<table>
<tr><th colspan="2">COURSE DESCRIPTION FORM</th></tr>
<tr><td>Course Code and Name</td><td>CENG205 DATA STRUCTURES</td></tr>
<tr><td>Course Semester</td><td>3</td></tr>
<tr><td>Catalogue Data of the Course (Course Content)</td><td>Introduction to data structures, pointers, arrays, stacks, queues, linked lists, binary trees, binary search trees, balanced trees, priority queues, graphs, hashing</td></tr>
<tr><td>Course Textbooks</td><td>1. Data Structures and Algorithm Analysis in C++. 4th Edition. Mark Allen Weiss, Pearson, 2014.</td></tr>
<tr><td>Supplementary Textbooks</td><td>1. Data Structures and Algorithms in C++ 2nd Edition by Michael T. Goodrich, Roberto Tamassia , David M. Mount, 2011.
2. Fundamentals of Data Structures in C++. Ellis Horowitz, Sartaj Sahni, and Susan Anderson-Freed, Computer Science Press, 1995.
3. Data Structures Using C and C++. 2nd Edition. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, Prentice-Hall International Inc., 1996.</td></tr>
<tr><td>Credit (ECTS)</td><td>6</td></tr>
<tr><td>Prerequisites for the Course (Attendance Requirements)</td><td>BM101 Computer Programming</td></tr>
<tr><td>Course Type</td><td>Compulsory</td></tr>
<tr><td>Language of Instruction</td><td>English</td></tr>
<tr><td>Course Objectives</td><td>To teach the basics of data structures and to select suitable data structures for efficient solutions.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Explains and implements basic data structures.
2. Uses basic data structures in problem solving.
3. Decides on the most appropriate data structure for problem solving.</td></tr>
<tr><td>Instruction Method
(Face-to-face, Distance education etc.)</td><td>The mode of delivery of this course is face to face</td></tr>
<tr><td>Weekly Schedule of the Course</td><td>Week 1: Introduction to data structures
Week 2: Performance analysis
Week 3: Pointers and multi-dimensional arrays
Week 4: Special matrices
Week 5: Stacks and queues
Week 6: Array based linked lists
Week 7: Singly and doubly linked lists
Week 8: Example uses of linked lists
Week 9: Binary trees
Week 10: Binary search trees
Week 11: Balanced trees
Week 12: Priority queues
Week 13: Graphs
Week 14: Hashing</td></tr>
<tr><td>Teaching Activities
(The time spent for the activities listed here will determine the amount of credit required)</td><td>Weekly theoretical course hours: 3
Weekly practical course hours: 2
Reading activities
Internet search and library work
Midterm and revision for midterm
Final exam and revision for final exam</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Number(s)</th><th>Weight (%)</th></tr>
<tr><td>Midterm exam</td><td>1</td><td>30</td></tr>
<tr><td>Assignment</td><td>0</td><td>0</td></tr>
<tr><td>Application</td><td>6</td><td>30</td></tr>
<tr><td>Project</td><td>0</td><td>0</td></tr>
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	Practice	0	0
	Quiz	0	0
	Final exam	1	40
	Total	8	100

Workload of the Course

Activity	Number of Weeks	Duration (Weekly Hour)	End of Semester Total Workload
Weekly theoretical course hours	14	3	42
Weekly practical course hours	14	2	28
Reading activities	11	2	22
Internet search and library work	11	3	33
Designing and implementing materials	0	0	0
Making a report	0	0	0
Preparing and making presentations	0	0	0
Midterm and revision for midterm	1	10	10
Final exam and revision for final exam	1	15	15
Total workload			150
Total workload/ 25			6
Course Credit (ECTS)			6

Contribution Level between Course Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Knowledge of mathematics, science, basic engineering, computing, and computer engineering; ability to use this knowledge in solving complex engineering problems.					X
2	Ability to define, formulate and analyze complex engineering problems using basic science, mathematics and engineering knowledge and considering the UN Sustainable Development Goals relevant to the problems addressed.				X	
3	Ability to design creative solutions to complex engineering problems; ability to design complex systems, processes, devices, software, algorithms or products to meet current and future requirements, considering realistic constraints and conditions.					X
4	Ability to select, use and develop appropriate techniques, resources and modern engineering and informatics tools, including estimation and modeling, for the analysis and solution of complex engineering problems while being aware of their limitations.				X	
5	Ability to use research methods to examine complex engineering problems or research topics in computer engineering, including reviewing the literature, designing experiments, conducting experiments, collecting data, analyzing and interpreting results.			X		
6	Knowledge of the effects of engineering practices and the standards used in these practices on society, health and safety, economy, sustainability and environment within the scope of the UN Sustainable Development Goals; awareness of the consequences of engineering solutions in the fields of information security and law.					
7	Acting in accordance with engineering		X			

	professional principles and knowledge on ethical responsibility; awareness of acting impartially, without discrimination on any issue, and being inclusive of diversity.						
8	Ability to work effectively individually and as a team member or leader in intradisciplinary and multidisciplinary teams (face-to-face, remote, or hybrid).		X				
9	Ability to conduct effective verbal and written communication on technical issues in Turkish or English, prepare reports, make effective presentations and prepare software documentation, considering the various differences of the target audience (such as education, language, profession).		X				
10	Knowledge of business practices such as project, risk and change management and economic feasibility analysis; awareness of entrepreneurship and innovation.						
11	Lifelong learning skill that includes the ability to learn independently and continuously, to adapt to new and developing scientific practices and technologies, and to think inquisitively about technological changes.						

Lecturer(s) and Contact Information	Assist. Prof. Dr. Öner BARUT onerbarut@gazi.edu.tr