TO: The Engineering Faculty

FROM: The Faculty of the Department of Biomedical Engineering

RE: New Undergraduate-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 205 Biomedical Engineering Laboratory I

Sem. 1. Lab. 3, cr. 1.

Prerequisite: CHM 116, CS 156, ENG 106, and MA 166 or equivalent;
Co-requisite: BIOL 295E, BME 201 (Biomolecules)

This course is an introductory laboratory experience that focuses on engineering concepts and practices used in the analysis of biomolecules and cells. Topics include fundamental quantitative techniques of analysis; methods of isolation, identification, and quantification of biomolecules and cells; and analysis of integrated biosystems. The course concludes with a student driven design project.

Reason: This course provides important laboratory experiences where students are exposed to fundamental concepts and techniques in both biology and engineering, and the integration of these two fields. Subsequent laboratory courses will build on fundamental skills developed in this introductory course.

George Wodicka
Professor and Head

Supporting Documentation:

1. Level: Undergraduate – sophomore year

2. Course Instructors: Albena Ivanisevic, Ann Rundell, Sherry Voytik-Harbin

3. Course Outline:

Module 1: Fundamental Quantitative Techniques
Lab 1: Safety and Practices
Lab 2: Microscopy
Lab 3: Spectroscopy
Lab 4: Chromatography

Module 2: From Biomolecules to Cells: Isolation, Identification and Quantification
Lab 5: Centrifugation and Cell Fractionation
Lab 6: DNA and RNA Isolation
Lab 7: Electrophoresis
Lab 8: PCR

Module 3: Analysis of Integrated Biosystems
Lab 9: Enzyme Kinetics
Lab 10: Lipid Bilayer and Membrane Potential
Lab 11: Cell Cycle
Lab 12: Antibodies and ELISA

Module 4: Application and Design of Biomedical Platforms
Lab 13: DNA Synthesis
Lab 14: Biosensors: Ligand Attachment to Matrices
Lab 15 &16: Design Project: Biochips

4. Text: This course will use a laboratory manual to be prepared by the instructors and technical staff and purchased by the students from the book store.

5. Grading: will be based on pre-laboratory assignments and final laboratory reports.