Master's Program Computational Engineering

Curriculum

		Code	Module Name	hours per week	CP	Semester
1st & 2nd semester	**P** Compulsory Courses 39 CP	CE-P01	Mathematical Aspects of Differential Equations and Numerical Mathematics	4	6	1
		CE-P02	Mechanical Modeling of Materials	4	6	1
		CE-P03	Computer-based Analysis of Steel Structures	4	6	1
		CE-P04	Scientific Programming	4	6	1
		CE-P05	Finite Element Methods in Linear Structural Mechanics	4	6	1
		CE-P06	Fluid Dynamics	2	3	2
		CE-P07	Continuum Mechanics	4	6	2
			Subtotal CP: Compulsory Courses		39	
1st, 2nd & 3rd 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	Object-oriented Modeling and Implementation of Structural Analysis Software	2	3	2
		CE-WP11	Applied Computational Simulations of Structures	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	4	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-WP24	Case Study A	2	3	2+3
			Minimum Subtotal CP: Compulsory optional courses		35	
1st, 2nd & 3rd semester	**W** Optional Courses 16 LP	CE-W01	Training of Competences (part 1)	4	4	1
		CE-W02	Training of Competences (part 2)	4	4	2
		CE-W04	Recent Advances in Numerical Modeling and Simulation	2	2	2
		CE-W05	Machine Learning: Evolutionary Algorithms	4	6	2
		CE-W06	Advanced Constitutive Models for Geomaterials	2	6	2
		CE-W03	Case Study B	2	3	2+3
			other relevant courses of the faculty or from engineering faculties of other universites			1+2+3
			Minimum Subtotal CP: Optional Courses		16	
4th Semester	**M** Master-Thesis	CE-M	Master Thesis	-	30	4
			Subtotal CP: Master Thesis		30	

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	

Last update: March 2025