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

Instructor: **Yuze (Alice) Sun, Ph.D.**
Assistant Professor, Dept. of Electrical Engineering
Office location: NH 532   Phone: 817-272-1317
E-mail: sun@uta.edu

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