

SPECIAL TOPICS: Biomedical Microdevices
EE4395-014 – CRN 19737 – Undergraduate Level
EE5390-011 – CRN 19350 – Graduate Level
Fall 2021 Syllabus

Tuesday & Thursday 4:30-5:50pm – BUSN 330

Instructor: Dr. Robert C. Roberts
Engineering A310
rcroberts@utep.edu
915-747-6959

Weekly Office Hours:
Weds 9:00am – 11:00am
Thur 9:00am – 11:00am
or by appointment

Course Description: The adaptation of microfabrication technologies originally devised for integrated circuit manufacturing has enabled a vast array of innovative sensor and actuator solutions found in a multitude of products. One burgeoning area of microsystems is for biomedical applications, including bio-sensing, microfluidics, bio micro-electro-mechanical systems (bioMEMS), drug delivery, and DNA sequencing. The use of microfabrication allows for lower-costs, faster performance, and massive parallelization of medical tests. Swallowable and implantable biomedical devices allow for minimally invasive diagnostics, or human-computer interfacing. This course will introduce the topic of biomedical devices and will study important concepts in the design and behavior of microfluidic systems, as well as several important biomedical MEMS and sensor topics in the field.

Pre-requisites for Course: There are no formal pre-requisites for this course, however familiarity with solid-state physics and microfabrication principles may be helpful.

EE5390 – Graduate Level Students: Students enrolled in the graduate section of the course will be expected to complete an additional project, due at the end of the semester.

Course Website: Blackboard will be utilized for presentations and for sharing electronic copies of the presentations and handouts.

Textbook: None. Handouts will be provided and/or posted onto the course Blackboard site, as this course will pull material from multiple sources including textbooks and research publications. The following textbooks may serve as useful references for students:

- Steven S. Saliterman, "Fundamentals of BioMEMS and Medical Microdevices," Wiley-Interscience, 2006, ISBN:0-8194-5977-1
- Gregory Kovacs, "Micromachined Transducers Sourcebook," McGraw-Hill, 1998, ISBN: 978-0072907223
- Stephen D. Senturia, "Microsystem Design," Springer, 2004, ISBN: 978-0792372462
- Marc J. Madou, "Fundamentals of Microfabrication: The Science of Miniaturization," CRC Press, 2002, ISBN: 978-0849308260
- Richard C. Jaeger, "Introduction to Microelectronic Fabrication: Volume 5 of Modular Series on Solid State Devices," Pearson, 2001, ISBN: 978-0201444940

Attendance: In order to be successful in the course, attendance is highly recommended every scheduled day, in order to keep up with the work. This means that the student should watch all videos, and complete all quizzes and activities prior to the next class period. Should a situation arise when a student begins to get behind, they should communicate with the instructor promptly to ensure they do not miss any important information and can get back on track.

Revised Course Grading: Students will be evaluated in the following manner:

Homework and Problem Sets:	20%
Technical Paper	30%
Technical Presentation	20%
Peer Review Forms	15%
Final Project (EE5390 students only)	15%
TOTAL	100% (85% for EE4395 students)

Course Drop Deadline: October 29th

Drop Policy: Students can drop the course before October 29th with a grade of "W". Students who drop the course after October 29th will be assigned the grade earned in the course.

Scholastic Integrity: As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. The assumption that a student's work is a fair representation of the student's ability to perform forms the basis for departmental and institutional quality. All students within the Department are expected to observe appropriate standards of conduct. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or material that are attributable in the 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 will not be tolerated. Any case involving academic dishonesty will be referred to the Engineering Dean's Office and the Office of the Dean of Students. The Dean of Students will assign a Student Judicial Affairs Coordinator who will investigate the charge and alert the student as to its disposition. Consequences of academic dishonesty may be as severe as dismissal from the University. See the Office of the Dean of Students' home page at www.utep.edu/dos/acadintg.htm for more information.

Policy relating to Disability / CASS: In Section 504 of the Vocational Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, if a student needs an accommodation then the Office of Disabled Student Services located at UTEP need to be contacted. If you have a condition, which may affect your ability to perform successfully in this course, you are encouraged to discuss this in confidence with the instructor and/or the director of the Disabled Student Services. Written guidelines r/t accommodations from CASS must be submitted to the course manager PRIOR to the start of the course. If you have a disability and need classroom accommodations, please contact CASS at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass. *CASS' Staff are the only individuals who can validate and if need be, authorize accommodations for students with disabilities.*

COVID-19 PRECAUTION STATEMENT

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org.