	4	6	1
		CE-Po2	Mechanical Modeling of Materials	4	6	1
		CE-Po3	Computer-based Analysis of Steel Structures	4	6	1
		CE-Po4	Scientific Programming	4	6	1
		CE-Po5	Finite Element Methods in Linear Structural Mechanics	4	6	1
		CE-Po6	Fluid Dynamics	2	3	2
		CE-Po7	Continuum Mechanics	4	6	2
		Subtotal CP: Compulsory Courses				
1 st , 2 nd & 3 rd semester	WP Compulsory Optional Courses 35 CP	CE-WP01	Variational Calculus and Tensor Analysis	3	5	1
		CE-WP31	Scientific C++ Programming (Basics)	2	3	1
		CE-WP02	Optimization Aided Design - Reinforced Concrete	4	6	2
		CE-WP03	Adaptronics	3	5	2
		CE-WP04	Nonlinear Finite Element Methods for Structures	4	6	2
		CE-WP05	Computational Fluid Dynamics	4	6	2
		CE-WP08	Numerical Methods and Stochastics	4	6	2
		CE-WP09	Numerical Simulation in Geotechnics and Tunneling	4	6	2
		CE-WP10	Programming the Finite Element Method	2	3	2
		CE-WP11	Applied Finite Element Methods	4	6	2
		CE-WP12	Computational Plasticity	4	6	2
		CE-WP25	High-Performance Computing on Multicore Processors	4	6	2
		CE-WP28	Machine Learning: Supervised Methods	4	6	2
		CE-WP30	Transient Finite Element and Finite Difference Methods	4	6	2
		CE-WP32	Scientific C++ Programming (Advanced)	2	3	2
		CE-WP33	Deep Learning for Engineers	4	6	2
		CE-WP34	Advanced Discretization Methods	2	3	2
		CE-WP06	Inelastic Finite Element Method for Structures	3	6	3
		CE-WP13	Advanced Control Methods for Adaptive Mechanical Systems	4	6	3
		CE-WP14	Computational Wind Engineering	2	3	3
		CE-WP15	Coupled Multiphysical Modeling and Simulations	4	6	3
		CE-WP16	Computational Modeling of Membranes and Shells	4	6	3
		CE-WP17	Numerical Methods for Conservation Laws	4	6	3
		CE-WP19	Computational Fracture Mechanics	4	6	3
		CE-WP20	Materials for Aerospace Applications	4	6	3
CE-WP21	Quantum Computing	4	6	3		
CE-WP26	High-Performance Computing on Clusters	4	6	3		
CE-WP29	Uncertainty Quantification in FE Analyses with Surrogate Modeling	4	6	3		
CE-WP35	Computational Structural Optimization	4	6	3		
CE-WP36	Automation in Design and Construction	4	6	3		
CE-WP24	Case Study A	2	3	2+3		
Minimum Subtotal CP: Compulsory optional courses					35	
1 st , 2 nd & 3 rd semester	W Optional Courses 16 LP	CE-Wo1	Training of Competences (part 1)	4	4	1
		CE-Wo2	Training of Competences (part 2)	4	4	2
		CE-Wo4	Recent Advances in Numerical Modeling and Simulation	2	2	2
		CE-Wo5	Numerical Optimization	4	6	3
		CE-Wo6	Advanced Constitutive Models for Geomaterials	2	6	2
		CE-Wo3	Case Study B	2	3	2+3
		CE-W11	Seminar Computing in Engineering	2	3	3+4
		CE-W13	German A1	4	5	1+3
		CE-W14	German A2	4	5	2+4
		other relevant courses of the faculty or from engineering faculties of other universities				
Minimum Subtotal CP: Optional Courses					16	
4 th Semester	M Master-Thesis	CE-M	Master Thesis	-	30	4
		Subtotal CP: Master Thesis				
Subtotal CP: Compulsory Courses					39	
Subtotal CP: Compulsory optional courses					35	
Subtotal CP: Optional courses					16	
Subtotal CP: Master Thesis					30	
Sum CP in total:					120	