BOSTON UNIVERSITY Department of Electrical & Computer Engineering

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ENG EC591	Photonics	Laborat	ory	Fall 2024	
Catalog Description:	Introduction to optical measurements. Basic theories of light. Principles of laser operation. Laser safety issues. Laboratory experiments: introduction to laser light and basic optical components; interference; Fabry-Perot resonators; beam optics; diffraction and Fourier optics; optical spectroscopy; polarization components; fiber optics. Optical simulation techniques. Waveguide design and modeling for integrated optics. Nanophotonics simulations based on the finite difference time domain (FDTD) method.				
Prerequisites:	Modern Physics (PY313 or equivalent)				
Recommended corequisite:	Fourier Optics (EC562)				
Credits:	4				
Lecture:	Tu 9-10:45 (all students)		CDS B63 (665 Comm Ave)	
Labs:	Th 9-10:45 (section B1) Wed 10:10-11:55 (section B2)		PHO 701 PHO 701		
Instructor:	Roberto Paiella	Office: Phone: e-mail: Office hours:	PHO 529 3-8883 rpaiella@bt Tu 1-3 or b	u.edu y appointment	
Lah Aggistant.	Hriteshwar Talukder	email:	hritesh@bu	edu	

Web Page: available on Blackboard Learn (https://learn.bu.edu)

Requirements:	Homework (lab reports and simulation projects) Quiz	90% 10%			
NOTE: Lab experiments will be carried out in groups, but individual reports will be expected.					

Course Calendar (tentative)

Date	Lectures	Labs
T-9/3	Course Introduction	
T-9/10	Ray Optics	
T-9/17	Lab 1: Introduction to Laser Light and Basic	W-9/18 (section B2)
	Optical Components	R-9/19 (section B1)
T-9/24	Lab 2: Optical Interference	W-9/25 (section B2)
		R-9/26 (section B1)
T-10/1	Lab 3: Fabry-Perot Resonators	W-10/3 (section B2)
		R-10/4 (section B1)
T-10/8	Lab 4: Beam Optics	W-10/9 (section B2)
		R-10/10 (section B1)
T-10/15	No class (substitute Indigenous People's Day	
	schedule)	
T-10/22	Lab 5: Diffraction and Fourier Optics	W-10/23 (section B2)
		R-10/24 (section B1)
T-10/29	Lab 6: Optical Spectroscopy	W-10/30 (section B2)
		R-10/31 (section B1)
T-11/5	Lab 7: Polarization Components	W-11/6 (section B2)
		R-11/7 (section B1)
T-11/12	Lab 8: Waveguide Design (Beam Propagation	W-11/13 (section B2)
	Method)	R-11/14 (section B1)
T-11/19	Lab 9: Fiber Optics	W-11/20 (section B2)
		R-11/21 (section B1)
T-11/26	Quiz	
T-12/3	Lab 10: Finite-Difference-Time-Domain	W-12/4 (section B2)
	Simulations	R-12/5 (section B1)
	Date T-9/3 T-9/10 T-9/17 T-9/24 T-10/1 T-10/15 T-10/22 T-10/29 T-11/20 T-11/12 T-11/12 T-11/12	DateLecturesT-9/3Course IntroductionT-9/10Ray OpticsT-9/17Lab 1: Introduction to Laser Light and Basic Optical ComponentsT-9/24Lab 1: Introduction to Laser Light and Basic Optical ComponentsT-9/24Lab 2: Optical InterferenceT-10/1Lab 3: Fabry-Perot ResonatorsT-10/8Lab 4: Beam OpticsT-10/15No class (substitute Indigenous People's Day schedule)T-10/20Lab 5: Diffraction and Fourier OpticsT-10/21Lab 6: Optical SpectroscopyT-11/25Lab 7: Polarization ComponentsT-11/12Lab 8: Waveguide Design (Beam Propagation Method)T-11/12Lab 9: Fiber OpticsT-11/26QuizT-12/3Lab 10: Finite-Difference-Time-Domain Simulations

Course Objectives

The objective of this course is to provide the students with hands-on experience with modern optical components and experimental techniques. Laser safety issues and computer-aided optical design will also be emphasized.