



INTERNATIONAL UNIVERSITY OF SARAJEVO
FACULTY OF ENGINEERING AND NATURAL SCIENCES
EE 413 - Fundamentals of Photonics
AY 2018-2019

Course Code	Course Title		Weekly Hours			ECTS	Weekly Class Schedule
			T	A	L		
EE 413	Fundamentals of Photonics		3	1	1	6	Tuesday 16.00-16.50 Thursday 15.00-15.50
Prerequisite	Electromagnetism, Senior standing	It is a prerequisite to					
Lecturer	Emir Karamehmedovic		Office Hours Schedule			Monday 11.00-12.00, Tuesday 10.00-12.00	
E-mail	ekaramehmedovic@ius.edu.ba		Office / Room No			AF1.16	
Phone	033 957 207						
Assistant	--						
E-mail	--						
Course Objectives	To introduce the concepts of light propagation, generation and detection, coherent and incoherent light, and develop the hands-on skills of the students in the area of photonics.						
Textbook	F. L. Pedrotti, L. S. Pedrotti, and L. M. Pedrotti, Introduction to Optics, 3rd ed., Prentice Hall, Fundamentals of Photonics					B.E.A. Saleh, M.C. Teich,	
Learning Outcomes	After successful completion of the course, the student will be able to:						
	1	Describe and analyze light-matter and light-light interaction, dependence on polarization, wavelength, temporal and spatial coherence					
	2	Formulate the principle on which lasers are based and operate in different regimes					
	3	Differentiate between different methods of light detection					
	4	Apply principles of photonics in experimental testing					
Teaching Methods	Class discussions with examples, team projects that involve engineering problems, interpretation and reporting.						
WEEK	TOPIC					REFERENCE	
Week 1	Light and Optical properties of materials, refractive index, photon energy, frequency...					Introduction	
Week 2	Ray optics - Lenses and mirrors, Matrix method for ray tracing, Ray optics					Chapter 1	
Week 3	Wave optics, Helmholtz equation					Chapter 2	
Week 4	Diffraction, coherence, interference, polarization, dispersion					Chapter 2	
Week 5	Laser optics, types of lasers					Notes on lasers	
Week 6	Light-matter interaction, pulsed and CW light					Chapter 4	
Week 7	Fourier Optics and Electromagnetic optics					Chapter 5	
Week 8	MIDTERM EXAM					--	
Week 9	Light detection, Nonlinear optics,					Chapter 6	
Week 10	Coherence, interferometers					Chapter 6	
Week 11	Lab Project Assignment					Notes on specific projects	
Week 12	Lab Project, Demonstration of solid state laser and frequency doubling					Notes on specific projects	
Week 13	Lab Project, Demonstration of gas laser operation					Notes on specific projects	
Week 14	Lab Project, Demonstration of spectrophotometry					Notes on specific projects	
Week 15	Revision and project presentations					--	
Assessment Methods and Criteria	Evaluation Tool		Quantity	Weight	Alignment with LOs		
	Final Exam		1	40			
	Semester Evaluation Components			60			
	Homeworks		2	20			
	Laboratory / Project Assignment		1	40			
*** ECTS Credit Calculation ***							
Activity	Hours	Weeks	Student Workload Hours	Activity	Hours	Weeks	Student Workload Hours
Lecture hours	3	14	42	Lab & Reporting	10	3	30
Assignments	10	2	20	Final exam study	16	1	16
Home study	3	14	42				0
Total Workload Hours =					150		
ECTS Credit =					6		
Course Academic Quality Assurance: Semester Student Survey							Date: 18/02/2019