TO: The Engineering Faculty
FROM: The Faculty of the Department of Biomedical Engineering
RE: New Dual-Level Course

The faculty of the Department of Biomedical Engineering has approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

BME 581/ECE 526 Fundamentals of MEMS and Micro-Integrated Systems
Sem. 1. Class 3, cr. 3. (Offered in alternate years.)
Prerequisites: Senior or graduate standing and consent of instructor.

Key topics in micro-electro-mechanical systems (MEMS) and biological micro-integrated systems; properties of materials for MEMS; microelectronic process modules for design and fabrication. Students will prepare a project report on design of a biomedical MEMS-based micro-integrated system.

Reason:

The motivation of the course stems from the fact that currently no course exists in the Biomedical Engineering in the field of MEMS and novel applications of microelectronic processing. All major research schools and most other schools have courses in this area. The course will introduce graduating seniors and beginning graduate students to the area of micro-integrated systems and MEMS. The course will nicely complement other microelectronics courses such as ECE 556 and ECE 557. In addition, it is also expected that students from other departments such as Mechanical Engineering, Chemical Engineering, and Chemistry might also enroll the class. There is a course from ME/ChemE that is being developed on microscale phenomena (597W). There is overlap between that course and the proposed course here. After discussions with the persons in charge for that course, we have decided to alternate the offerings of the two courses between Fall and Spring. This course was offered in Spring 2000, Spring 2001, and Fall 2002 with 25, 14, and 37, respectively.

George R. Wodicka
Professor and Head

Supporting Documentation:

1. Level: Graduate Level

2. Course Instructor: Rashid Bashir

3. Course Outline:

	Topics	*Lectures*
1.	Introduction to MEMS and Biomedical Micro-integrated Systems	2
2.	Electromechanical Fundamentals	3
3.	Scaling Laws and Miniaturization	2
4.	Properties of Materials for MEMS	3
5.	MEMS Processing Modules (Lithography, Etching, Deposition, Bonding)	8
6.	Process Integration	3
7.	Sensors and Actuators: Mechanical, Chemical, Biomedical, Magnetic	9
8.	Examples of Biomedical Micro-integrated Systems	10
9.	MEMS in Commercialization	2
10.	Exams	2
	Total	44

4. Text: Micromachined Transducers Sourcebook, G. Kovacs, McGraw Hill, New York, NY, 1998. ISBN 0-07-290722-3.