

<b>Program of Studies:</b>	<b>Master Program Bioinformatics</b>
<b>Name of the module:</b>	<b>Data Structures and Algorithms</b>
<b>Abbreviation:</b>	<b>I-M-1</b>
<b>Subtitle:</b>	Core Lecture
<b>Modules:</b>	Lecture: 4 h (weekly) Tutorial: 2 h (weekly)
<b>Semester:</b>	1 <sup>st</sup> -3 <sup>rd</sup> semester/at least every two years
<b>Responsible lecturer:</b>	Prof. Dr. Kurt Mehlhorn
<b>Lecturer:</b>	Prof. Dr. Raimund Seidel, Prof. Dr. Kurt Mehlhorn
<b>Language:</b>	English
<b>Level of the unit/ Mandatory or not:</b>	Graduate course / mandatory elective
<b>Total workload:</b>	270 h = 90 h of classes and 180 h private study
<b>Credits:</b>	9
<b>Entrance requirements:</b>	For graduate students: C, C++, Java
<b>Aims/Competences to be developed:</b>	The students know standard algorithms for typical problems in the area's graphs, computational geometry, strings and optimization. Furthermore, they master a number of methods and data-structures to develop efficient algorithms and analyze their running times.
<b>Content:</b>	<ul style="list-style-type: none"> <li>- graph algorithms (shortest path, minimum spanning trees, maximal flows, matchings, etc.)</li> <li>- computational geometry (convex hull, Delaunay triangulation, Voronoi diagram, intersection of line segments, etc.)</li> <li>- strings (pattern matching, suffix trees, etc.)</li> <li>- generic methods of optimization (tabu search, simulated annealing, genetic algorithms, linear programming, branch-and-bound, dynamic programming, approximation algorithms, etc.)</li> <li>- data-structures (Fibonacci heaps, radix heaps, hashing, randomized search trees, segment trees, etc.)</li> <li>- methods for analyzing algorithms (amortized analysis, average-case analysis, potential methods, etc.)</li> </ul>
<b>Assessment/Exams:</b>	<ul style="list-style-type: none"> <li>- Regular attendance of classes and tutorials</li> <li>- Passing the midterm and the final exam</li> <li>- A re-exam takes place during the last two weeks before the start of lectures in the following semester.</li> </ul>

<b>Grade:</b>	Will be determined from performance in exams, exercises and practical tasks. The exact modalities will be announced at the beginning of the module.
<b>Literature:</b>	Will be announced before the start of the course on the course page on the Internet.