ITMO

ITMO University

Discrete Mathematics

Course Workload		Assessment form (examination/ graded test/ ungraded test)
ECTS	**Hours**	
3	**108**	**Exam**

The course will introduce students to the basic concepts of Boolean logic, combinatorics, dynamic programming and algorithms on graphs, which are the basis for solving many bioinformatics problems.

Course structure:

1. Introduction to set theory. Boolean functions

1.1. Introduction to set theory: definitions, set operations and properties
1.2. Boolean functions, boolean logic and proof methods

2. Combinatorics

2.1. Combinations, permutations, pigeonhole principle
2.2. Combinatorial generation

3. Asymptotic analysis and sorting algorithms

3.1. Asymptotic analysis of algorithms
3.2. Sorting algorithms

4. Dynamic programming

4.1. Definitions, subtask optimization, basic problems
4.2. Dynamic programming in bioinformatics: local and global alignments
4.3. RNA's secondary structure prediction

5. Graph theory

5.1. Definitions, DFS, BFS
5.2. Algorithms, de Bruijn graph