

## EECE474/530 ELECTRO-OPTICS

(Fall 2011)

**Description:** Electro-optic devices and systems. Blackbody, LED and laser sources, photodetectors, modulators, fiber optics, Fourier optics. Design of electro-optic systems.

**Instructor:** Prof. Vladimir Nikulin, Office: ES-2320, Phone: 777- 6956, e-mail: vnikulin@binghamton.edu  
Office hours: TBA

**Textbook:**

E. Hecht, *Optics, 4<sup>th</sup> Edition*. Addison Wesley, 2002. ISBN 0-8053-8566-5

**Reference Texts:**

L. Desmarais, *Applied Electro-Optics*. Pearson Education, 1997. ISBN 0-13-802711-0

R. Guenther, *Modern Optics*. John Wiley and Sons, 1990. ISBN 0-471-60538-7

A. Yariv, *Optical Electronics in Modern Communications*. Oxford Univ. Press ISBN 0-19-510626-1

**Prerequisites:** Familiarity with electromagnetic theory, basic concepts of optics and electronics, elementary differential equations.

**Course Topics:**

1. Light Properties (wave motion, speed, measurement, blackbody radiation)
2. Reflection and Refraction
3. Geometrical Optics (lenses, fiber, ABCD formalism)
4. Beam Propagation (interference, diffraction, polarization)
5. Optical Sources and Transmitters (LED, lasers, modulation)
6. Optical Detectors and Receivers (photodiodes, phototransistors, optocouplers)
7. Electro-Optic Effect (modulation, deflection)
8. Acousto-Optic Effect (scattering of light by sound, deflection)
9. Electro-Optic System Design

**Grading:**

a) EECE 474	b) EECE 530
Homeworks – 20%	Homeworks – 15%
2 Exams – 25% each	2 Exams – 20% each
Final Exam – 30%	Project – 15%
	Final Exam – 30%

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TOTAL 100%

**Policy:**

Discussions among students regarding homework, lab, and project assignments are strongly encouraged; however, each student must show his/her individual effort. Partial credit is given. All students must adhere to the Student Academic Honesty Code of the University and the Watson School (links below). The Department of Electrical and Computer Engineering has adopted a standard policy to enforce these codes for violations involving course work. Category I violations result in a grade of 0 for the graded work plus a one letter course grade reduction. A *Report of Category I Academic Dishonesty* form is filed with the Provost's Office; if a prior report is already on file, the offense is automatically elevated to Category II. Category II violations result in at least a failing grade for the course plus any additional penalties determined by the Watson Academic Integrity Committee.

University Academic Honesty Code:

[http://bulletin.binghamton.edu/program.asp?program\\_id=826](http://bulletin.binghamton.edu/program.asp?program_id=826)

Watson School Academic Honesty Code:

[http://www.binghamton.edu/watson/Watson\\_Academic\\_Honesty\\_Policy.pdf](http://www.binghamton.edu/watson/Watson_Academic_Honesty_Policy.pdf)

ECE Department Academic Honesty Code Enforcement Policy

[http://www.ece.binghamton.edu/documents/Academic\\_Honesty\\_Policy.pdf](http://www.ece.binghamton.edu/documents/Academic_Honesty_Policy.pdf)

This course is also offered under the articulation agreement between Binghamton University and SUNYIT. It is available to qualified students at Binghamton University via the distance learning system Enginet.