

Course Description	
Course Code	YZ 205
Course Name	DATA STRUCTURES AND ALGORITHMS
Prerequisite Courses	
Language of the Course	The English
Course Coordinator	
Instructor(s)	
Course Assistants	
The aim of the course	An introduction to practical and formal aspects of data structures. This is a lecture course presenting data structure techniques and laboratory course with programming projects that emphasize methodologies useful for the implementation and empirical evaluation of data types. Also introduces the student to basic algorithmic techniques, to the idea that the time requirements of an algorithm can be analyzed formally, as well as to the more elementary of the mathematical techniques used in the design and analysis of algorithms.
Course Content	Descriptive and analytic introduction to data structures and algorithms. Lists, tables, priority queues, dictionaries data types, structures and classes, stacks, recursion, queues and lists. Data structuring techniques including linked lists, arrays, hashing, trees. Introduction to the design and analysis of efficient algorithms. Basic techniques for analyzing the time requirements of algorithms. Algorithms for sorting, searching, compress-decompress and pattern matching, algorithms for graphs.

Weekly Course Content	
Week 1	Problem solving and algorithm design
Week 2	Algorithm design, flow charts
Week 3	Complexity analysis
Week 4	Sorting algorithms
Week 5	Searching algorithms
Week 6	Linked lists
Week 7	Queue and stack, Hash function
Week 8	Midterm exam.
Week 9	Trees
Week 10	Binary trees, AVL trees
Week 11	B/B+ trees
Week12	Graphs
Week 13	Graph traversal algorithms
Week 14	Shortest path problem
Week 15	Final exam.

Course Learning Outcomes	
1	The ability to use data structures
2	The ability to solve problems using suitable algorithms
3	The ability to use data structures of linked lists
4	The ability to use data structures of stack and queues
5	The ability to use data structures of trees
6	The ability to use data structures of graphs

Contribution of the Course to Program Qualifications			Contribution Level
01	The student will have the ability to apply analytical approach, mathematics and science knowledge in software and engineering issues.		2
02	The student will have the ability to identify, define, formulate and solve a problem in software and computer systems.		2
03	The student will have gains scientific research skills in software and engineering problems, has the ability to design a system, part or process.		2
04	The student will have the ability to use the design capability, techniques and tools required for engineering applications.		4
05	The student will have the ability to design, implement and interpret experimental work and software projects by analyzing the results.		5
06	The student will have the ability to work between disciplines and teamwork.		1
07	The student will have the ability to work in international environments and adapt to different cultures.		5
08	The student will have verbal and written communication skills in Turkish and English.		3
09	The student will have the awareness of the necessity of lifelong learning and the ability to realize it.		4
10	The student will gain knowledge of legal issues with the awareness of professional and ethical responsibility.		1
11	The student will have managerial skills (leadership, organization, time and risk management, quality awareness, efficiency, etc.).		4
12	The student will have the ability to participate in social activities, to acquire regular sports habits and to use time in the best way.		2
13	The student will have the ability to find unusual ways and produce projects.		5
14	The student will have professional self-confidence, being an entrepreneur and taking initiative.		2
15	It is sensitive about the problems of the age and looks after the national interests.		5

ECTS WORKLOAD			
	Number	Duration (hours)	Number*Duration
Face to face education	14	3	42
Out-of-class study time (pre-study, reinforcement)	10	3	30
Homeworks	2	10	20
Presentation / Seminar preparation	0	0	0
Quizzes	0	0	0
Preparation for midterm exams	1	7	7
midterm exams	1	2	2
Project (Semester assignment)	0	0	0
Lab	0	0	0
field work	0	0	0
Preparation for the final exam	1	14	14
Semester final exam	1	2	2
Research	0	0	0
TOTAL WORKLOAD			117
ECTS			4

Evaluation			
SEMESTER EVALUATION		Number	Contribution Percentage
Midterm		1	20
Quiz		0	0
Homework		2	20
SEMESTER TOTAL			40

Contribution rate of mid-term evaluations to success		40
Contribution rate of the final exam to success		60
GRAND TOTAL		100

RESOURCES	
Textbook	Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, The Benjamin/Cummings Publishing Company
Helpful Resources	-