COURSE DESCRIPTION FORM	
Course Code and Name	CENG358 GRAPH THEORY (TECH.ELECT.)
Course Semester	6
Catalogue Data of the Course (*Course Content*)	Definition of graph, history, theoretical and practical application areas. Definition of basic graphs, Representation of graphs in computer environment. Node-arc contiguity and node-arc relation matrices, Representation forms of graphs in computer environment. Maximal flow problems, shortest path problem, planar graphs and graph coloring, transport-transfer-assignment and mapping problems, connectivity and distance, node-arc contiguity and node-arc relation matrices, trees, activity graphs
Course Textbooks	Discrete Mathematics with Graph Theory 3/E, Edgar G. Goodaire, Michael M. Permanter, Prentice Hall, 2005.
Supplementary Textbooks	- Graph Theory and its applications 2/E, J.L. Gross, J. Yellon, Chapman and Hall/CRC, 2005. - Graph Theory: A Problem Oriented Approach, Daniel Marcus, The Mathematical Association of America, 2008.
Credit (*ECTS*)	6
Prerequisites for the Course (*Attendance Requirements*)	-
Course Type	Technical Elective
Language of Instruction	English
Course Objectives	To provide knowledge about graph, history, theoretical and practical application areas. Definition of basic graphs, Representation of graphs in computer environment. Node-arc contiguity and node-arc relation matrices, Representation forms of graphs in computer environment. Maximal flow problems, shortest path problem, planar graphs and graph coloring, transport-transfer-assignment and mapping problems, connectivity and distance, node-arc contiguity and node-arc relation matrices, trees, activity graphs
Course Learning Outcomes	The usage of graphs in discrete optimization and modeling with graphs.
Instruction Method *(Face-to-face, Distance education etc.)*	The mode of delivery of this course is face to face
Weekly Schedule of the Course	Week 1: Introduction: description, history, applications in theoretical and practical areas. Week 2: Algorithms: basic definitions, computational complexity, pseudo codes. Week 3: Representation of graphs on computers. Node-arc incidence and node-arc adjacency matrices. Week 4: Trees: basic definitions. Types of trees. Week 5: Spanning trees: Kruskal, Prim and Sollin algorithms. Week 6: Path, tour and circuits: Eulerian tour and related problems. Week 7: Path, tour and circuits: Hamiltonian tour and related problems. Week 8: Maximum flow I: acyclic networks Week 9: Maximum flow II: unidirectional networks. Week 10: Shortest path problems Week 11: Planar graphs and graph coloring Week 12: Transportation, assignment and matching problems. Week 13: Connectedness and distance in graphs. Week 14: Activity graphs
Teaching Activities *(The time spent for the activities listed here will determine the amount of credit required)*	Weekly theoretical course hours Reading activities Internet search and library work Designing and implementing materials Making a report Preparing and making presentations Midterm and revision for midterm Final exam and revision for final exam

Assessment Criteria

	Number(s)	Weight (%)
Midterm exam	1	45
Assignment	3	15
Application		
Project		
Practice		
Quiz		
Final exam	1	40
Total	5	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	0	0	0
Reading activities	10	2	20
Internet search and library work	5	4	20
Designing and implementing materials	5	3	15
Making a report	2	4	8
Preparing and making presentations	4	6	12
Midterm and revision for midterm	1	15	15
Final exam and revision for final exam	1	18	18
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			X		

		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 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.				X	
	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.					X
Lecturer(s) and Contact Information	Assist. Prof. Dr. Yılmaz Atay yilmazatay@gazi.edu.tr						