

Module name					
Algorithms and Data Structures					
Module nr. 20-00-0005	Credit points 10 CP	Workload 300 h	Self-study 180 h	Module duration 1 Term	Module cycle Summer term
Language German			Module owner Prof. Dr. phil. nat. Marc Fischlin		
1	Teaching content • data structures: array, list, binary search tree, B-tree, graph representation, hash table, heaps • algorithms: sorting algorithms, string matching, graph traversal, insertion, search, and deletion for data structures, shortest path search, minimal spanning trees • asymptotic complexity: run times, Big O notation, complexity classes P and NP, NP completeness • algorithmic strategies. for example: Divide-and-Conquer, dynamic programming, brute-force, greedy, backtracking, meta heuristics				
2	Learning objectives Upon successful completion of the module students get to know fundamental data structures and algorithms and the complexity classes P, NP, and NPC. They acquire the abilities to apply fundamental principles of algorithmics and to assess and determine asymptotic complexity. Furthermore, they understand major algorithmic strategies and can apply them.				
3	Recommended prerequisites for participation Recommended: Prior attendance of "Functional and Object-Oriented Programming Concepts" or a comparable course.				
4	Form of examination DefaultCourse related exam: • [20-00-0005-iv] (Technical examination, Oral/written examination, Default RS) • [20-00-0005-iv] (Study achievement, Oral/written examination) See german description.				
5	Prerequisite for the award of credit points Pass exam (100%)				
6	Grading DefaultCourse related exam: • [20-00-0005-iv] (Technical examination, Oral/written examination, Weighting: 100 %) • [20-00-0005-iv] (Study achievement, Oral/written examination, Weighting: 0 %)				
7	Usability of the module B. Sc. Informatik B.Sc. Wirtschaftsinformatik JBA Informatik B.Sc. Informationssystemtechnik B.Sc. Computational Engineering Lehramt an Gymnasien - Fach Informatik Bachelor/Master of Education mit beruflicher Fachrichtung oder Unterrichtsfach Informatik May be used in other degree programs.				
8	Grade bonus compliant to §25 (2) In dieser Veranstaltung findet eine Anrechnung von vorlesungsbegleitenden Leistungen statt, die lt. 25(2) der 6. Novelle der Allgemeinen Prüfungsbestimmungen der TU Darmstadt und den vom Fachbereich Informatik am 14.07.2022 beschlossenen Anrechnungsregeln zu einer Notenverbesserung um bis zu 1.0 führen kann.				

9	References Will be appointed in lecture.			
Courses				
	DefaultCourse nr. 20-00-0005-iv	Course name Algorithms and data structures		
	Instructor		Type Integrated course	SWS 8