Module MA-INF 1211	**Parameterized Complexity**		
Workload 270 h	**Credit points** 9 CP	**Duration** 1 semester	**Frequency** at least every 2 years
Module coordinator	Prof. Dr. Stefan Kratsch		
Lecturer(s)	Prof. Dr. Stefan Kratsch		
Classification	**Programme** M. Sc. Computer Science	**Mode** Optional	**Semester** 1., 2. or 3.
Technical skills	A fundamental understanding of the more fine-grained complexity analysis of NP-hard problems that is provided by parameterized complexity. Learning to employ a rich toolbox of techniques for upper and lower bounds on the complexity of parameterized problems.		
Soft skills	• Social competence: solving exercise tasks in teams, presenting solutions • methodical competence: analysis, abstraction, proofs • individual competence: learning, reading scientific papers/book chapters, abstraction		
Contents	• Parameterized problems • Algorithmic techniques: bounded search trees, kernelization, treewidth, iterative compression, color coding, algebraic algorithms, etc. • Methods for establishing intractability: parameterized reductions, hardness under ETH/SETH, lower bounds for kernelization		
Prerequisites	none		

Format

Teaching format	**Group size**	**h/week**	**Workload[h]**	**CP**
Lecture	60	4	60 T / 105 S	5.5
Exercises	30	2	30 T / 75 S	3.5

T = face-to-face teaching; S = independent study

Exam achievements	Oral exam (graded)
Study achievements	Successful exercise participation (not graded)
Forms of media	
Literature	• Downey/Fellows: Fundamentals of Parameterized Complexity • Flum/Grohe: Parameterized Complexity Theory • Niedermeier: Invitation to Fixed Parameter Algorithms • Cygan et al.: Parameterized Algorithms (to appear)