

TO: The Engineering Faculty

FROM: The Faculty of the School of Mechanical Engineering

RE: Cross-Listing Approval of ME 527/ECE 526/BME 581 Fundamentals of MEMS and Micro-Integrated Systems.

The Faculty of the School of Mechanical Engineering has approved the cross listing of the following course for a permanent course number. This action is now submitted to the Engineering Faculty with a recommendation for approval.

ME 527/ECE 526/BME 581 Fundamentals of MEMS and Micro-Integrated Systems

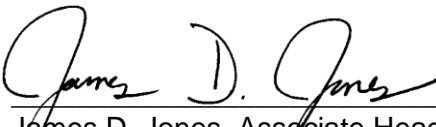
Sem. 1, Class 3, cr. 3.

Prerequisite: Differential equations, Basic physics (mechanics, optics, electricity and magnetism), Basic inorganic chemistry or consent of instructor.

Key topics in micro-electro-mechanical systems (MEMS) and micro-integrated system will be presented. Properties of *useful* materials will be discussed in context to MEMS and BioMEMS. Micro-electronics process modules used in the design and fabrication of MEMS and micro-integrated systems will be presented. Applications of these systems in a variety of sensors and transducers will be described. Recent advances in biomedical applications of MEMS will also be discussed in detail. Course will require a mid term design project, and a final project report of design of a Biomedical MEMS-based micro integrated system.

Reason: ECE 526/BME 581 Fundamentals of MEMS and Micro-Integrated Systems has been in existent for several semesters. The purpose of this EFD is to cross-list this course in the School of Mechanical Engineering under ME 527. There is considerable research in MEMS and micro-integrated systems occurring in Mechanical Engineering. Cross-listing this course both in ME and ECE would improve student awareness of this course in both programs and promote collaboration between ME and ECE faculty both in teaching and research. Unfortunately the course number ME 526 is in use so ME 527 was selected, as the next closest course number to ECE 526.

Details of the course are provided below in the two-page course profile.

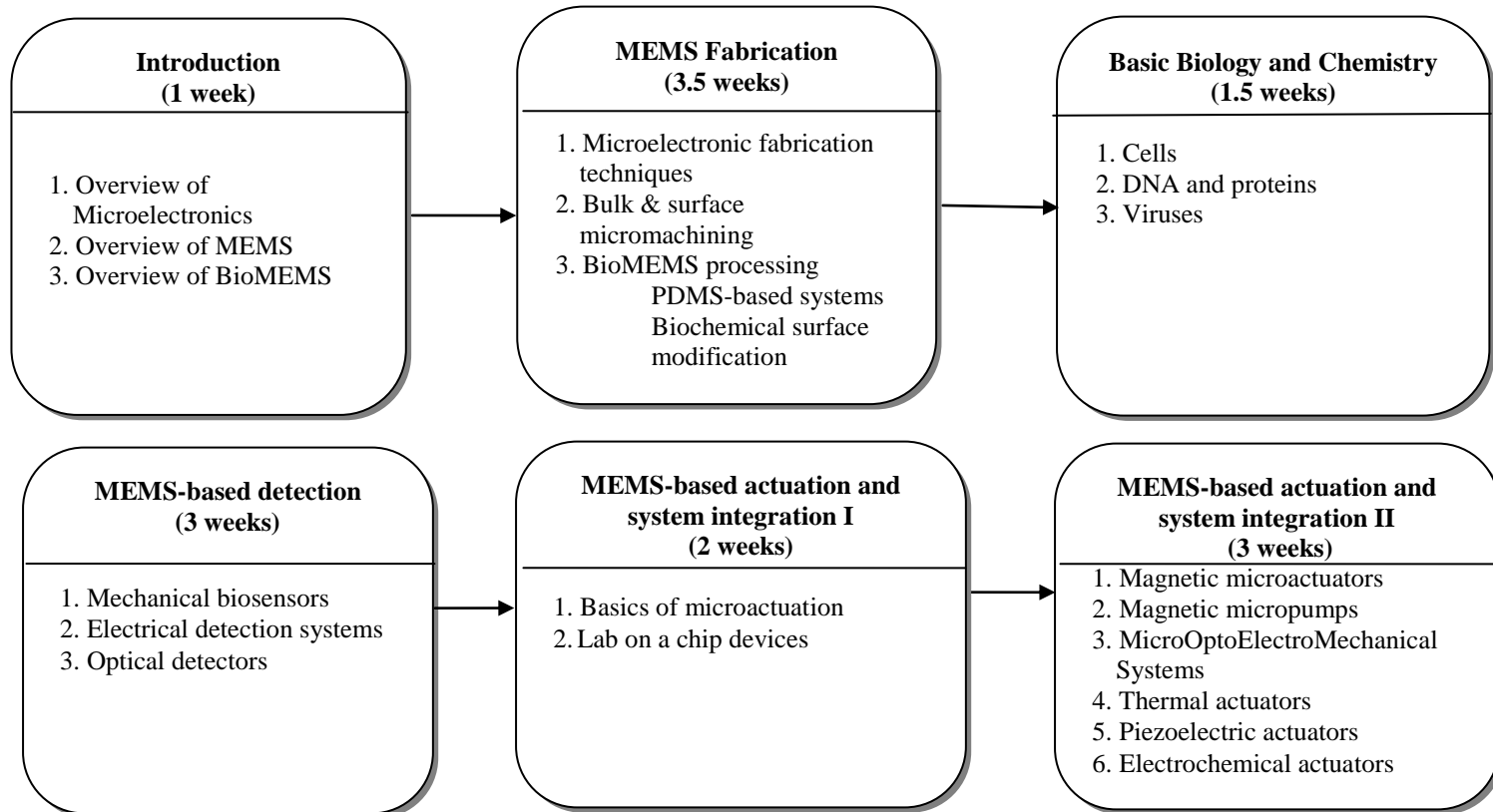


James D. Jones, Associate Head/Professor
School of Mechanical Engineering

ME 527/ECE 526/BME 581
Fundamentals of MEMS and Micro-Integrated Systems

Course Outcomes

1. To understand micro-integrated systems by applying principles from *mechanics&materials, micro/nanofabrication* and *basic chemistry&biology*.
2. To learn basic knowledge of MEMS *processing steps and modules*.
3. To understand basic design and operation of MEMS *sensors and transducers*.
4. To learn the basics of micro-fabricated *biosensors and biochips*.



COURSE NUMBER: ME 527/ ECE 526/BME 581		COURSE TITLE: Fundamentals of MEMS and Micro-Integrated Systems	
REQUIRED COURSE OR ELECTIVE COURSE: Elective		TERMS OFFERED: Fall	
TEXTBOOK/REQUIRED MATERIAL: Class Notes		PRE-REQUISITES: Differential equations, Basic physics (mechanics, optics, electricity and magnetism), Basic inorganic chemistry or consent of instructor	
COORDINATING FACULTY: C. Savran		COURSE OUTCOMES:	
COURSE DESCRIPTION: Key topics in micro-electro-mechanical systems (MEMS) and micro-integrated system will be presented. Properties of <i>useful</i> materials will be discussed in context to MEMS and BioMEMS. Micro-electronics process modules used in the design and fabrication of MEMS and micro-integrated systems will be presented. Applications of these systems in a variety of sensors and transducers will be described. Recent advances in biomedical applications of MEMS will also be discussed in detail. Course will require a mid term design project, and a final project report of design of a Biomedical MEMS-based micro integrated system.		To give graduate students or outstanding seniors the ability to analyze and design basic Microelectromechanical (MEMS) systems, and familiarization with their applications with strong emphasis on biomedical applications.	
ASSESSMENTS TOOLS: Class participation (10%), 2 quizzes (20%), final exam (25%), design project(25%) homework (20%)		1. To understand micro-integrated systems by applying principles from <i>mechanics&materials, micro/nanofabrication</i> and <i>basic chemistry&biology</i> .	
PROFESSIONAL COMPONENT: 1. Engineering Topics: Engineering Science – 2 credit (67%) Engineering Design – 1 credit (33%)		2. To learn basic knowledge of MEMS <i>processing steps and modules</i> .	
NATURE OF DESIGN CONTENT: The design component of this course will consist of designing a MEMS systems with a biomedical target application.		3. To understand basic design and operation of MEMS <i>sensors and transducers</i> .	
COMPUTER USAGE: Required for homework problems and design projects. Matlab experience is necessary. Familiarity with common finite element software packages (Pro-Mechanica, Ansys) is useful but not required.		4. To learn the basics of micro-fabricated <i>biosensors and biochips</i> .	
COURSE STRUCTURE/SCHEDULE: 1. Lecture – 2 days per week at 75 minutes.		RELATED ME PROGRAM OUTCOMES: N/A	
PREPARED BY: C. Savran (Based on the existing ECE 526: R. Bashir)		REVISION DATE: November 28, 2007	