uc3m | Universidad Carlos III de Madrid
Vicerrectorado de Estudios
Apoyo a la docencia y gestión del grado

COURSE: DIGITAL IMAGE PROCESSING		
DEGREE: SOUND AND IMAGE ENGINEERING	YEAR: 3rd	TERM: 2nd

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	TEACHING (mark X)		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS		DESCRIPTION	CLASS HOURS (1,66=50+50 min)	HOMEWORK HOURS (Max. Estim. 6,5h)
1	1	Course Presentation Overview of Image Processing	x			Course Presentation Overview of Image Processing	1,66	6,5
	2	Digital Images		x		Basic camera model. Spatial sampling and quantification. Color models. (Study & practical exercises)	1,66	
2	3	Intensity transformations	x			Basic Intensity transformations. Histograms. Histogram Equalization. (Study & practical exercises	1,66	6,5
	4	Intensity transformations		x		Histogram matching. Adaptive histogram equalization. CLAHE. (Study & practical exercises)	1,66	
3	5	Spatial Filtering	x			Correlation and convolution. Low-pass filters. High-pass filters. Gaussian Filters. Statistical ordered filters. (Study & practical exercises)	1,66	6,5
	6	Spatial Filtering. Geometrical transformations		x		Template matching. Geometrical transformations. Interpolation. (Study & practical exercises)	1,66	
4	7	Fourier Transform	x			FT and properties. Filtering in the Frequency Domain. (Study & practical exercises)	1,66	6,5
	8	Lab Session 1: Managing images		x	Lab 40B01A / Computer classroom	Reading and displaying images. Accessing sub-images and components. Color models. (practical computer implementations)	1,66	
5	9	Image restoration	x			Image restoration: only noise; only linear distortion; noise and linear distortion. (Study & practical exercises)	1,66	6,5
	10	Edge Detection		x		Gradient and Laplacian. Discrete approximations of first and second derivative. (Study & practical exercises)	1,66	

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6	11	Mid-term exam #1.	x			Mid-term exam #1.	1,66	6,5
	12	Lab Session 2: Intensity transformation		x	Lab 40B01A / Computer classroom	Histograms and Histogram Equalization .(practical computer implementations)	1,66	
7	13	Edge Detection	x			Canny Edge Detector. Edge sharpening. (Study & practical exercises)	1,66	6,5
	14	Lab Session 3: Filtering		x	Lab 40B01A / Computer classroom	Spatial filtering and template matching. (practical computer implementations)	1,66	
8	15	Segmentation	x			Threshold-based segmentation. Region evolution. Connected components. (Study & practical exercises	1,66	6,5
	16	Segmentation		x		Threshold-based segmentation. SLIC. (Study & practical exercises)	1,66	
9	17	Morphological Image Processing	x			Basic morphological operations. Basic morphologica algorithms. (Study & practical exercises)	1,66	6,5
	18	Lab Session 4: Segmentation		x	Lab 40B01A / Computer classroom	Threshold-based and clustering-based segmentations. (practical computer implementations)	1,66	
10	19	Lab Session 5: Project1 - Image Segmentation	x		Lab 40B01A / Computer classroom	Practical problem of image segmentation (practical computer implementations)	1,66	6,5
	20	Lab Session 6: Project1 - Image Segmentation		x	Lab 40B01A / Computer classroom	Practical problem of image segmentation (practical computer implementations)	1,66	
11	21	Image Descriptors	x			Principal component analysis. Hough transform. (Study & practical exercises)	1,66	6,5
	22	Image Descriptors		x		Basic form, color and texture descriptors. (Study & practical exercises)	1,66	
12	23	Mid-term exam #2	x			(Study & practical exercises)	1,66	6,5
	24	Lab Session 7: Image descriptors		x	Lab 40B01A / Computer classroom	Basic form, color and texture descriptors. (practical computer implementations)	1,66	

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13	25	Lab Session 8: Project2 - Image classification	x		Lab 40B01A / Computer classroom	Practical problem of image classification (practical computer implementations)	1,66	6,5
	26	Lab Session 9: Project2 - Image classification		x	Lab 40B01A / Computer classroom	Practical problem of image classification (practical computer implementations)	1,66	
14	27	Introducion to NNs	x			Introduction to NNs .(Study & practical exercises)	1,66	6,5
	28	Introducion to CNNs and their Applications in Image Processing		x		Introducion to CNNs and their Applications in Image Processing. (Study & practical exercises)	1,66	
	29	Quizz on NNs and CNNs. Oral Presentations	x			Quizz on NNs and CNNs. Oral Presentations of selected projects 1 and 2	1,66	3,25
						Subtotal 1	**48**	**94**
						Total 1 *(Hours of class plus student homework)*	**142**	
15		Tutorials, handing in, etc					3,6	-
16		Assessment					4	10
17								
18								
						Subtotal 2	**8**	**10**
						Total 2 *(Hours of class plus student homework)*	**18**	
TOTAL (*Maximun 160 horas*)							**160**	