# EE 383P (Topic 6) – Optoelectronic Devices

## Description:

This is an introduction to semiconductor optoelectronic devices for communications, spectroscopy, and other applications. After developing the requisite physics, we apply these principles to (1) describe optoelectronic device operation and (2) understand their practical strengths/weaknesses.

## Instructor:

Professor Seth R. Bank, 2.606C MER, 520A ENS, E-Mail: sbank@ece.utexas.edu
    Office Hours:  3:30-5:00 M/W here and at my office & ***Anytime my office door is open at MER***
Teaching Assistant: Xin Wang, Office Hours: Tuesday afternoons, time TBA
Course Website: https://courses.utexas.edu/webapps/portal/frameset.jsp (Lecture notes)

## Prerequisites:

**Required:** Course on solid-state electronic devices (EE 339 or equivalent)
**Helpful:** Quantum mechanics and/or solid-state physics for scientists and engineers

## Text:

**Required:**
- *Semiconductor Optoelectronic Devices*, Course Reader, by D.A.B. Miller
- *Semiconductor Optoelectronic Devices*, 2$^{nd}$ Ed., by P.K. Bhattacharya
- Relevant papers and other reading materials will be distributed as necessary

**Recommended:**
- *Physics of Optoelectronic Devices*, by S.L. Chuang
- *Diode Lasers and Photonic Integrated Circuits*, by L.A. Coldren and S.W. Corzine

## Planned Topics:

- Review of basic semiconductor physics
- Heterostructures and band engineering
- Materials systems, preparation, and characterization
- Optical absorption, emission, and refraction processes
- Light emitting diodes
- Lasers (edge-emitting and vertical-cavity)
- Detectors
- Solar cells
- Modulators
- Other devices as time permits (e.g. THz sources/detectors)

## Examinations and Grading:

- Homeworks (30%), Two Midterms (30%), In-class presentation (20%), Final Paper (20%)
  - Presentation: 15 minute talk surveying a device not covered in lecture
    - Cannot be on your research directly, but rather a device you are interested in.

> *Collaboration on problem sets is strongly encouraged. However, copying another's work is cheating. Academic integrity is paramount and cheating will not be tolerated (see below).*

- Late homework will be accepted at instructor's discretion
- Attendance is strongly encouraged, but not strictly enforced

## College Drop/Add Policy:

An engineering student must have Dean's approval to add/drop after the fourth class day of the semester.

## Students with Disabilities:

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TTY or the College of Engineering Director of Students with Disabilities at 471-4382.

## Course Website and Student Privacy:

Web-based, password-protected class sites are associated with all academic courses taught at The University.  Syllabi, handouts, assignments and other resources are types of information that may be available within these sites.  Site activities could include exchanging e-mail, engaging in class discussions and chats, and exchanging files.  In addition, electronic class rosters will be a component of the sites.  Students who do not want their names included in these electronic class rosters must restrict their directory information in the Office of the Registrar, Main Building, Room 1.

## Academic Integrity:

Plagiarism or any form of academic dishonesty (cheating includes, but is not limited to, copying another student's work, bringing notes into a test and copying material directly from a book, article or web site without including appropriate references, falsifying data, doing someone's work) is a violation of University rules and may return a grade of zero for each assignment in which it is detected or may incur even steeper penalties.  For University policies see:
http://www.utexas.edu/opa/news/04newsreleases/nr_200404/nr_honor040429.html