

BME135 PHOTOMEDICINE

(Elective for BME)

- Catalog Data:** **BME135 Photomedicine (Credit Units: 4)** 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- or Physics 7B/7LB or Physics 7C/7LC or EECS12 or consent of instructor. Same as Biological Sciences D130. (Design units: 0)
- Textbook:** Berns, M.W., *Biological Microirradiation On loan at the Science Library*
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
- Relationship to Program Outcomes:** This course relates to the Program Outcomes for **BME:** a, b, c, and k as stated at:
<http://undergraduate.eng.uci.edu/degreeprograms/biomedical/mission>
- Course Outcomes / Performance Criteria:** Students will:
Define the discipline of bio-photonics/photomedicine. (BME k)
Describe the research of the various faculty at the Beckman Laser Institute in the Department of Biomedical Engineering and the BLI. (BME k)
Assess knowledge learned in the sub disciplines listed below. (BME a, b, c)
- 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:** Meets for 3 hours of lecture and 1 hour of discussion each week for 10 weeks.
- Computer Usage:**

Laboratory Projects:

Professional Component: Contributes toward the Biomedical Engineering Topics experience.

Grading Criteria:

Midterm #1	33%
Midterm #2:	33%
Final exam:	<u>34%</u>
	100%

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 2008

CEP Approved: Winter 2006