



COURSE: NANOPHOTONICS (3 ECTS)		
MASTER: Master in Photonics Engineering	YEAR: 2018-2018	TERM: 1st

WEEKLY PLANNING							
SESSION	DESCRIPTION	GROUPS (mark X)		Special room for session (computer classroom, audio-visual classroom ...)	WEEKLY PROGRAMMING FOR STUDENT		
		LECTURES	SEMINARS /LAB ¹		DESCRIPTION	CLASS HOURS	HOMEWORK HOURS
1	INTRODUCTION of the subject. Basic concepts. Near- and far-field, diffraction limit, evanescent waves.	X			Introduction to the subject.	1,5	4
2	Light-matter Interaction. Concepts of scattering, absorption and extinction. Mie theory	X			Previous reading and revision of class materials. Decision about the topics of the works.	1,5	
3	Fabrication Techniques of nanophotonic structures. Top-down and bottom-up techniques for nanofabrication.	X			Previous reading and revision of class materials.	1,5	15
4	Characterization techniques. Near-field microscopy, AFM, confocal microscopy	X			Previous reading and revision of class materials.	1,5	
5	Plasmonic and Resonant Dielectric nanoparticles. Surface plasmon resonances and localized surface plasmon resonances. High refractive index nanoparticles. Electric and magnetic resonances.	X			Previous reading and revision of class materials.	1,5	

6	Examples of simulation of light scattering of nanoparticles		x		Exercises, using a numerical tool, to simulate the optical response of nanoparticles.	1,5		
7	Non-linear nanophotonics. Second and third harmonic generation and their applications.	x			Previous reading and revision of class materials.	1,5	20	
8	Photonic Crystal and nanostructured optical fibers	X			Previous reading and revision of class materials.	1,5		
9	Single photon emitters. Nanoparticles and quantum dots.	x			Previous reading and revision of class materials.	1,5		
10	Experimental Demonstration		x		Answer questions about the experimental set-ups, the optical behavior of the samples and the operation mode of the devices.	1,5		
11	Metamaterials. Engineered optical properties. Left-handed materials and artificial magnetism.	x			Previous reading and revision of class materials.	1,5		
12	Nanophotonics at the Marketplace. Applications of Nanophotonics in different fields.	x			Previous reading and revision of class materials.	1,5		
13	Nanophotonics Workshop I		x		Presentation and discussion of the student's works.	1,5		
¹ A maximum of 1-2 lab sessions						Subtotal 1	21	34
Total 1 (Hours of class plus student homework hours between weeks 1-7)						55		
	Tutorials, handing in, etc				Solving any remaining question	10		
15	Assessment				Studying the documentation for the final assessment.	3	7	
Subtotal 2						3	17	
Total 2 (Hours of class plus student homework hours at week 8)						20		
TOTAL (Total 1 + Total 2)						75		

