

## BME180B BIOMEDICAL ENGINEERING DESIGN

- Catalog Data:** **BME180B Biomedical Engineering Design (Credit Units: 4) W.**  
Design strategies, techniques, tools, and protocols commonly encountered in biomedical engineering; clinical experience at the UCI Medical Center and Beckman Laser Institute; industrial design experience in group projects with local biomedical companies; ethics, economic analysis, marketing, and FDA product approval. Prerequisites: BME180A. Open only to senior BME majors. In-progress grading. (Design Units: 4)
- Textbook:** King, P. H. and Fires, R. C., *Design of Biomedical Devices and Systems*. Marcel Dekker, 2002.
- References:** Lecture notes.
- Coordinator:** Abraham Lee and William Tang.
- Course Outcomes:** Students will be able to:  
Understand biomedical engineering problems and their solutions.  
Gain leadership and teamwork skills.  
Develop biomedical products from concept to market.
- Prerequisites By Topic:** Understanding of fundamentals of biomedical device and system product design processes and hands on experience in classroom project teams.
- Lecture Topics:** Biomedical engineering from bench to market.  
Fundamental product design tools.  
Computer-Aided Design (CAD) tools.  
Strategies and protocols in product development.  
Coordination and leadership in product development team.  
Design for quality, usability, manufacturability, reliability, and safety.  
Food and Drug Administration approval process and regulatory issues.  
Ethics and human factors in biomedical engineering.  
Licensing, patents, copyrights, and trade secrets.  
Market forecast and economic analysis.
- Class Schedule:** Each class meets 3 hours per week for 10 weeks and students are assigned to a 3 hour lab session per week and to a 1 hour discussion session per week.
- Computer Usage:** Students will use Microsoft Projects for project planning and tracking, Cobalt for 3D solid design, Labview for programming device controls, MATLAB for solving homework problems, and Microsoft Word to prepare design reports.
- Laboratory Projects:** Students will work in teams to design a solution to a real world biomedical engineering problem: Problem definition. Team building/allocation of work. Synthesis of concepts, design of solution. Analysis. Evaluation.
- Professional Component:** Contributes toward the Biomedical Engineering Major Design experience.

**Relationship to Program Outcomes:** This course relates to Program Outcomes 1, 2, and 4 as stated at: [http://www.eng.uci.edu/dept/objective\\_biomedical](http://www.eng.uci.edu/dept/objective_biomedical).

**Design Content Description**

**Approach:** Students will use learned skills to design systems and devices for biomedical engineering. (30%) Specific discussions on system and device designs (30%). Team projects in design process flows. (40%)

**Lectures:** 60%

**Laboratory Portion:** 40%

**Grading Criteria:**

Homework assignments:	40%
First quarter project report:	<u>60%</u>
	100%

**Estimated ABET Category Content:**

Mathematics and Basic Science: 0 credit units or 0%

Engineering Science: 0 credit units or 0%

Engineering Design: 4 credit units or 100%

**Prepared by:** Abraham Lee & William Tang **Date:** July 2005

**CEP Approved:** Fall 2004