

**EE 5389-001/ EE 4328-006**  
**Optical Biosensors: Instrumentation and Techniques**  
(Fall 2015)

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**Class Meetings:** Tu/Th 3:30-4:50 pm **Location:** WH 308  
**Office Hours:** 4:50 – 5:50 pm Thursdays or by appointment, NH 532  
**Credits:** 3

**Course Description and Objectives**

This course will provide students with an overview of modern biological and chemical sensing for in-vivo or in-vitro disease diagnosis and molecular analysis based on photonics and nanotechnology. Considerations in bio/chemical sensor design will be described; applications and limitations of each sensing technology will be discussed.

Through lectures, recent literature review papers, classroom discussion, and a course project, students will be familiar with the research frontiers in the bio/chemical sensing field, obtain a detailed understanding of underlying sensing principles, the cutting-edge optical sensing techniques, and the related instrumentation. The course will prepare students to apply acquired knowledge in their own research projects in the bio/chemical sensor development as well as in their future academic/industrial career.

**Textbooks:** No textbook is required but relevant references on each topic will be specified.

**Grading:** Homework 30%, Final exam 20%, and Course Project 50% (course project report 25% and project presentation 25%).

**Course Project:** A list of topics and related reading materials will be provided. Each student chooses one topic of his/her interest. Each student is required to write a report and do an in-class presentation.

**Tentative Topics:**

1. Overview of biosensors
2. Optics review
3. Optical sensing/detection techniques and instrumentation
4. Photonic structures in sensing
  - a. Optical label-free detection
  - b. Optical fluorescence detection
  - c. Surface enhanced Raman spectroscopy
5. Microfluidics and optofluidics
6. Overview of nanotechnology in bio/chemical sensing
7. Gas sensing
8. Optical manipulation and sorting

**Grading Scale:** A ( $\geq 89\%$ ); B ( $\geq 79\%$  to  $< 89\%$ ); C ( $\geq 60\%$  to  $< 79\%$ ); F ( $< 60\%$ ).

**Class Attendance and Drop Policy:** Attendance is required. Students are responsible for all materials covered in class. Drop policy: As per University guidelines. See the Registrar's Bulletin or the University Calendar in the front part of the UTA catalog for drop dates.

### **Academic Dishonesty**

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22)

### **Americans With Disabilities Act**

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93-112 -- The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act - (ADA), pursuant to section 504 of The Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

### **Student Support Services Available**

The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.