BME 385 – Cell and Biomaterial Engineering Laboratory

3 Credits, 4 Contact hours
Instructor: Cheul H. Cho, PhD

Textbook(s)/Materials Required:
No textbook is required for this lab course. Class handouts of lectures and lab protocols will be provided.

Description:
This laboratory course is designed to provide students with valuable hands-on experience in the field of cell and biomaterial engineering. Experiments include biomaterial fabrication and characterization, mechanical testing of biomaterials, colorimetric protein assay, the basics of cell culture techniques, cell-based assays, the basics of light and scanning electron microscopy, flow cytometry analysis, and image capture and analysis. A lecture on the principles of a given technique will be followed by a laboratory activity. Generally, lab activities will be run at one week interval.

Prerequisites: BME 303, **Corequisites:** BME 420

This is a required course for the Biomaterials and Tissue Engineering Track.

Objectives:

3. Gain hands-on experience with biomedical engineering techniques and methods in the field of cell, tissue, and biomaterials engineering.
4. Learn the principles and practical experience of interfacing with the living systems for collection of biological data
5. Develop skills to design and conduct experiments, as well as analyze and interpret data
6. Apply knowledge of biology to biomedical problems
7. Apply modern engineering tools to collect, analyze and interpret biological systems
8. Work in groups and develop written communication skills

Student Outcomes:

Student outcome B - Ability to design and conduct experiments/analyze data
Related CLO – 3, 5

Student outcome K - Ability to use the techniques, skills, and modern engineering tools needed for engineering practice
Related CLO – 1, 3

Student outcome L: Apply bio/physio insight to BME application
Related CLO - 4

Student outcome M-2: Statistically analyze/interpret bio/physio data
Related CLO – 3, 5

Student outcome N: Collect and analyze data from living systems
Related CLO - 2

Topics: Basic Lab Skills, Colorimetric Protein Assay using Spectrophotometer, Fabrication of Biomaterials, FTIR Characterization of Biomaterials, Optical Microscopy and Quantitative Image Analysis, Scanning Electron Microscopy, Flow Cytometry Analysis, Basic Techniques in Mammalian Cell Culture I and II, Tensile Testing of Biomaterials Using Instron Mechanical Tester, Microencapsulation Techniques, DNA Quantitation Assay Using Spectrofluorometer