ITMO University

Algorithms and Data Structures

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

In this course, students will consider the principles of algorithms and data structures, as well as the principles of dynamic and linear programming; they will master the criteria for the applicability of statistical models and their implementation in a programming language. Students will learn to: Work with algorithms and data structures Conduct statistical analysis of data and visualize the resu

Course structure:

1. Complexity. Sorting. Basic Data Structures: Stack, Queue, Heap.

1.1. Queues, Dequeue, Heap, Amortized time
1.1. Complexity
1.2. Sorting and Binary Search
1.3. DigitSort and Stacks

2. Binary Search Trees

2.2. Vector continuation, BST, AVL, Treap
2.3. Treap and Treap with hidden keys

3. Dynamic Programming

3.1. Part 1
3.2. Part 2
3.3. Part 3

4. Graph algorithms

4.1. String Hashes
4.2. Depth-First Search
4.3. Eulerian cycle, Breadth-First Search, Dijkstra
4.4. Ford-Bellman, Floyd