COM 223.1 – Algorithms and data structures (ID 3114)
Fall 2017.

Prerequisites:	COM 116 (Programming I. Intro to Object-Oriented Programming)	
Instructor:	Shostak Dmitry (shostak_d@auca.kg)	
Lecture:	Wednesday, 10.50	room 434
Labs:	Friday, 12.45	room G30
	Friday, 14.10	room G30
	Friday, 15.35	room G30

Office hours: Wednesday, 12.05-12.45 room G30

Goal of the course is to give knowledge of classic data structures and algorithms basic for both practical and theoretical parts of computer science. Brief list of data structures and algorithms studying in this course: dynamic arrays, linked lists, hash-tables, binary trees, linear search, binary search. Special emphasize in the course will be done on the STL part of the C++ standard library: classes string, vector, list, set, unordered_set, map, unordered_map and standard algorithms.

Literature:

Aho, Alfred V.	Data structures and algorithms. 1983
Cormen, Thomas H.; Leiserson, Charles E.; Rivest, Ronald L.	Introduction to Algorithms. 2001
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 or 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 or 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	Intro to C++: fundamental types, input/output, control statements.	Lab 1
2	Intro to C++: functions, parameters, pass by value, pass by reference, exceptions.	
3	Intro to C++: class string, string streams	Lab 2
4	Intro to C++: class vector, iterators, standard algorithms	
5	Intro to C++: multi-file programs, header files, libraries, make-files	Lab 3
6	Intro to C++: classes, constructors, destructors, methods, operator overloading.	Project 01
7	Into to C++: pointers, dynamic memory	
8	Dynamic arrays. Implementation of class Vector	Lab 4
	Midterm	
9	Linked Lists. Implementation of class List	Lab 5
10	ADT Stack and Queue.	
11	Linear search. Binary search. STL algorithms.	Lab 6
12	ADT Set. Hash-tables.	Project 2
13	STL class unordered_set. Implementation of class HashSet.	Lab 7
14	ADT Map. Binary Search Trees.	
15	STL class map. Implementation of class TreeMap.	Lab 8
	Final	

Grades:

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

19.08.17