GAU, Faculty of Engineering

Course Unit Title	Analysis of Algorithms
Course Unit Code	CEN457
Type of Course Unit	Technical Elective, Computer Engineering Students
Level of Course Unit	4th Year BSc
National Credits	3
Number of ECTS Credits Allocated	6 ECTS
Theoretical (hour/week)	3
Practice (hour/week)	-
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7/8
Course Coordinator	Assist. Prof. Dr. Tamer Tulgar
Name of Lecturer (s)	Assist. Prof. Dr. Tamer Tulgar
Name of Assistant (s)	-
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisities and co-requisities	ENG203 - Computer Programming II
Recommended Optional Programme Components	Basic bacground Computer Programming and Data Structures

Objectives of the Course:

- To introduce the performance issues of algorithms
- To teach divide and conquer, dynamic programming and greedy approaches
- To improve implementation abilities
- To teach advanced algorithm design

Learning Outcomes

When this course has been completed the student should be able to		Assesment.
1	Learn good principles of algorithm design;	1
2	Analyze the resource complexity of an existing algorithm.	1,2
3	Become familiar with fundamental data structures and with the manner in which these data structures can best be implemented;	1
4	Distinguish between Divide and Conquer, Greedy approaches and Dynamic Programming approaches for a problem.	1
5	Design an algorithm for a problem.	1,2,3
6	Code and apply an algorithm for a problem.	1,2,3

Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4.Presentation, 5 Lab. Work

Course's Contribution to Program

		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	4
2	Ability to design and conduct experiments as well as to analyze and interpret data	4
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	1
4	Ability to apply systems thinking in problem solving and system design	5
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	1
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	4
7	Ability to express their ideas and findings, in written and oral form	1
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	4
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	3
10	Ability to apply design and development principles in the construction of software systems	5
11	Ability to find appropriate technical information to solve computer engineering problems	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate 4: High, 5:Very High)

Course Contents

Week			Exams
1	Chapter 1	Introdution	
2		Design Principles	
3	Chapter 2	Recursion	
4		Recursion	
5	Chapter 3	Sorting	
6		Recursive Sorting	
7			Midterm
8	Chapter 4	Dynamic Programming (DP)	
9		DP-Knapsack Alg.	
10		DP-Longest Common Subsequence Alg.	
11		DP-Matrix Chain Multiplication Alg.	
12	Chapter 5	Greedy Algorithms	Quiz
13		Greedy Algorithms	
14		Greedy Algorithms	
15			Final

Recommended Sources

Textbook:
T. H. Cormen, C. E. Leiserson, R. L. Rivest, C. Stein,"Introduction to Algorithms", MIT Press, 3rd Edition, 2009

Supplementary Material (s):
Anany Levitin, "The Design & Analysis of Algorithms", Pearson-Addison Wesley, 2nd Edition, 2007.

Assessment

Attendance	10%	Less than 25% class attendance results in NG grade.
Laboratory	-	
Midterm Exam	30%	Written Exam
Quiz	20%	Written Exam
Final Exam	40%	Written Exam
Total	100%	

ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including the Exam week)	15	3	45
Labs and Tutorials	-	-	-
Assignments	-	-	-
Project/Presentation/Report Writing	5	4	20
E-learning Activities	-	-	-
Quizzes	1	15	15
Midterm Examination	1	15	15
Final Examination	1	15	15
Self Study	15	4	60
Total Workload			170
Total Workload/30 (h)			5.6
ECTS Credit of the Course			6