COURSE DESCRIPTION FORM	
Course Code and Name	CENG448 COMPUTER VISION (TECH.ELECT.)
Course Semester	8
Catalogue Data of the Course (*Course Content*)	Image formation, image color spaces, image representation, reshaping, filtering, convolution, edge detection, corner detection, basic matching techniques, image features, optical flow, 3D computer vision, artificial neural networks for computer vision, convolutional neural networks and applications.
Course Textbooks	Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer. 2nd edition.
Supplementary Textbooks	Linda G. Shapiro, George C. Stockman, "Computer Vision", Prentice Hall, 2001
Credit (*ECTS*)	6
Prerequisites for the Course (*Attendance Requirements*)	-
Course Type	Technical Elective
Language of Instruction	English
Course Objectives	To introduce the concepts and applications of computer vision, to provide a basis for computer vision applications.
Course Learning Outcomes	1. Having knowledge about the basics and problems of computer vision. 2. Understanding basic feature extraction techniques in computer vision. 3. Having a background in computer vision learning-based approaches. 4. Implementing a computer vision method for real-world tasks.
Instruction Method *(Face-to-face, Distance education etc.)*	The mode of delivery of this course is face to face.
Weekly Schedule of the Course	1.Week: Introduction to Computer Vision 2.Week: Visual world, Human vision, color spaces 3.Week: Image coordinates, resizing 4.Week: Image resizing, filtering, and convolution 5.Week: Edge Finding 6.Week: Corner finding, matching, Ransac 7.Week: SIFT, HoG 8.Week: Optical Flow 9.Week: 3D Computer Vision, depth and stereo 10.Week: Introduction to learning-based vision Introduction to learning-based vision 11.Week: Artificial Neural Networks 12.Week: Convolutional Neural Networks 13.Week: Convolutional Neural Network applications 14.Week: Convolutional Neural Network applications
Teaching Activities *(The time spent for the activities listed here will determine the amount of credit required)*	Weekly theoretical course hours 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	30
Assignment		
Application		
Project	1	30
Practice		

	Quiz		
	Final exam	1	40
	Total	3	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	0	0	0
Internet search and library work	10	5	50
Designing and implementing materials	5	5	25
Making a report	1	8	8
Preparing and making presentations	1	5	5
Midterm and revision for midterm	1	10	10
Final exam and revision for final exam	1	10	10
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 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. Ceren Güzel Turhan cerenguzel@gazi.edu.tr