Program of Studies:	**Master Program Bioinformatics**
Name of the module:	**Optimization**
Abbreviation:	**I-M-6**
Subtitle:	Core Lecture
Modules:	Lecture: 4 h (weekly) Tutorial: 2 h (weekly)
Semester:	1st -3rd semester/at least every two years
Responsible lecturer:	Prof. Dr. Kurt Mehlhorn
Lecturer:	Prof. Dr. Kurt Mehlhorn, Dr. Andreas Karrenbauer
Language:	English
Level of the unit/ Mandatory or not:	Graduate course / mandatory elective
Total workload:	270 h = 90 h of classes and 180 h private study
Credits:	9
Entrance requirements:	For graduate students: none
Aims/Competences to be developed:	The students learn to model and solve optimization problems from theory as from the real world.
Content:	- Linear Programming: Theory of polyhedra, simplex algorithm, duality, ellipsoid method - Integer linear programming: Branch-and-Bound, cutting planes, TDI-Systems - Network flow: Minimum cost network flow, minimum mean cycle cancellation algorithm, network simplex method - Matchings in graphs: Polynomial matching algorithms in general graphs, integrality of the matching polytope, cutting planes - Approximation algorithms: LP-Rounding, greedy methods, knapsack, bin packing, steiner trees and forests, survivable network design
Assessment/Exams:	- Regular attendance of classes and tutorials - Solving accompanying exercises, successful participation in midterm and final exam - Grades: Yes - The grade is calculated from the above parameters according to the following scheme: 20%, 30%, 50% - A re-exam takes place during the last two weeks before the start of lectures in the following semester
Grade:	Will be determined from performance in exams, exercises and practical tasks. The exact modalities will be announced at the beginning of the module.
Literature:	Will be announced before the start of the course on the course page on the Internet.