Universidad Carlos III de Madrid

Course: Medical image generation		
Postgraduate degree: MASTER's DEGREE in Information for health engineering Professor: Jorge Ripoll LorEnzo	ECTS: 3.0	SEMESTER: 2

COURSE SCHEDULE (Detailed version)

Week	Session	SESSION CONTENT	Group (Mark X)		Indicate space Necessary different classroom (computer room, Audiovisual, etc...)	STUDENT'S WORK DURING THE WEEK		
			1	2		Description	HOURS OF PRESENCE	WORKING HOURS Week Max 7 H
1	1	*Radiation-matter interaction, radiological protection and dosimetry, and introduction to medical imaging.*					1.5	
2	2	*Introduction to medical imaging: sources of contrast, resolution, signal/noise ratio, quantification.*					1.5	
3	3	*Main image Modalities*: Optical image (Microscopy and endoscopy)			Aula 1.0. G14		1.5	
4	4	*Main image Modalities*: Optical image. Microscopy image analysis (resolution, quantification). Lab practice.			Classroom 1. 0. G12	Practical classes require to have studied the previous material (sessions 1, 2, 3)		
5	5	*Main image modalities:* X-rays – physical principles and reconstruction					1.5	

6	6	*Main image modalities:* X-Ray – Image generation – artifacts, signal/noise, resolution, and quantification			Computer room	Practical classes require to have studied the previous material (session 5)		
7	7	*Main image modalities:* X-Ray – Image generation – practices			1.0. G12	The practical classes require to have studied the previous material (session 5,6)		
8	8	*Main image modalities:* Nuclear – Physical principles, isotope production, Tracer, Detectors, scintigraphy, SPECT AND PET.					1.5	
9	9	*Main image modalities:* PET- Image generation-artifacts, signal/noise, resolution, and quantification			Computer room	Practical classes require to have studied the previous material (Session 8)		
10	10	*Main image modalities:* RM – Physical principles, description of MR equipment and RM modalities. Image reconstruction, artifacts, quantification, resolution, signal-to-noise ratio					1.5	
11	11	*Main image modalities:* RM – Semi-Practical Session of the control of an RM scanner					1.5	
12	12	*Main image modalities:* Visit to the medical imaging facilities in the HGGM			HGGM	The practical classes require to have reviewed the		

						Previous material (Session 5,8,10)		
13	13	*Main image modalities:* Ultrasound and Photoacoustics – Physical principles and image generation					1.5	
14	14	*Main image modalities:* Ultrasound-practice example and reconstruction			1.0. G12	Practical classes require to have reviewed the previous material (session 13)		
TOTAL HOURS							**12**	

LABORATORY PROGRAMMING

WEEK	SESSION	DESCRIPTION	LABORATORY	WEEKLY PLANNING FOR THE STUDENT		
				Description	HORaS class	HOURS OF WORK AT HOME (Max. 7h week)
4	4	Main image modalities: Optical image. Microscopy image analysis (resolution, quantification). Lab Practice.	1.0. G12	Practical classes require to have studied the previous material (sessions 1, 2, 3)	1.5	1
6	6	Main image modalities: X-Ray – Image generation – artifacts, signal/noise, resolution, and quantification	Computer room	Practical classes require to have studied the previous material (session 5)	1.5	1
7	7	Main image modalities: X-Ray – Image generation – practices	1.0. G12	The practical classes require to have studied the previous material (session 5,6)	1.5	0.5
9	9	SECTION 3 – Main image modalities: PET-Image generation-artifacts, signal/noise, resolution, and quantification	Computer room	Practical classes require to have studied the previous material (Session 8)	1.5	1
12	12	Main image modalities: SESSION VISIT TO HGGM	HGGM	The practical classes require to have reviewed the Previous material (Session 5,8,10)	1.5	1
14	14	Main image modalities: Ultrasound-practice example and reconstruction	1.0. G12	Practical classes require to have reviewed the previous material (session 13)	1.5	0.5
		Delivery results Rebuild	-	Results of the image generation practices presented as a summary		4
		TOTAL B				**18**

TOTAL hours	**30**