

**OSTİM TECHNICAL UNIVERSITY
FACULTY OF ENGINEERING**

**COURSE SYLLABUS FORM
2020-2021**

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CENG 205 Data Structures and Algorithms							
Course Name	Course Code	Period	Hours	Application	Laboratory	Credit	ECTS
Data Structures and Algorithms	CENG205	1	4	0	0	3	4

Language of Instruction	English
Course Status	Compulsory
Course Level	Bachelor
Learning and Teaching Techniques of the Course	Lecture, Discussion, Question Answer, Practice

Course Objective
The objective of this course is to provide an introduction to basic data structures, and algorithms for manipulating them, by using C programming language. This course specifically has the following objectives: The fundamental design, analysis, and implementation of basic data structures and algorithms; The analysis and evaluation of the data structure needs of particular problems; The design, analysis, and implementation of C programs by using basic data structures and algorithms

Learning Outcomes
<ol style="list-style-type: none"> 1. Apply advance C programming techniques such as pointers, dynamic memory allocation, structures to developing solutions for particular problems; 2. Design and implement abstract data types such as linked list, stack, queue and tree by using C as the programming language using static or dynamic implementations; 3. Analyse, evaluate and choose appropriate abstract data types and algorithms to solve particular problems; 4. Design and implement C programs that apply abstract data types.

Course Outline
This course provides the classification of data structures, space and time considerations. Linked lists, stacks and queues. Tree structures, binary search trees. Array and pointer based implementations. Recursive applications. Sorting and searching.

Weekly Topics and Related Preparation Studies		
Weeks	Topics	Preparation Studies
1	Introduction: Pointers, Dynamic memory allocation, pointers and arrays, structures	Chapter 1
2	Basic concepts for data structures, performance analysis, space and time complexity	Chapter 2
3	Algorithms Analysis	Chapter 2
4	Lists, Stacks, and Queues	Chapter 3
5	Lists, Stacks, and Queues	Chapter 4
6	Sorting	Chapter 4
7	Sorting	Chapter 5
8	Midterm Exam	
9	Trees	Chapter 6
10	Trees	Chapter 6
11	Graph Algorithms	Chapter 7
12	Graph Algorithms	Chapter 7
13	Hashing and Pattern Matching	Chapter 7
14	Connected Components, Directed Graphs and Topological Sort Algorithm	Chapter 8
15	Review for final Exam	Chapter 8
16	Final Exam	

Textbook(s)/References/Materials:
Algorithms and Data Structures © N. Wirth
Algorithms, 4th Edition, R. Sedgewick and K. Wayne, Addison-Wesley Professional, 2011

Assessment		
Studies	Number	Contribution margin (%)
Continuity	10	80
Lab		
Application		
Field Study		
Course-Specific Internship (if any)		
Quizzes / Studio / Critical	6	60
Homework		
Presentation		
Projects		
Report		
Seminar		
Midterm Exams / Midterm Jury		
General Exam / Final Jury	1	40
	Total	100
Success Grade Contribution of Semester Studies		
Success Grade Contribution of End of Term		
	Total	100

Relationship Between Course Learning Outcomes and Program Competencies						
Nu	Learning Outcomes	Contribution Level				
		1	2	3	4	5
1	An ability to apply knowledge of science, mathematics, and engineering.				x	
2	An ability to design energy systems, components, or processes to meet industrial needs.					x
3	An ability to work with multi-disciplinary teams.			x		
4	An ability to identify, formulate, and solve engineering problems.				x	
5	Take responsibility to solve unpredictable and complex problems encountered in applications as an individual and as a member of a team				x	
6	plan and manage activities in teamwork				x	
7	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.				x	
8	Can do research on interdisciplinary fields.			x		

ECTS / Workload Table			
Activities	Number	Duration (Hours)	Total Workload
Course hours (Including the exam week: 16 x total course hours)	16	3	48
Laboratory			
Application			
Course-Specific Internship			
Field Study			
Study Time Out of Class	14	2	28
Presentation / Seminar Preparation			
Projects			
Reports			
Homeworks	5	6	30
Quizzes / Studio Review	6	2	12
Preparation Time for Midterm Exams / Midterm Jury	2	15	30
Preparation Period for the Final Exam / General Jury	1	15	15
Total Workload			163