COURSE: ORGANIC PHOTONICS (3 ECTS)		
MASTER: Master in Photonics Engineering	**YEAR: 2017-2018**	**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	**Basic concepts.** Absorption/emission in organic molecules. Primary photophysic processes.	x			Introduction to the subject. Review of concepts: rate constants, lifetime, quantum yield, radiationless processes.	1,5	4
2	**Fundamentals of Organic Semiconductors.** Small molecules and polymers. Fabrication processes	x			Previous reading and revision of class materials.	1,5	
3	**Organic light-emitting diodes.** Injection layers. Fluorescence and phosphorescence.	x			Previous reading and revision of class materials.	1,5	10
4	**Organic light-emitting diodes.** OLED displays. Rigid and flexible structures. Lighting.	x			Previous reading. Comparison of commercial products for mobiles and large-area TV	1,5	
5	**Organic photodetectors.** Organic photovoltaic cells. Performance.	x			Previous reading and revision of class materials.	1,5	
6	**Polarization of light.** Circular and linear polarizers and		x		Using a numerical tool to calculate evolution	1,5	14

	retarders. Jones calculus. Müller matrices				of polarization states. Poincaré sphere.		
7	**Liquid crystals.** Mesophases, physical properties, anisotropy, birefringence	x			Previous reading. Observation of actual materials, fluidity, orientation, melting.	1,5	
8	**Liquid crystals.** Cell manufacturing, surface conditioning. Switching and switching modes.	x			Previous reading. Home exercises with actual cells and polarizers.	1,5	
9	**Liquid crystal displays**. Addressing modes. Multiplexing. Dynamic response. Active matrix LCDs	x			Previous reading and revision of class materials.	1,5	
10	**Liquid crystal displays**. Microdisplays, large-area displays, HMDs, HUDs, simulators, virtual reality.	x			Previous reading and revision of class materials.	1,5	
11	**LC spatial light modulators.** LCoS, phase gratings, Wavelength-selective switching (WSS), holography.	x			Previous reading. Search for applications of liquid crystals in optical communications.	1,5	
12	**LC photonic devices**. Beam steering, tunable prisms and lenses, vortex generators. LCs and optical fibers.		x		Handling actual devices. Discussion of observed phenomena. Calculations.	1,5	
13	**Organic waveguides.** Guided modes, coupling, passive waveguides, tunable cladding	x			Previous reading and revision of class materials.	1,5	6
14	**Integrating organic devices.** Approach to photonic devices made of organic emitters, waveguides, modulators and detectors.		x		Previous work suggesting different approaches. Discussion on actual devices.	1,5	
					Subtotal 1	**21**	**34**
					Total 1 *(Hours of class plus student homework hours between weeks 1-7)*	**55**	

[1] **A maximum of 1-2 lab sessions**

	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**