ABDULLAH GUL UNIVERSITY
DEPARTMENT OF COMPUTER ENGINEERING
COMP 301 ANALYSIS OF ALGORITHMS

Course Description	This course introduces students to the analysis and design of computer algorithms. The material covered in this course draws from discrete mathematics, elementary real analysis, combinatorics, algorithms and data structures. Topics include sorting algorithms, growth of functions, divide and conquer, randomized algorithms, order statistics, elementary data structures.
Course Objectives	Students will be able to • Gain an understanding of the mathematical concepts needed to study the performance of computer programs • Learn major algorithms and data structures • Learn asymptotic analysis of algorithms • Learn algorithm design techniques
Learning Outcomes	The students who finish this course will be able to • Analyze the worst-case running times of algorithms using asymptotic analysis • Analyze average-case running times of probabilistic algorithms • Implement algorithms in a computer programming language • Explain major algorithms for sorting • Compare the running times of algorithms • Develop algorithms for solving computational problems
Course Prerequisites	• COMP 203 Data Structures and Algorithms
Textbooks	• *Introduction to Algorithms*, T. H. Cormen, C. E. Lieserson, 3rd edition, MIT Press and McGraw-Hill, 2009 https://mitpress.mit.edu/books/introduction-algorithms-third-edition.
Other References	• Introduction to Algorithms, MIT OpenCourseware, https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-introduction-to-algorithms-sma-5503-fall-2005/ • Khan Academy Course, https://www.khanacademy.org/computing/computer-science/algorithms • *Data Structures and Algorithms in Java*, 6th edition, M. T. Goodrich, R. Tamassia, M. H. Goldwasser, Wiley, 2014.
Meeting Times and Rooms	Lecture Hours: Friday 14:20-17:00 in class B209 and through Zoom Laboratory Hours: Monday: 11:20-13:00 in COMP LAB

Evaluation Criteria

There are two types of grading criteria depending on whether a student chooses to do a course project or not. These are tabulated below.

Course Project Option	
Quizzes	5%
Labs	15%
Homework	10%
Project	15%
Midterm 1	15%
Midterm 2	15%
Final	25%

No Course Project Option	
Quizzes	5%
Labs	15%
Homework	10%
Midterm 1	20%
Midterm 2	20%
Final	30%

Grading Policy

The final grades will be computed based on the general performance of the class and the distribution of grades (i.e. who deserves A and who deserves F). The grading strategy will be a combination of the standard catalogue grading and curve grading (i.e. a shifted version of catalogue grading defined in the school's regulations document). The grading intervals we used in 2020's course is given below (this does not mean we will use the same intervals in 2021's course but just to give you an idea).

72.5-100	A
67.5-72.5	A-
62.5-67.5	B+
57.5-62.5	B
52.5-57.5	B-
47.5-52.5	C+
42.5-47.5	C
37.5-42.5	C-
32.5-37.5	D+
27.5-32.5	D
0-27.5	F

Attendance Policy

Each student is expected to attend to at least 50% of the classes. If not he/she will get NA as the final grade.

Classwork

Lectures

Each week all three lectures will be in class and will also be available through zoom synchronously. Most of the students expressed interest in attending to the lecture in class. Our class has 35 seats available. Therefore each week a selected set of 5-6 students will not come to class and follow the lecture through zoom. Attendance will be taken both in class and in zoom. If you have a valid excuse you will be able to follow the lecture through zoom for that week.

Quizzes

You will work on a problem in exam format at the beginning of a class. Quizzes aim to make the students come prepared to lectures.

Labs

In laboratory assignments, you will work on a self-paced problem. At the end of each lab session you must submit your work to Canvas or to TA. In

	some laboratory sessions we can cover lecture material. *Homework* You can discuss the homework with other students but your solution should be developed alone and should not resemble to others. *Project* Doing a course project is optional. The course project may include learning and implementing an advanced algorithm, making performance tests for different programming languages and/or computational platforms, improving an existing algorithm or developing a better algorithm. *Exams* The exams will require you to solve computing problems, which are typically submitted as a text document and/or source codes. You are not allowed to collaborate with others in exams. *Late Submission Policy* It is the student's responsibility to follow the classes and do the assignments on time. Late submissions will be subject to a penalty of 25% if submitted within one week after the due date and %50 if submitted after one week. *Make-Up Policy* There are no make-ups in homework assignments, labs and quizzes. The student may be exempt from these assignments if a written and formal documentation is provided. Possible reasons for excused absences include serious illnesses, illness or death of a family member, university related trips and other serious circumstances. Acceptable documents for claiming an excused absence include medical doctor's statements, petitions related to official university travels, court related documents, etc. If the student misses an exam (midterms or final) he or she can take a make-up exam upon submitting a formal document.
Weekly Schedule	Week 1: Introduction, examples, applications, technologies, getting started, insertion sort Week 2: Merge sort, growth of functions Week 3: Growth of functions, divide and conquer, maximum subarray problem Week 4: Strassen's matrix multiplication algorithm, substitution method Week 5: National holiday (October 29) Week 6: Recursion tree, master method, heap sort Week 7: Midterm exam 1 Week 8: Semester break Week 9: Priority queues, probabilistic analysis and randomized algorithms Week 10: Probabilistic analysis, quicksort

	Week 11: Sorting in linear time Week 12: Midterm exam 2 Week 13: Medians and order statistics Week 14: Medians and order statistics Week 15: Data structures Week 16: Data structures Week 17: Final exam
Instructor	Assoc. Prof. Dr. Zafer Aydın Phone: 0 352 224 8800 / 7256 E-mail: zafer.aydin@agu.edu.tr Office: BA118 Office hours: Through appointment by e-mail
Teaching Assistants	Serkan Seven E-mail: serkan.seven@agu.edu.tr
Academic Honesty	Each student is expected to abide by the Abdullah Gül University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student's own work. Cheating is strictly prohibited and is not allowed in quizzes, homework assignments, midterms and final exam. You can discuss homework problems with other students but every student is required to submit a separate solution. Your submissions will be checked for academic misconduct and proved cheating will guarantee a zero grade and a disciplinary action. You can read the about the student discipline rules and regulations at https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=16532&MevzuatTur=7&MevzuatTertip=5.