

## **BME1 INTRODUCTION TO BIOMEDICAL ENGINEERING**

(Required for BME and BMEP)

- Catalog Data:** **BME1 Introduction to Biomedical Engineering (Credit Units: 3)**  
Introduction to the central topics of biomedical engineering. Offers a perspective on bioengineering as a discipline in a seminar format. Principles of problem definition, team design, engineering inventiveness, information access, communication, ethics, and social responsibility are emphasized. (Design units: 1)
- Textbook:** *Introduction to Biomedical Engineering*, John Enderle (ed.), Academic Press, 1999. (Recommended not required.)
- References:** Research Articles from BME faculty  
Class Notes
- Coordinator:** Tibor Juhasz
- Course Outcomes:** Students will:  
Define the discipline of Biomedical Engineering.  
Describe the scope of research in the Department of Biomedical Engineering.  
Complete a problem based design project of interest.  
Perform a literature search.  
Present sketches or graphics and explain design objectives, principles and expectations.  
Discuss difficulties, feasibility, time required for completion and any possible ethical questions.
- Prerequisites by Topic:**
- Lecture Topics:** Introduction to Biomedical Engineering  
Biomedical Microsystems and nanotransducers  
Biomedical computation  
Biomedical photonics  
Molecular, cellular, and tissue Engineering  
On ethical issues; government and university regulation  
On quality of products and research; reliability of products  
Discussion of design problems  
Review
- Class Schedule:** Meets for 3 hours of lecture each week for 10 weeks.
- Computer Usage:** Basic computer. Design graphics may be necessary.
- Laboratory Projects:**
- Professional Component:** Contributes toward the Biomedical Engineering Topics and Major Design experience.

**Relationship to Program Outcomes:** This course relates to Program Outcomes (c), (d), (f), (g), and (h) as stated at:  
<http://undergraduate.eng.uci.edu/degreeprograms/biomedical/mission>

**Design Content Description:**

**Approach:** The students will describe a biomedical engineering research project that they would like to carry out. This can be an invention of an instrument for scientific inquiries, or a device for clinical application or a gadget for home care, or any other things that would qualify as Biomedical Engineering. Or it can be a study of a scientific or technological problem concerning a phenomenon of interest to biomedical engineering. (50%)  
 Discussion of the phases of design (need, definition of the problem, synthesis, analysis, optimization, evaluation, presentation). Consideration of geometry and material properties. Consideration of physical, chemical and biological principles. Consideration of tools (software, instrumentation, devices). Design parameters and error analysis under various initial and boundary conditions. (50%)

**Lectures:** 100%

**Laboratory Portion:** 0%

**Grading Criteria:**

		<u>%Eng. Sci.</u>	<u>%Eng. Design</u>	<u>%Total</u>
Lectures:	Questions on Noteboard:	9%		9%
	Individual Lecture Report:	15%		15%
Midterm:		8%		8%
Final:		8%		8%
Project:	Individual Task Report:	5%	10%	15%
	Final Report	20%	20%	40%
		<u>65%</u>	<u>30%</u>	<u>95%</u>
Bonus:	Online Evaluations / ad hoc tasks:			<u>5%</u>
				100%

**Estimated ABET Category Content:**

Mathematics and Basic Science:	<u>0</u>	Credit units or	<u>0%</u>
Engineering Science:	<u>2</u>	Credit units or	<u>67%</u>
Engineering Design:	<u>1</u>	Credit units or	<u>33%</u>

**Prepared by:** Abraham P. Lee **Date:** July 2007

**CEP Approved:** Fall 2004