

OSE 6455 Photonics Laboratory – Fall 2018

Pre-requisites: Graduate Standing, OSE 6349 Quantum Mechanics or PHY 5606 Physics Quantum Mechanics, OSE 6111 Optical Wave Propagation or PHY 5346 Electrodynamics I or OSE 6525 Laser Engineering

Time: Fridays 1-5 PM
Room: CREOL 265
Instructor: Xiaoming Yu (CREOL 273)
TA: Arifur Rahaman (CREOL 255)
Office Hour: Wednesdays, 3-5 PM, or by appointment

Goals:

1. Relate what you have learnt in classroom to what you can see in the lab of a variety topics related to photonics.
2. Take away the “fear factor” by providing experience of operating various equipment.
3. Establish good practices in experimentation including keeping a lab notebook and keeping the experiment station clean.
4. Learn to write lab reports of journal-manuscript quality/style.

Experiments:

- | | |
|----|---|
| 1 | LabView basics |
| 2 | Beam propagation in free space and in fiber |
| 3 | Polarization optics |
| 4 | Acousto-optic modulator (AOM) |
| 5 | Electro-optic modulator (EOM) |
| 6 | Liquid-crystal display (LCD) |
| 7 | <u>Fiber sensor</u> |
| 8 | Laser diode |
| 9 | Fiber-optic communications |
| 10 | Wavelength-division multiplexing (WDM) |
| 11 | <u>VPI Simulation</u> |

Schedule:

Group	I	II	III	IV
8/24	Introduction and Lecture			
8/31	LabView basics	Beam propagation	Polarization optics	AOM
9/7	AOM	LabView basics	Beam propagation	Polarization optics
9/14	Polarization optics	AOM	LabView basics	Beam propagation
9/21	Beam propagation	Polarization optics	AOM	LabView basics
9/28	Lecture (make-up lab, drafting final report)			
10/5	EOM	LCD	Fiber sensor	Laser diode
10/12	Laser diode	EOM	LCD	Fiber sensor
10/19	Fiber sensor	Laser diode	EOM	LCD
10/26	LCD	Fiber sensor	Laser diode	EOM
11/2	Lecture (make-up lab, drafting final report)			
Group	I	II	III	
11/9	Fiber-optic communications	WDM	VPI Simulation	
11/16	Thanksgiving			
11/23	VPI Simulation	Fiber-optic communications	WDM	
11/30	WDM	VPI Simulation	Fiber-optic communications	
12/7	2 Final reports due			

Grading Policy:

Attendance	7%
Pre-Lab Quizzes	10%
Lab Notebook	7%
2 Full Lab Reports	40%
9 Short Lab Reports	36%

A: >95
A-: 90-94
B+: 85-89
B: 80-84

Reference Books:

- Fundamentals of Photonics by B. E. A. Saleh and M. C. Teich, Wiley, 1991
- Optical Electronics in Modern Communications by A. Yariv, Oxford, 5th Edition, 1997