

## EE5500 - Introduction to Photonics

Learn the fundamental principles of photonics and light-matter interactions

Develop the ability to formulate problems related to photonic structures/processes and analyze them

Understand processes that help to manipulate the fundamental properties of light

<b>I. Photonics - Fundamentals</b>	<b>Schedule</b>	<b>Grading</b>	<b>Lab Session</b>	<b>Class TA</b>	<b>Lab TA</b>
1. Ray/wave optics principles	Week 1		Diffraction of light	Bagath	Nirjhar
2. Statistical properties of light, Coherence	Week 2		Michelson interferometer	Fredy	Srinivas
3. Photon properties - energy, flux, statistics	Week 3		Coupling laser light into optical fiber	Bagath	Fredy
4. Interaction of photons with atoms	Week 4		Light absorption & filtering	Srinivas	Bagath
5. Light amplification	Week 5		Optical amplifiers (EDFA)	Nirjhar	Srinivas
		<b>Quiz I (15%)</b>			
<b>II. Semiconductor light sources &amp; detectors</b>					
1. Laser Fundamentals	Week 6			Srinivas	
2. Junction devices	Week 7		Fiber ring laser	Fredy	Bagath
3. Semiconductor light sources	Week 8		Optical sources	Nirjhar	Fredy
4. Semiconductor light detectors	Week 9		Optical detectors	Nirjhar	Fredy
		<b>Quiz II (15%)</b>			
<b>III. Manipulation of photons</b>					
1. Interaction with RF and acoustic waves	Week 10		Malus law	Bagath	Nirjhar
2. Nonlinear behavior of materials	Week 11		EOM characterization	Srinivas	Bagath
		<b>Lab (30%)</b>	Mini-Quiz (5)+Reports (10)+Viva (15)		
		<b>Tutorials (10%)</b>			
		<b>Final (30%)</b>			

**Text: Saleh & Teich, "Fundamentals of Photonics", Wiley Interscience, Second edition**

Reference: Ben Streetman, "Solid State Electronic Devices", Prentice Hall, Sixth edition

Reference: Yariv & Yeh, "Photonics", Oxford Press, Sixth edition

Reference: Eugene Hect, "Optics", Addison Wesley, Second edition

**Teaching Assistants**

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