Course Description Form	
Course Code and Name	CENG358 GRAPH THEORY (TECH.ELECT.)
Course Semester	6
Catalog 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
Textbook	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	6
Prerequisites of the Course **(** *Attendance Requirements***)**	-
Type of the Course	Technical Elective
Instruction Language	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 and modeling of graphs in discrete in mathematics..
Instruction Methods	The mode of delivery of this course is face to face
Weekly Schedule	1.Week: Introduction: description, history, applications in theoretical and practical areas. 2.Week: Algorithms: basic definitions, computational complexity, pseudo codes. 3.Week: Representation of graphs on computers. Node-arc incidence and node-arc adjacency matrices. 4.Week: Trees: basic definitions. Types of trees. 5.Week: Spanning trees: Kruskal, Prim and Sollin algorithms. 6.Week: Path, tour and circuits: Eulerian tour and related problems. 7.Week: Path, tour and circuits: Hamiltonian tour and related problems. 8.Week: Maximum flow I: acyclic networks 9.Week: Maximum flow II: unidirectional networks. 10.Week: Shortest path problems 11.Week: Planar graphs and graph coloring 12.Week: Transportation, assignment and matching problems. 13.Week: Connectedness and distance in graphs. 14.Week: Activity graphs

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly Theoretical Course Hours: 3
Reading Tasks
Studies
Material Design and Implementation
Report Preparing
Preparing a Presentation
Presentations
Midterm Exam and Preparation for Midterm Exam
Final Exam and Preparation for Final Exam

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	45
Assignment	3	15
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		60
Percentage of Final Exam to Total Score (%)		40
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	0	0	0
Reading Tasks	10	2	20
Studies	5	4	20
Material Design and Implementation	5	3	15
Report Preparing	2	4	8
Preparing a Presentation	2	3	6
Presentations	2	3	6
Midterm Exam and Preparation for Midterm Exam	1	15	15
Final Exam and Preparation for Final Exam	1	18	18
Other (should be emphasized)	0	0	0
Total Workload			150
Total Workload / 25			6
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Sufficient knowledge on mathematics, science and computer engineering; ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems					X
2	Ability to identify, define, formulate and solve complex engineering problems; ability to choose and apply appropriate analysis and modelling methods for these purposes					X

	3	Ability to design a complex system, process, device, software, algorithm, or product under realistic constraints and circumstances to meet certain requirements; ability to apply modern design techniques for this purpose					X
	4	Ability to choose, develop and use modern techniques and tools necessary for engineering applications; ability to effectively use computing technologies					X
	5	Ability to design and implement systems or experiments to solve engineering problems, collect and interpret data to evaluate and analyze the results of solutions					X
	6	Ability to work effectively in intradisciplinary and interdisciplinary teams or individually			X		
	7	Ability to efficiently prepare, evaluate and interpret reports			X		
	8	Ability to make presentations and conduct effective verbal and written communication in Turkish and English			X		
	9	Awareness of the necessity of lifelong learning; ability to access information, follow scientific and technological developments; ability to perpetually renew oneself				X	
	10	Awareness of professional and ethical responsibility, ability to act in accordance with ethical principles		X			
	11	Ability to apply knowledge on project management, risk management and change management			X		
	12	Awareness of entrepreneurship and innovation, ability to design and build	X				
	13	Ability to devise local and global solutions to contemporary issues considering the effects of engineering applications on health, environment and security		X			
	14	Awareness of the legal consequences of engineering solutions	X				
	15	Ability to apply knowledge on software development process and documentation rules	X				
	16	Knowledge on standards used in engineering applications	X				
	17	Awareness of occupational health and security, information security and privacy	X				
The Course's Lecturer(s) and Contact Information		Prof. Dr. M. Ali AKCAYOL akcayol@gazi.edu.tr					