

Overview CSiS Curriculum based on Examination Regulations 2020 3rd amendment 13.11.2023

Pflichtbereich / Compulsory Subjects

Term	Computer Simulation	Computer Science	Numerical Methods
1 (WiSe) 28 CP	Computer Simulation 1* 11 CP Lab Course I 150h Introduction to Computer Simulation 120h Block Course on Mathematical Foundations 60h	Computer Science 1 9 CP Modern Programming 180h Virtualization I 90h or Introduction to HPC 90h	Numerical Methods 1 8 CP NM1: Numerical Analysis and Simulation I 240h or NM1a: Numerics of Ordinary Differential Equations with components: a + b or a + c 240h or MatML: Mathematical Machine Learning 240h
2 (SoSe) 24 CP	Computer Simulation 2 13 CP Data Analysis 150h Parallel Algorithms 240h	Computer Science 2 3 / 7 CP Tools 90h or Bayesian Learning 90h	Numerical Methods 2a / 2b 8 CP Numerical Methods 2a: Numerical Analysis and Simulation II 240h or Numerical Methods 2b: Numerical Methods in Classical Field Theory and Quantum Mechanics 240h
3 (WiSe) 22 CP	Computer Simulation 3* 12 CP Introduction to Computer Simulation II 120h Lab Course II 240h	Computer Science 2 (contd.) 4 / 7 CP Image Processing and Data Visualization 120h or Virtualization II 120h or Bayesian Learning (contd.) 120h	Numerical Methods 3 6 CP Numerical Linear Algebra 180h

Table 1: Overview CSiS Curriculum: Obligatory Subjects

*final module exam with limited repeatability: 3 attempts in total

Overview CSiS Curriculum – Wahl-Pflichtbereich / Elective Subjects

Term	Atmospheric Physics	Computational Electromagnetics	Computational Finance	Computational Fluid Mechanics
1 (WiSe)				
2 (SoSe)	AtmP1 8 CP Summer School on Chemistry and Dynamics of the Atmosphere (Jülich) 150h 8 CP Selected Topics in Atmospheric Physics 90h or Atmospheric Modelling 90h	CEM1 8 CP Computational Electromagnetics 1 240h	CompFin1 8 CP Computational Finance 1 240h	CFM1.1* 4 CP Computational Fluid Dynamics 120h
3 (WiSe)	EAP /AtmP2b 8 CP EAP: Introduction to Atmospheric Physics 240h or AtmP2b: Selected Topics in Atmospheric Physics 150h Seminar on Atmospheric Physics 90h	CEM2 8 CP Computational Electromagnetics 2 240h (CEM-Lab Project)	CompFin2 8 CP Computational Finance 2 240h	CFM1.2* 4 CP Radiative Heat Transfer 120 h CFM 2, 5, 6 (choice of two): 8 CP CFM2: Pedestrian Dynamics 120h CFM5: Fire Simulation 120h CFM6: Machine Learning for Fire Simulation 120h
4 (SoSe) 30 CP	Master Thesis 30 CP**			

Table 2: Overview CSiS Curriculum: Elective Subjects (cont.)

*CFM1.1: final module exam with limited repeatability: 3 attempts in total; exam registration only possible if the module CSim1 has been successfully passed.

*CFM1.2: final module exam with limited repeatability: 3 attempts in total; exam registration only possible if the modules CSim1 and CFM1.1 have been successfully passed.

** CFM: module exams CFM1.1 and CFM1.2 must have been successfully passed for registration of Master Thesis.

Overview CSiS Curriculum – Wahl-Pflichtbereich / Elective Subjects

Term	Detector Physics	Imaging in Medicine	Molecular and Materials Modelling	Theoretical Particle Physics
1 (WiSe)				
2 (SoSe) 8 CP	PDP Particle Detector Project 8 CP 240h	IMG1 Quantitative Medical Imaging 4/8 CP 120h	MMM1 Molecular and Materials Modelling 1 8CP 240h	SMTP /SFT /VTT 8 CP SMTP: The Standard Model of Elementary Particle Physics 240h or SFT: Statistical Field Theory 240h or VTT: Many Particle Theory 240h
3 (WiSe) 8 CP	DET DET: Detector Physics 8 CP 240h	IMG1 4/8 CP TPDP-a Detector Physics + TPDP-b Exercises Detector Physics 120h IMG2 8 CP IMG2: Image Processing and Data Visualization + Seminar 240h	MMM2 8 CP Molecular and Materials Modelling 2 240h	COS /EQFT /FQM 8 CP COS: Introduction to Cosmology and General Relativity + Seminar 240h or EQFT: Introduction to Quantum Field Theory 240h or FQM: Advanced Quantum Mechanics 240h
4. (SoSe) 30 CP	Master Thesis 30 CP			

Table 3: Overview CSiS Curriculum: Elective Subjects (cont.)