

ΗΛΕΚΤΡΟ-ΟΠΤΙΚΗ & ΕΦΑΡΜΟΓΕΣ (ΧΕΙΜΕΡΙΝΟ ΕΞΑΜΗΝΟ 2023-2024)

Date	Topics Covered	Teaching Hours	Total Hours
03/10/2023	ΔΕΝ ΕΓΙΝΕ ΜΑΘΗΜΑ (Κανείς Σπουδαστής)	0	0
10/10/2023	ΔΕΝ ΕΓΙΝΕ ΜΑΘΗΜΑ (Ένας Σπουδαστής)	0	0
17/10/2023	Introduction, EM Review, Maxwell's Equations, Constitutive Equations, Poynting Theorem, Time-Average Poynting Vector, Wave Equation, Plane wave solutions, Wavevector Surfaces, Anisotropic Materials, Birefringence. Review of Index Ellipsoid.	3	3
25/10/2023	Review of EM (short), Fresnel Equations . Jones Calculus, Examples, Beam Propagation, ABCD Matrices for Homogeneous Medium and Thin Lens. Biperiodic System of Lenses, Stable/Unstable Cavities.	3	6
01/11/2023	Example cavities. Propagation of rays in inhomogeneous media. Lens-Like media. Gaussian Beams. Fundamental and higher order.	3	9
08/11/2023	Propagation of Gaussian beam with ABCD. Gaussian Beam Propagation Example. Optical Resonators introduction. Fabry-Perot resonator introduction.	2	11
15/11/2023	ΔΕΝ ΕΓΙΝΕ ΜΑΘΗΜΑ (Κλειστή Σχολή-Επέτειος Πολυτεχνείου)	0	11
22/11/2023	Fabry-Perot Resonant frequencies. FSR-Delta nu (FWHM). Tuning using Fabry-Perot. Example of spectrum analysis with a Fabry-Perot. FSR-Delta nu (FWHM). Tuning using Fabry-Perot. Example of spectrum analysis with a Fabry-Perot. ABCD Stable Resonators, Resonant Frequencies. Cavity Lifetime. Blackbody Radiation (introduction).	3	14
29/11/2023	Blackbody radiation: historical development, Planck's formula, Wien's displacement law, Cosmic Background Microwave radiation. Radiative processes, Einstein's Coefficients. Lineshape Function. Homogeneous Broadening. Elastic scattering broadening. Inhomogeneous Broadening (introduction).	3	17
06/12/2023	Inhomogeneous Broadening, Maxwell-Boltzmann velocity distribution. Doppler broadening in gas laser example. Voigt function. Absorption and Amplification, Gain and Cross Section.	3	20
13/12/2023	ΔΕΝ ΕΓΙΝΕ ΜΑΘΗΜΑ (Κανείς Σπουδαστής)	0	20
20/12/2023	Gain Saturation in Homogeneous and Inhomogeneous media. Lamb's Dip. Examples of He-Ne and Ruby Lasers. Small signal gain and large signal. Electron Oscillator Model. Electric susceptibility χ_e' and χ_e'' .	2	22
27/12/2023	ΔΙΑΚΟΠΕΣ ΧΡΙΣΤΟΥΓΕΝΝΩΝ	0	22
03/01/2024	ΔΙΑΚΟΠΕΣ ΧΡΙΣΤΟΥΓΕΝΝΩΝ	0	22

