BE 242 Biophotonics

Syllabus

Instructor:
Instructor: Prof. Liang Gao Office: EV 4121F
Email: gaol@ucla.edu

Instructor Office Hours:
Thursday, 10:00 -11:00 am
In person: EV 4121F
Zoom: meeting ID 545 463 4106

Lecture:
Monday & Wednesday, 1:00 - 2:50 pm, EV 5101

Credit:
4 hours

Course Website:
https://bruinlearn.ucla.edu/courses/129216

Course Objective:
To introduce principles and survey applications in the field of biophotonics.

Instructor Teaching & Learning Philosophy:
I believe and teach that technology is becoming increasingly interdisciplinary, particularly between engineering, medicine, and biology. Your ability to learn and integrate ideas and concepts from multiple disciplines will enable you to investigate and solve many of the new engineering problems we will face in the future. I value three things in students and colleagues: hard work, productivity, and creativity. To be successful in my course and in life, you must demonstrate that you possess one or more of these three values.

Required Textbook:
Wang, Lihong V., and Hsin-I. Wu. **Biomedical optics: principles and imaging**. John Wiley & Sons, 2012.

Classroom lectures will emphasize the main points in the material and allow for discussion. I expect you to read the assigned chapters but focus on the concepts presented in lecture. Homework and exams will be structured with the assumption that you have read all of the assigned text and handout material.

Other Suggested References:
Introduction of Biophotonics, by Paras Prasad, John Wiley & Sons, Inc, 2003.
Saleh and Teich, **Fundamentals of Photonics**
Hecht, **Optics**, 4th edition
Verdeyen, **Laser Electronics**
Born and Wolf, **Principles of Optics**, 7th edition
Hollas, **Modern Spectroscopy**, 4th edition
Vo-Dinh, **Biomedical Photonics Handbook**
Berlien and Muller, **Applied Laser Medicine**
Welch and van Gemert, **Optical-Thermal Response of Laser Irradiated Tissue**

Homework:
There will be four graded homework sets for this course. Homework assignments will be distributed approximately 1 week before they are due. Solutions will be posted on the course website. Late homework will be accepted, but 10% will be deducted for each day it is late.

Exams:

One midterm and one final exams will be given in class. You will be allowed to have one equation sheet (front and back) for each exam.

An excuse from the Dean's office is the only acceptable excuse for missing an exam.

Grading:

Your final grade in this course will be based on your total score on all the components of the course. The total score is broken down into the following components:

Midterm	25%
Homework	25%
Final	40%
Participation	10%
Total	**100%**

Note: At the end of the semester, the course grade scale may be adjusted to reflect large breaks between groups of students. Efforts at classroom participation have been known to make a difference in a grade.

Extra credit: You will be awarded up to 1 extra point on your final grade if you complete the end-of-quarter course evaluation in MyUCLA. I will be able to see a list of who completed the evaluation. However, I will have no way to tell who wrote what – so your comments will remain confidential.

Absences and Excused Grades:

There is no way to make up a missed semester exam. An unexcused absence from a semester exam will be assigned a zero grade. An excused absence requires a letter from the Dean's office. An excused absence from a semester exam will receive an EX grade. At the end of the semester, the EX grade will be replaced with the average of your grades on the other exams and the final.

Grade Disputes:

Grade disputes on homework will be settled at the discretion of the TA. Grade disputes on the semester exams will be settled at the discretion of Prof. Gao. In both cases, the problem in question will be RE-GRADED, making it possible for you to receive a lower score. To dispute an exam grade, you must explain your dispute IN WRITING and staple this to the front of your exam. Prof. Gao will then re-grade your exam.

BE 298 - Biophotonics Syllabus

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Wang, Lihong V., and Hsin-I. Wu. Biomedical optics: principles and imaging. John Wiley & Sons, 2012.

Week	Date		Book Chapter	Topic
1	Mar	28		Course Introduction
		30	Notes	First-order design concepts
2	Apr	4		First-order design concepts
		6		First-order design concepts
3		11	Notes	Introduction to Zemax
		13	Notes	Optical abberation theory: General
4		18		Optical abberation theory: General
		20	Wang 1, 2	Optical Properties of Tissues
5		25		Optical Properties of Tissues
		27		**Midterm Exam**
6	May	2	Wang 8	Ballastic Imaging and Microscopy
		4		Ballastic Imaging and Microscopy
7		9		Ballastic Imaging and Microscopy
		11		Ballastic Imaging and Microscopy
8		16	Wang 9	Optical Coherence Tomography
		18		Optical Coherence Tomography
9		23	Wang 12	Photoacoustics
		25		Photoacoustics
10		30		**Memorial Day Holiday**
	Jun	1		**Final Exam**

Syllabus content subject to change.