COURSE RECORD

Code	ECE 530
Name	Digital Image Processing
Hour per week	3+0
Credit	3
ECTS	7,5
Level/Year	Graduate
Semester	Fall-Spring
Type	Elective
Location	
Prerequisites	Signal Processing
Special Conditions	
Coordinator(s)	Assist. Prof. Kasım Taşdemir
Webpage	
Content	The principle objectives of this course are to provide an introduction to basic concepts and methodologies for digital image processing, and to develop a foundation that can be used as the basis for further study and research in this field.
Objectives	- An ability to understand, analyze and modify the structure of digital images acquired from various types of sensors - An ability to enhance the quality of the digital images by using various filters in both spatial and frequency domains - An ability to analyze different kinds of noises and to eliminate the noise using image restoration and reconstruction tools - An ability to carry out morphological operations on digital images - An ability to segment regions with particular properties using various image segmentation tools
Learning Outcomes	LO1 Explaining how digital images are represented and manipulated in a computer, including reading and writing from storage, and displaying. LO2 Implementing fundamental image processing algorithms. LO3 Understanding mathematical description of image processing techniques LO4 Apply principles and techniques of digital image processing in applications related to digital imaging system design and analysis.
Requirements	Signal Processing background
Reading List	Course Textbook: Rafael C. Gonzalez, "Digital Image Processing", Prentice Hall, 3rd edition, 2008 Additional Materials: Gonzalez, et al., "Digital Image Processing Using MATLAB", Gatesmark Publishing, 2nd edition, 2009 William K. Pratt, "Digital Image Processing: PIKS Scientific Inside", Wiley, 4th edition, 2006, Edward R. Dougherty, "Random Processes for Image Signal Processing", Wiley, 1998
Ethical Rules and Course Policy	

LEARNING ACTIVITIES

Activities	Number	Weight (%)
Lecture	42	25%
Homework	4	25%
Presentation	1	25%

Term Project	1		25%
		Total	100

ASSESSMENT

Evaluation Criteria	Weight (%)
Quizzes	10%
Homework	20%
Term Project	20%
Midterm Exam	20%
Final Exam	30%
Total	100%

For a detailed description of grading policy and scale, please refer to the website https://goo.gl/HbPM2y section 28.

COURSE LOAD

Activity	Duration (hour)	Quantity	Work Load (hour)
Project	50	1	50
Research (web, library)	5	12	60
Pre-work for Presentation	20	1	20
Exams	20	2	40
Homework	10	4	40
In class activity	3	14	42
		General Sum	**294**

ECTS: 7,5 (Work Load/25-30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
LO1	5	5	5	5	5	5	5	5	5	5	5	5	5	5
LO2	2	5	5	5	5	5	5	5	5	5	5	5	5	5
LO3	2	2	2	2	2	2	2	5	3	5	5	5	5	3
LO4	5	5	5	5	5	5	5	5	5	5	5	5	5	5

* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

WEEKLY SCHEDULE

W	Topic	Outcomes
1	Overview of Digital Image Processing applications,	LO1, LO4
2	Image sampling and quantization, Relation of the pixels	LO1, LO2, LO4
3	Intensity transformations, histogram processing, spatial filters	LO1, LO2, LO4
4	Fourier transform of sampled functions, Discrete Fourier Transform (DFT) and properties of 2D DFT	LO1, LO2, LO4
5	Filtering in frequency domain	LO1, LO2, LO4
6	Filtering in frequency domain (Continued)	LO1, LO2, LO4
7	Image restoration	LO1, LO2, LO4
8	Midterm Exam	LO1, LO2, LO3, LO4
9	Morphological operations	LO1, LO2, LO4
10	Morphological operations (Continued)	LO1, LO2, LO3, LO4
11	Image segmentation and thresholding	LO1, LO2, LO3, LO4
12	Image segmentation and thresholding(Continued)	LO1, LO2, LO3, LO4
13	Object recognition	LO1, LO2, LO3, LO4
14	Final Exam	LO1, LO2, LO4

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