

Course Name/Kode: ILT 522 PHOTONICS								ADVANCED TECHNOLOGIES	
Semester	Teaching and Learning Methods							Credit	
	Theory	App.	Lab.	Project	Homework	Other	Total	Credit	ECTS Credit
1-2	42	30			40	76	188	3	7.5
Language	Turkish								
Compulsory/ Elective	Elective								
Prerequisites	None								
Course Content	Geometrical optics, refraction, reflection, prisms, lenses and imaging instruments. Electromagnetic theory of light, Fresnel coefficients, interference and interferometers, diffraction, coherence, thin film optics, methods for determining the optical constants from transmittance and reflectance, polarized light, Stokes parameters, Mueller matrices, ellipsometry, optical waveguides, optical sources and amplifiers, quantum nature of light, blackbodies. Line sources, light emitting diodes, lasers light detectors, photomultiplier, photodiode.								
Course Objectives	In this course, students will learn geometric, wave optics and comprehensively polarization of light, the principles of photonics applications (light sources, optical waveguides, photodetectors, etc.) considering both classic and quantum characteristics of light.								
Learning outcomes and competences	Students will learn fundamental principles of photonics and its applications. The students will be able to (1) use their knowledge in their research or engineering careers (2) follow the technological developments, (3) broaden and deepen their knowledge further in this rapidly developing discipline.								
Textbook and/or References	<ul style="list-style-type: none"> • B.E. A Saleh, M.C. Teich, Fundamentals of Photonics. Wiley, New York (1991) • J.C. Palais, Fiber Optic Communications. Pearson Prentice Hall; 5 th edition (2005) • Jia-Ming Liu, Photonic Devices. Cambridge University Press, Cambridge (2005) • E. Hencht, Optics, Addison-Wesley; Reading 3 rd. editon (1998) • G. Lifante, Integrated Photonics: Fundamentals. Wiley (2003) • D. Golstein, Polarized Light. Marcel Dekker; New York, 2nd. editon (2003) 								
Assessment Criteria								<i>If any, mark as (X)</i>	Percentage (%)
	Midterm Exams							X	30
	Quizzes								
	Homeworks							X	20
	Projects								
	Term paper							X	20
	Laboratory Work								
	Other								

	Final Exam	X	30
Prepared by	Doç. Dr. Barış Akaoglu		
Week	Subject		
1	Geometrical optics, refraction, reflection		
2	Prisms, lenses and imaging instruments		
3	Electromagnetic theory of light, wave equation, polarization		
4	Interference and interferometers		
5	Diffraction and coherence		
6	Thin film optics, transmission and reflection of a thin film–substrate system, methods for determining the optical constants from transmittance and reflectance		
7	Polarized light, polarization ellipse, Stokes parameters		
8	Mueller matrices, Measuring Stokes parameters		
9	Elipsometry,		
10	Optical waveguides, basic optical geometries		
11	Modes in optical waveguides, integrated optical waveguides		
12	Optical sources and amplifiers, blackbodies		
13	Light emitting diodes, lasers		
14	Light detectors, photomultiplier, photodiode		