<table>
<tr><th colspan="2">COURSE DESCRIPTION FORM</th></tr>
<tr><td>Course Code and Name</td><td>CENG376 COMPUTER GRAPHICS (TECH.ELECT.)</td></tr>
<tr><td>Course Semester</td><td>6</td></tr>
<tr><td>Catalogue Data of the Course (Course Content)</td><td>Introduction to computer graphics for games, computer graphics with WebGL, graphics pipeline, mathematical and geometric graphics operations, 3D transformations, interactive applications with WebGL, camera and projection properties, color systems, light systems, texture systems, material properties</td></tr>
<tr><td>Course Textbooks</td><td>1. Interactive Computer Graphics: A Top-Down Approach with WebGL, 8th Edition, Edward Angel, Dave Shreiner, Pearson, 2020.</td></tr>
<tr><td>Supplementary Textbooks</td><td>1. Fundamentals of Computer Graphics, 5th Edition, Steve Marschner, Peter Shirley, A K Peters/CRC Press, 2021.
2. WebGL Programming Guide: Interactive 3D Graphics Programming with WebGL (OpenGL) 1st Edition by Kouichi Matsuda (Author), Rodger Lea, 2013.</td></tr>
<tr><td>Credit (ECTS)</td><td>6</td></tr>
<tr><td>Prerequisites for the Course (Attendance Requirements)</td><td>There is no prerequisite or co-requisite for this course.</td></tr>
<tr><td>Course Type</td><td>Technical Elective</td></tr>
<tr><td>Language of Instruction</td><td>English</td></tr>
<tr><td>Course Objectives</td><td>To teach the basics of computer graphics, how to express information to create images, how to create images with 2D/3D scenes, and how to create animated graphics with user interaction.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Gives information about current graphics systems.
2. Can create graphics for 2D/3D scenes.
3. Can create animated graphics with user interaction.
4. Can use WebGL and related libraries.</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: Overview of computer graphics
Week 2: Principles of rendering
Week 3: WebGL features and working principle
Week 4: Programmable graphics pipeline
Week 5: GLSL programs and features
Week 6: Creating 2D-3D graphics
Week 7: Input processing and interaction
Week 8: Interactive WebGL applications
Week 9: Coordinate systems and transformations
Week 10: 3D models and their visualization
Week 11: Projections and camera features
Week 12: Shadow creation techniques
Week 13: Shading, materials and lighting
Week 14: Textures and texturing</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
Reading activities
Internet search and library work
Designing and implementing materials
Midterm and revision for midterm
Final exam and revision for final exam</td></tr>
<tr><td>Assessment Criteria</td><td>
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<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>3</td><td>30</td></tr>
<tr><td>Application</td><td>0</td><td>0</td></tr>
<tr><td>Project</td><td>0</td><td>0</td></tr>
<tr><td>Practice</td><td>0</td><td>0</td></tr>
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Quiz	0	0
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	11	3	33
Internet search and library work	11	3	33
Designing and implementing materials	3	6	18
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	14	14
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.		X			
7	Acting in accordance with engineering professional principles and knowledge on		X			

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