

## EE474 / EECE530 ELECTRO-OPTICS

(Fall 2009)

**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: Q12, Phone: 777- 6956, e-mail: vnikulin@binghamton.edu  
Office hours: 2:50 – 4:20 pm Tuesday, 11:35am – 1:10pm Thursday, or by appointment.

**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

Homeworks – 20%

2 Exams – 25% each

Final Exam – 30%

b) EECE 530

Homeworks – 15%

2 Exams – 20% each

Project – 15%

Final Exam – 30%

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TOTAL 100%

**Policy:**

Discussions among students regarding homework assignments are strongly encouraged; however, each student must show his/her individual effort. Partial credit is given. Any form of academic dishonesty will be penalized. Anyone caught cheating will receive a zero for that assignment, plus the final grade will be reduced by one letter grade.

**H1N1 Flu Policy:**

If you have a fever, body aches, cough, and/or sore throat please do not come to class. The university recommends that you remain at home or in your room and follow instructions from the University's Health Services (<http://www2.binghamton.edu/health/>). If possible, notify your instructor by email or phone. Every effort will be made to accommodate make-up work. While you will not be asked to validate your illness with a medical note, it is considered a violation of the academic honesty code if you abuse this policy for non-medical reasons.

Binghamton University maintains an updated H1N1 webpage at

<http://www2.binghamton.edu/news/updates/index.html>

For recommendations on what to do if you get sick, see the CDC site at

<http://www.cdc.gov/h1n1flu/sick.htm>