

SYLLABUS COS 397 "Competition Programming"

Spring 2017, Wednesday 10:45 – 12:00 and 14:15 – 15:30, Room MB 115

Instructor: Assoc. Prof. EMIL KELEVEDJIEV

Office MB 206 **Office hours:** Wednesday, 13:00-14:00.

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Books and sources

Completive Programming. Steven Halim, Felix Halim. A Handbook for ACM ICPC and IOI Contestants. 2010.

Programming Challenges. The Programming Contest Training Manual by Steven Skiena, Miguel Revilla.

Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest.

Algorithms in C++ by Robert Sedgewick.

Software: Code:Blocks C++

Course description: The focus of the course is the development and implementation of advanced algorithms, as well as the skills required for programming competitions. The students will learn to select appropriate algorithms for a given problem, integrate multiple algorithms for solving a complex problem, design new algorithms, and implement them in C++ programming language. They will also learn skills required for participation in programming contests, which include evaluation of problem difficulty, solving problems in teams, and work under time pressure. We expect that the best students from this course will represent AUBG at the National Programming Competition and possibly at the International ACM Programming Competition. The course involves in-class programming practices and home works.

Prerequisite: Introduction to Programming in C/C++; Data Structures.

Course outline:

Week	Topics	Date
1	C++ Revisited.	Jan 25
2	Dynamic Programming	Feb 01
3	Divide and Conquer. Greedy Algorithms	Feb 08
4	Quiz 1 (Solving tasks using computer)	Feb 15
5	Backtracking and Searching.	Feb 22
6	Recursion revisited and Trees	Mar 01
-	(Spring Break)	
7	Quiz 2 (Solving tasks using computer)	Mar 15
8	Arithmetic Algorithms	Mar 22
9	Elementary geometric algorithms	Mar 29
10	Advanced geometric algorithms	Apr 05
11	Quiz 3 (Practice work, no classes)	Apr 12
12	Elementary graph algorithms	Apr 19
13	Basic graph algorithms, Minimum Spanning Tree, Shortest path	Apr 26
14	Advanced graph algorithms. Preparation to the Final exam	May 03
15	Final exam	Final week

Grading:

Quiz 1	20%
Quiz 2	20%
Quiz 3	20%
Final exam	20%
Home assignments	15%
Other (attendance, involvement, etc.)	5%

The total score will be used to define your final grade:

"A"	covers the scores above 90
"A-"	between 88 and 90
"B+"	between 84 and 87
"B"	between 81 and 83
"B-"	between 77 and 80
"C+"	between 74 and 76
"C"	between 70 and 73
"C-"	between 67 and 69
"D+"	between 63 and 66
"D"	between 60 and 62

You will fail the course if your total score is below 60.

Quizzes and Final exam: will be described.

Communication: You can communicate with me using e-mail (Please, insert a subject line with "COS 397").