

BME 354 (14595) Molecular Sensors and Nanodevices for Biomedical Applications

Lecture time: MWF 11am-12pm @ CPE 2.206
Prerequisite: BME 314 and BME 352
Instructor: Professor Tim Yeh
Office: BME 5.202C, Department of Biomedical Engineering
Telephone: 512-471-7931
Email: tim.yeh@austin.utexas.edu
Office hour: MF 12-1pm right after lecture or by appointment, BME 5.202C

TA and grader: Cong Liu (primary) and Allen Liu
Email: Cong Liu <cong.liu@utexas.edu>, Allen, Yen-Liang Liu <ylliu@utexas.edu>
Office hour: Allen – M 5:30-6:30pm, Cong – T 3:45-4:45pm (or by appointment)

Method of Instruction:

The course will consist of three lectures per week (including guest lectures). Homework assignments (eight total), a presentation project, and three exams (two midterms and a final exam) will be used to assess student performance.

Textbook (required):

Molecular Sensors and Nanodevices: Principles, Designs and Applications in Biomedical Engineering,
John X.J. Zhang and Kazunori Hoshino, *Elsevier* 2014

References (optional):

Selected papers posted on BlackBoard.
Micromachined Transducers Sourcebook, Kovacs, *McGraw-Hill* 1998
Fundamental of Microfabrication, Madou, *CRC Press* 2002
Chemical Sensors and Biosensors, Eggins, *Wiley* 2002
Biomolecular Sensors, Gizeli and Lowe, *Taylor and Francis* 2002
Commercial Biosensors, Ramsay, *Wiley* 1998

Class website:

All materials for the class will be distributed electronically via BlackBoard (<http://courses.utexas.edu>). You will be responsible for checking the BlackBoard course site regularly for class work and announcements.

Grading:

Final grades will be based on performance on the homework, presentation, exams and participation. The weight of each in determining your grade will be as follows:

Homework:	25%
Midterm I, II:	25%
Project presentation:	20%
Final Exam:	30%

Homework:

There will be 8 homework assignments throughout the semester. Homework is due on Wednesday before class (i.e. at 10:59am). No late HW will be accepted.

What you will learn:

- Basic elements and major classes of molecular sensors, nano-devices and biomedical microsystems (i.e. Micro-Electro-Mechanical Systems, MEMS);

- Fundamental principles behind the operation of molecular sensors, nano-devices and biomedical microsystems.
- Unique requirements, environments, and applications of molecular sensors, nano-devices and biomedical microsystems.
- Standard micro- and nano-fabrication techniques for sensors
- Design and manufacturing of such microsystems.

The term "micro" is interpreted in its classical sense as "tiny", including both MEMS and Nanotechnology. We will use the terms "microsystems", "microsensors", "transducers", "MEMS" interchangeably throughout this course.

Academic dishonesty:

Cheating will be dealt with in as severe a manner as possible. You will fail this course if you cheat. Cheating includes, but is not limited to, copying and plagiarism. Please see the following points to clarify the above situations for this course.

- Assignments and homework are to be the work of the individual student. Utilizing computer codes, notes, answer sheets, assignment banks, etc. that have not been explicitly authorized by the Instructor is considered cheating.
- For the purposes of this course, plagiarism consists of, but is not limited to, any of the following: copying exact text from a published source without citation (> 10 words), inaccurately citing sources, paraphrasing text or ideas from a published source without citation (>3 sentences), copying text but changing only selected words without citation (>3 sentences), and constructing a text that is primarily another's work (whether cited or not).
- Students may be suspended or expelled permanently from the University for scholastic dishonesty.

Please see the following website for the official UT Austin policy: at

http://deanofstudents.utexas.edu/sjs/acint_student.php It is OK to ask questions now about what constitutes cheating. It is not OK later once an event has happened. Additionally, claiming ignorance regarding cheating does not excuse an individual. It is up to you to determine what constitutes academic dishonesty.

Notice for students with disabilities:

Students with disabilities who require special accommodations need to get a letter that documents the disability from the Services for Students with Disabilities area of the Office of the Dean of Students (471-6259 voice or 471-4641 TTY for users who are deaf or hard of hearing). This letter should be presented to the instructor at the beginning of the semester and accommodations needed should be discussed at that time. Five business days before an exam the student should remind the instructor of any testing accommodations that will be needed. See websites below for more information:

<http://ddce.utexas.edu/disability/>

Accommodations for religious holidays:

By UT Austin policy, you must notify the instructor of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, an assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.