



EASTERN MEDITERRANEAN UNIVERSITY
SCHOOL OF COMPUTING AND TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE POLICY SHEET



Course Code	ITEC 415	Course Title	Analysis of Algorithms
Semester	2024-2025 Spring	Language	English
Category	AC (Area Core Course)	Level	Fourth Year
Workload	180 Hours	Teaching Format	3 Hours Lecture, 1 Hour Tutorial / week
EMU Credit	(3,0,1) 3	ECTS Credit	6
Prerequisite(s)	-	Course Web	https://lms.emu.edu.tr

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Course Description

The main aim of this course is to introduce the students to the analysis and the design of algorithms for improving students' analytical thinking skills. The course focuses on algorithms and problem solving techniques. Major concepts include; runtime analysis, complexity analysis of sorting, searching, divide and conquer algorithms, dynamic programming, greedy algorithms, graph algorithms, cryptographic algorithms, and string matching algorithms.

General Learning Outcomes

On successful completion of this course students should be able to:

- Possess the mathematical knowledge and programming skills necessary to analyse the common algorithms.
- Gain insight into algorithmic design and how it is affected by algorithmic logic, structure, and performance.
- Proof techniques and mathematical concepts to demonstrate the correctness and assess the performance of standard algorithms.
- Demonstrate their ability to carry out a complete algorithmic process involving, algorithmic design, analysis, and implementation.
- Analyze certain classes of algorithms, along with models for future algorithmic work.

Teaching Methodology / Classroom Procedures

- Home works will be mostly in the form of programming assignments. A midterm exam and a comprehensive final exam will be held during the exam periods announced in the University's Academic Calendar.
- Attendance is essential for the learning process. Class lectures will not exactly follow the text, so you are expected to attend all classes. While I will not mandate attendance, your regular attendance will be required in order to participate in class. You are accountable for all material covered, all announcements made, and all handouts given out during class.
- Course grades will be a function of your performance in exams as well as of your participation in class.
- Laboratory sessions should also be followed for understanding the real mechanisms of the focused algorithms in the class.

Course Materials / Main References

Text Book:

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, "Introduction to ALGORITHMS", MIT Press. ISBN: 0-262-03141-8 (MIT Press). ISBN: 0-07-013143-0 (McGraw-Hill), sixteenth printing, 1996.

Note: All Lecture notes and lab applications will be published through the internet as *.rar or *.doc or *.ppt formats in the course web site.

Weekly Schedule / Summary of Topics	
Week 1	Introduction: Definition and properties of Algorithms. Design, analysis, and representation of Algorithms. Data abstraction. Pseudo code conventions.
Week 2-3	Growth of functions, NP Completeness.
Week 4	The use of incremental approach, analyses of insertion sort algorithm.
Week 5	The divide and conquer approach, analyses of merge sort algorithm, Towers of hanoi problems and their growing functions.
Week 6	Heaps, maintaining the heap property, build a heap, and heap-sort algorithm.
Week 7	Heaps, maintaining the heap property, build a heap, and heap-sort algorithm, priority queues.
Week 8-9	Midterm Examinations Week
Week 10	Description of quick sort, performance of quick sort algorithm.
Week 11	Randomized versions of quick sort, analysis of quick sort.
Week 12	Analyses of binary search tree, querying a binary search tree, minimum and maximum, successor and predecessor, insertion and deleting.
Week 13	Advance design and analyses techniques. Dynamic programming, Greedy algorithms. NP Completeness
Week 14-15	Graph algorithms, breadth-first tree. Breadth-first search, shortest paths, and depth-first search algorithms. Approximation algorithms (TSP, MST, SP)
Week 16-18	Final Examinations Week

Requirements
- Each student can have only one make-up exam. One who misses an exam should provide a medical report within 3 days after the missed exam. The make-up exam will be done at the end of the term and will cover all the topics. No make-up exam will be given for the quizzes. - Students who do not pass the course and fail to attend the lectures regularly may be given NG grade. - Students are responsible from every subject that will be covered in the class and lab. - Students have to be ready for the quizzes. - Students should attend to the labs and quizzes just on time regularly and submit their assignments. - Instructor Home Page, http://sct.emu.edu.tr/oylum must frequently be visited for the course announcements, the exam/quiz results, labs etc. - Tutorials will also be organized on the selected algorithms.

Method of Assessment				
Evaluation and Grading	Assignments	Quizzes	Midterm Exam	Final Exam
Percentage	20 %	15 %	25 %	40 %

Grading Criteria *											
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
90 -100	85 - 89	80 - 84	75 - 79	70 - 74	65 - 69	60 - 64	56 - 59	53 - 55	50 - 52	40 - 49	0 – 39

* Letter grades will be decided upon after calculating the averages at the end of the semester and distribution of the averages will play a significant role in the evaluation of the letter grades.