

COURSE DESCRIPTION FORM			
Course Code and Name	CENG471 INTRODUCTION TO IMAGE PROCESSING (TECH.ELECT.)		
Course Semester	7		
Catalogue Data of the Course (Course Content)	Basics of image processing, image sensing and image capturing, image quality enhancing, noise reduction, image blurring and sharpening.		
Course Textbooks	Gonzalez R.C., Woods R.E., Digital Image Processing, 2nd Edition, Prentice Hall 2002.		
Supplementary Textbooks	Szeliski R., Computer Vision: Algorithms and Applications, Springer, 2010		
Credit (ECTS)	6		
Prerequisites for the Course (Attendance Requirements)	-		
Course Type	Elective		
Language of Instruction	English		
Course Objectives	Teaching the basic concepts of image processing, explain the properties of image processing algorithms to be able to solve image processing problems.		
Course Learning Outcomes	<ol style="list-style-type: none"> 1. Explains the basics of image processing 2. Applies point based image processing operations. 3. Implement spatial domain and frequency domain filters. 4. Implement image restoration techniques. 5. Applies image processing algorithms in real world scenarios 		
Instruction Method (Face-to-face, Distance education etc.)	Face-to-face		
Weekly Schedule of the Course	Week 1: Basics of Image Processing Week 2: Image formation, sampling and quantization Week 3: Color perception and color spaces Week 4: Point operations Week 5: Image enhancement techniques Week 6: Spatial filtering Week 7: Image smoothing Week 8: Edge detection and sharpening Week 9: Frequency domain image processing Week 10: Binary image analysis Week 11: Morphological image processing Week 12: Image segmentation Week 13: Deep learning based image processing applications Week 14: Advanced topics and trends in image processing		
Teaching Activities (The time spent for the activities listed here will determine the amount of credit required)	Weekly theoretical course hours: 3 Reading activities Internet search and library work 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						
	Reading activities	14	2	28			
	Internet search and library work	14	2	28			
	Designing and implementing materials						
	Making a report	1	10	10			
	Preparing and making presentations	1	10	10			
	Midterm and revision for midterm	1	20	20			
	Final exam and revision for final exam	1	20	20			
	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).				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	Lecturer's First/Last Name: Asst. Prof. Dr. Tuba ÇAĞLIKANTAR E-mail address: tubac@gazi.edu.tr						