	Course name: EE409 Digital Image Processing	Department: Electrical and Electronics Engineering	Semester
			7
	Methods of Education		Credit (ECTS)
	Lecture	Study Time	Mini Projects	Exam (incl. Preparation)	Total	5
	42	35	40	30	147	

Language	English
Compulsory/Elective	Elective
Prerequisites	None
Course Contents	2D signals, images, image sensing and image formation, image processing in spatial and frequency domain, image enhancement, noise filtering, restoration and reconstruction, edge detection, binary image processing, morphological operations, color spaces and conversion, image encoding and compression
Course Objective	To gain necessary skills to apply digital image processing techniques to applications which arise in electrical engineering and computer science.
Learning Outcomes and Competences	**Students who pass the course will be able to:** – Understand imaging techniques and image formation – Apply different image processing techniques in spatial and frequency domain – Understand the image enhancement problem and apply enhancement techniques – Understand the image restoration problem and apply restoration techniques – Understand image encoding and compression
Textbook and /or References	1. "Digital Image Processing", 3rd Ed., R. C. Gonzalez, R. E. Woods, PrenticeHall, 2008, ISBN 013168728X. 2. "Digital Image Processing using MATLAB", R. C. Gonzalez, R. E. Woods, B. R. Masters, and S. L. Eddins, McGraw Hill Education, 2013. 3. "Handbook of Image and Video Processing", A.Bovik, Academic Pr., 2000 4. "The Image Processing Handbook", 3rd Edition, J.C. Russ, IEEE Pr., 1999

Assessment Criteria		If any, mark as (X)	Percentage (%)
	Midterm Exam	X	30
	Quizzes		
	Homework		
	Mini Projects (~4x)	X	30
	Term Paper		
	Laboratory work		
	Other		
	Final Exam	X	40

Instructors	Dr. Gökhan Koray Gültekin

Weekly Schedule

Week	Subject
1	Introduction to images as 2D signals, image sensing and acquisition methods
2	Cameras, camera parameters, image formation, image processing and its applications
3	Spatial image processing, convolution, correlation, image gradient, laplacian
4-5	Intensity transformations and spatial filtering, image histogram, image enhancement, smoothing and sharpening in spatial domain
6-7	Binary image processing, morphological image processing, erosion, dilation, opening closing, other morphological operations
8	Filtering in the frequency domain
9	**Mid-term Exam**
10-11	Image restoration and reconstruction, noise and noise models
12-13	Color spaces, color image processing
14	Image encoding and compression methods
15	Basic image segmentation, edge detection