

COM 324.1 – Algorithm analysis (ID 3261)
Spring 2018.

Prerequisites: COM 223 Algorithms and Data Structures
Instructor: Shostak Dmitrii (shostak_d@mail.auca.kg)
Lectures: Wednesday, 10.50 room 220
Labs: Friday, 10.50, 12.45 room G30

Office hours: Friday, 12.05-12.45 room G30

Building on the principles introduced in Algorithms and data structures, this course equips students with additional mathematical tools for algorithm analysis. Students learn many techniques for efficient algorithm design and must complete several significant programming projects. Topics include basic algorithmic analysis, algorithmic strategies and fundamental computing algorithms.

Literature:

Aho, Alfred V.	Data structures and algorithms. 1983
Cormen, Thomas H.;	
Leiserson, Charles E.;	Introduction to Algorithms. 2001
Rivest, Ronald L.	
Sedgewick, R.	Algorithms in C++. 1998

Programming language and software tools of the course:

Students have to do lab works and projects using standard C++ and any compilers that support standard C++ and command line interface.

Labs (Each lab counts for 8%):

Lab works are regular programming assignments which demonstrate material of the lectures. Students should make each lab work during the week after they got assignment. Lab works 1-4 will be checked on midterm exam; lab works 5-8 will be checked on final exam. Students have to work individually and be ready to explain and repeat any part of their code on the exam.

Projects (Each project counts for 18%):

Project1 and project 2 are more serious programming assignments. Students will have 3 weeks for each to do them. Students can find more about evaluation of projects in assignments. Students have to work individually and be ready to explain and repeat any part of their code on the exam. Project 1 will be checked on midterm exam. Project 2 will be checked on final exam.

Schedule of the course

#	Topic	Projects and Labs
1	Performance of algorithms. O-notation	Lab 1
2	Linked lists. Class list of standard library C++	Lab 2
3	Doubly linked lists and single linked lists. Implementation of ADT Stack and Queue.	Project 1
4	Hashing. Classes unordered_set and unordered_map of standard library C++.	Lab 3
5	Implementation of class HashSet	
6	Binary Search Trees. Classes set and map of standard library C++	Lab 4
7	Implementation of class BinarySearchTree	
8	Recursion. Backtracking	
	Midterm	
9	Sort algorithms: insertion sort, merge sort, quick sort	Lab 5
10	Heap, heap sort	Lab 6
11	Graphs. Breadth-first Search, depth-first search, Topological sort.	Project 2
12	Weighted graphs. Shortest path.	
13	Weighted graphs. Minimum spanning tree.	Lab 7
14	Dynamic Programming. Longest common subsequence problem	
15	Algorithms of standard library C++.	Lab 8
	Final	

Grades:

$F < 20\%$
$20\% \leq D- < 26\%$
$26\% \leq D < 34\%$
$34\% \leq D+ < 40\%$
$40\% \leq C- < 46\%$
$46 \leq C < 54\%$
$54\% \leq C+ < 60\%$
$60 \leq B- < 66\%$
$66\% \leq B < 74\%$
$74\% \leq B+ < 80\%$
$80\% \leq A- < 90\%$
$90\% \leq A \leq 100\%$

13.01.18