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	Modern Programming Concepts in Engineering	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-WP02	Optimization Aided Design - Reinforced Concrete	4	6	2
		CE-WP03	Adaptronics	3	5	2
		CE-WP04	Advanced Finite Element Methods	4	6	2
		CE-WP05	Computational Fluid Dynamics	4	6	2
		CE-WP06	Finite Element Methods for Nonlinear Analyses of Materials and Structures	2	3	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-WP13	Advanced Control Methods for Adaptive Mechanical Systems	4	6	3
		CE-WP14	Computational Wind Engineering	2	3	3
		CE-WP15	Design Optimization	4	6	3
		CE-WP17	Numerical Methods for Conservation Laws	4	6	3
		CE-WP18	Safety and Reliabilty of Engineering Structures	4	6	3
		CE-WP19	Computational Fracture Mechanics	4	6	3
		CE-WP20	Materials for Aerospace Applications	4	6	3
		CE-WP26	High-Performance Computing on Clusters	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-W09	Scientific C++ Programming (Basics)	2	3	1
		CE-W02	Training of Competences (part 2)	4	4	2
		CE-W04	Recent Advances in Numerical Modeling and Simulation	2	2	2
		CE-W06	Advanced Constitutive Models for Geomaterials	2	3	2
		CE-W10	Scientific C++ Programming (Advanced)	2	3	2
		CE-W05	Simulation of Incompressible Turbulent Flows with the Finite Volume Method	2	3	3
		CE-W08	Quantum Computing	2	3	3
		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**	

	CP	
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**	

Stand: September 2023