School of Engineering and Natural Sciences / Electrical and Electronics Engineering (English)

2024 - 2025 Academic Year

DATA STRUCTURES

Syllabus

Course Description					
Name	**Code**	**Semester**	**T+A Hour**	**Credit**	**ECTS**
DATA STRUCTURES	EEE2233850	Spring Semester	3+2	4	8

Prerequisites Courses	PROGRAMLAMAYA GİRİŞ
Recommended Elective Courses	Data Communication and Networking, Object Oriented Programming and Discrete Math
Language of Instruction	English
Course Level	First Cycle (Bachelor's Degree)
Course Type	Elective
Course Coordinator	Prof.Dr. Mehmet Kemal ÖZDEMİR
Name of Lecturer(s)	Assist.Prof. Ahmet KAPLAN
Assistant(s)	Teaching assistant for the lab sessions.
Aim	This course aims to teach how to organize data in a computer so that it can be used for designing efficient algorithms to solve various types of problems. Topics covered include arrays, lists, stacks, queues, trees, heaps, graphs and the use of these data structures for searching, sorting, selection and other related applications. C Programming language will be used for the implementation of data-structures.
Course Content	This course contains; Introduction to data structures and algorithms; Introduction to Basics of C,Functions, Arrays, and Pointers,Strings, Structs, and Memory Allocation,Algorithm analysis and complexity notations,Fundamental data structures: Linked Lists,Abstract data types: Stack,Abstract data types: Queues,Trees and Binary Search Trees,Efficient Binary Trees and Multi-way Search Trees,Priority Queues and Heaps,Graphs,Searching and Sorting,Hashing and Collision,Files and Their Organization.

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
Explain basic principles of algorithm analysis.	12, 21, 6, 9	A
Apply basic data structures, such as arrays, lists, stacks and queues, to algorithmic design	12, 17, 2, 21, 6, 9	A, F
Applys the tree, binary tree, heap, hash tables, and graph data structures in problem solutions	12, 17, 6, 9	A
Choose the right data type for efficient solution of a problem.	12, 17, 2, 6, 9	F
Analyze the accuracy, complexity and efficiency of an algorithmic solution.	17, 2, 21, 6, 9	A, F

Teaching Methods	12: Problem Solving Method, 17: Experimental Technique, 2: Project Based Learning Model, 21: Simulation Technique, 6: Experiential Learning, 9: Lecture Method
Assessment Methods	A: Traditional Written Exam, F: Project Task

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Introduction to data structures and algorithms; Introduction to Basics of C	Book Chapter 1, Lecture Slides 1
2	Functions, Arrays, and Pointers	Book Chapter 1 and 3, Lecture Slides 2
3	Strings, Structs, and Memory Allocation	Book Chapter 4 ve 5, Lecture Slides 3
4	Algorithm analysis and complexity notations	Book Chapter 2, Lecture Slides 4
5	Fundamental data structures: Linked Lists	Book Chapter 6, Lecture Slides 4
6	Abstract data types: Stack	Book Chapter 7, Lecture Slides 6
7	Abstract data types: Queues	Book Chapter 8, Lecture Slides 7
8	Trees and Binary Search Trees	Book Chapter 9, Lecture Slides 8
9	Efficient Binary Trees and Multi-way Search Trees	Book Chapter 10-11, Lecture Slides 9
10	Priority Queues and Heaps	Book Chapter 12, Lecture Slides 10
11	Graphs	Book Chapter 13, Lecture Slides 11
12	Searching and Sorting	Book Chapter 14, Lecture Slides 12
13	Hashing and Collision	Book Chapter 15, Lecture Slides 13
14	Files and Their Organization	Book Chapter 16, Lecture Slides 14

Evaluation Methods	**Weight(%)**
Midterm Exam	30
General Exam	70

Resources

Course Textbook:
Data Structures Using C 2nd Edition
by Reema Thareja
ISBN-10 : 0198099304Supplementary Material:
Data Structures and Algorithms in C++, 4th Edition, Mark A. Weiss,
ISBN: 978-0132847377
Lecture presentations and notes