

## BME135 PHOTOMEDICINE

- Catalog Data:** **BME135 Photomedicine (Credit Units: 4) F.** Studies the use of optical and engineering-based systems (laser-based) for diagnosis, treating diseases, manipulation of cells and cell function. Physical, optical, and electro-optical principles are explored regarding molecular, cellular, organ, and organism applications. Prerequisites: Physics 3A-B-C or 7A-B-D, or EECS10 or consent of instructor. Same as Biological Sciences D130. Formerly ECE175. (Design units: 0)
- Textbook:** Berns, M.W., *Biological Microirradiation*. This book will be loaned to students since it is no longer in print.  
Neimz, M. H., *Laser Tissue Interactions*. Available on loan at the Science Library.
- References:** Each lecturer will provide reference articles for the students.
- Coordinator:** Michael W. Berns.
- Course Outcomes:** Students will be able to:  
Define the discipline of bio-photonics/photomedicine.  
Describe the research of the various faculty at the Beckman Laser Institute in the Department of Biomedical Engineering and the BLI.  
Assess knowledge learned in the sub disciplines listed below.
- Prerequisites By Topic:** Cell Biology, Physics.
- Lecture Topics:** Optical instrumentation.  
Light properties.  
Optical coherence tomography.  
Diffuse reflectance.  
Photochemistry.  
Photodynamic therapy.  
Laser scissors.  
Laser tweezers.  
Multiphoton microscopy.  
Lasers in gynecology.  
Cancer, dermatology, veterinary medicine, dentistry, and other clinical applications.
- Class Schedule:** Class meets 3 hours per week for 10 weeks and students are assigned to a 1 hour discussion session per week.
- Computer Usage:** None.
- Laboratory Projects:** There is no lab work associated with this course however, the students will be given demonstrations of the equipment.
- Professional Component:** Contributes toward the Biomedical Engineering Topics experience.

**Relationship to Program Outcomes:** This course relates to Program Outcomes 1, 8, 9, and 10 as stated at: [http://www.eng.uci.edu/dept/objective\\_biomedical](http://www.eng.uci.edu/dept/objective_biomedical).

**Design Content Description**

*Approach:*

*Lectures:*

*Laboratory Portion:*

**Grading Criteria:**

Midterm exam: 50%

Final exam: 50%

100%

The exams are essay, short answer, definitions, and multiple choice. Some involve problem solving.

**Estimated ABET Category Content:**

Mathematics and Basic Science: 0 credit units or 0%

Engineering Science: 4 credit units or 100%

Engineering Design: 0 credit units or 0%

**Prepared by:** Michael W. Berns **Date:** July 2005

**CEP Approved:** Fall 2005