



ESOGÜ Electrical-Electronics Engineering Department

COURSE CODE:151227522-151247522 COURSE TITLE:Intro. to Image Processing

Semester	Weekly Hours		COURSE				
	Theoretical	Practical	Credits	ECTS	Type	Language	
7	3	0	3	5	Compulsory () Elective (✓)	Turkish () English (✓)	
Write the credit (for non-credit courses weekly hours) below (If necessary distribute the credits.).							
Math and Basic Science		Electrical Engineering [mark (✓) if there is high design content]		General Education		Humanities	
		()					
Assessment		THEORETICAL-PRACTICAL COURSES			LABORATORY COURSES		
Midterm		Type	Number	%	Activity Type	Number	%
		Midterm	1	30	Quiz		
		Quiz			Lab performance		
		Homework	5	25	Report		
		Project	1	20	Oral exam		
Final			1	25	Other (.....)		
Makeup exam (Oral/Written)							
Prerequisites		SYSTEMS AND SIGNALS					
Brief content of the course		Components of an image processing system and its applications, Low level image processing, Image histograms and gray level transformation, Spatial filters, Color Spaces, Image enhancement, Image morphology, Edge detection, Segmentation, Introduction to computer vision					
Objectives of the course		<ol style="list-style-type: none"> 1. To introduce students basic principles of two dimensional digital signal processing and the application of these principles to images 2. To provide students the mathematical background of image processing 3. To introduce students implementation methods that adress common problems in image processing 4. To encourage students formulate real life image processing applications and implement solutions 					
Contribution of the course towards professional education		<ol style="list-style-type: none"> 1. To introduce students basic principles of two dimensional digital signal processing and the application of these principles to images 2. To provide students the mathematical background of image processing 3. To introduce students implementation methods that adress common problems in image processing 4. To encourage students formulate real life image processing applications and implement solutions 					
Outcomes of the course		<ol style="list-style-type: none"> 1. Learning the theoretical background for digital image processing. 2. Implementing basic image manipulation and analysis techniques. 3. Recognizing solution methods to basic image processing problems. 					
Textbook of the course		Rafael C. Gonzalez and Richard E. Woods, “Digital Image Processing”, Third Ed., Prentice-Hall, 2008.					
Other reference books		R.C. Gonzalez, R.E. Woods, S.L. Eddins, “Digital Image Processing using MATLAB”, Prentice-Hall, 2004. W. Pratt, Digital Image Processing, 3rd edition, John Wiley & Sons, 2001					
Required material for the course		MATLAB, MATLAB Image Processing Toolbox					

WEEKLY PLAN OF THE COURSE	
Week	Topics
1	Introduction, basic concepts, image processing applications
2	Representation formats of images, scaling, translation and rotation of images, sums and differences
3	Contrast and grey levels, histograms, intensity transforms, equalization
4	Spatial filtering, convolution, simple filters, Gaussian and other non-linear filters, image enhancement
5	Filtering in the frequency domain, power spectral density, the FFT, noise removal
6	Color basics, color spaces
7	Image morphology, morphological operations, dilation, erosion, opening, closing
8	Midterm
9	Midterm
10	Image morphology, extraction of connected components, convex hull, contour extraction
11	Thresholding, clustering, segmentation, edge detection
12	Region based segmentation, region growing
13	Introduction to computer vision, shape analysis, extraction of shape-based features
14	Introduction to computer vision, texture analysis, extraction of texture-based features
15,16	Final

NO	OUTCOMES OF THE PROGRAMME	4	3	2	1
1	Adequate knowledge of mathematics, science and Electrical and Electronic Engineering; ability to practice theoretical and practical knowledge of these areas into modeling and solving complex problems of Electrical and Electronic Engineering		X		
2	Ability to identify complex engineering problems in Electrical and Electronic Engineering and related fields, for this purpose having skills to formulate, select and apply appropriate methods.	X			
3	Having skills to apply modern design methods to design a complex system, process, equipment or product that should work under realistic conditions and constraints and satisfy specific requirements concerning the Electrical and Electronic Engineering.		X		
4	Having skills to develop, select and apply modern techniques and tools needed to analyze and solve complex applications in Electrical and Electronic Engineering, skills to use information technology effectively.	X			
5	Skills to design and conduct tests, collect data, analyze results, and interpret data for the experimental investigation of complex problems in Electrical and Electronic Engineering				X
6	Ability to function effectively as an individual and as a member of teams within the discipline and in multidiscipline areas.				X
7	Communicating effectively in oral and written form both in Turkish and English. Effective report writing and understanding written reports, preparing design and manufacturing reports, making effective presentations, skills to give and receive clear and concise instructions.				X
8	Awareness of the necessity of lifelong learning, access to information, monitoring developments in science and technology and the ability to self-renewing				X
9	Understanding of professional and ethical responsibility				X
10	Information on project management, change management and risk management practices, awareness on entrepreneurship and innovation, knowledge on sustainable development.				X
11	Information about universal and societal effects of engineering applications on health, safety and environment; awareness of the legal consequences of engineering solutions.				X

Scale for assessing the contribution of the course to the program outcomes:

4: High 3: Medium 2: Low 1:None

Name of Instructor(s): Yrd. Doç. Dr. Helin Dutağacı

Signature(s):

Date: