OSTIM TECHNICAL UNIVERSITY
FACULTY OF ENGINEERING

COURSE SYLLABUS FORM
2020-2021

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	6

Language of Instruction	English
Course Status	Compulsory
Course Level	Bachelor
Course Lecturer(s)	Dr. Güney GÜRSEL
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 f 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

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 Releated 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		
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		60
Success Grade Contribution of End of Term		40
	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	5	25
Quizzes / Studio Review	6	1	6
Preparation Time for Midterm Exams / Midterm Jury	2	15	30
Preparation Period for the Final Exam / General Jury	1	15	15
Total Workload	**(ECTS 152/25 = 6,08)**		**152**