

Cover Sheet: Request 10820

EEE4553 Introduction to Biophotonics

Info

Process	Course New Ugrad/Pro
Status	Pending
Submitter	Edvardsson, Laurie laurie@ece.ufl.edu
Created	3/1/2016 3:20:47 PM
Updated	6/24/2016 4:02:41 PM
Description	Introduction to the principles of optics, lasers and biology, the interaction of light with cells and tissues, and various optical imaging, sensing and activation techniques and their applications in biomedicine.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Electrical and Computer Engineering 011905000	Fox, Robert M		3/8/2016
Added 4553 Biophotonics - ucc1 syl.docx					3/2/2016
College	Approved	ENG - College of Engineering	Caple, Elizabeth		4/27/2016
No document changes					
University Curriculum Committee	Comment	PV - University Curriculum Committee (UCC)	Case, Brandon	Added to the September agenda.	6/24/2016
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			6/24/2016
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 10820

Info

Request: EEE4553 Introduction to Biophotonics

Request description: Introduction to the principles of optics, lasers and biology, the interaction of light with cells and tissues, and various optical imaging, sensing and activation techniques and their applications in biomedicine.

Submitter: Edvardsson, Laurie laurie@ece.ufl.edu

Created: 9/14/2016 8:47:28 AM

Form version: 2

Responses

Recommended PrefixEEE

Course Level 4

Number 553

Lab Code None

Course TitleIntroduction to Biophotonics

Transcript TitleIntro to Biophotonics

Effective Term Fall

Effective Year2017

Rotating Topic?No

Amount of Credit3

Repeatable Credit?No

S/U Only?No

Contact Type Regularly Scheduled

Degree TypeBaccalaureate

Weekly Contact Hours 3

Category of Instruction Advanced

Delivery Method(s)On-Campus

Course Description Introduction to the principles of optics, lasers and biology, the interaction of light with cells and tissues, and various optical imaging, sensing and activation techniques and their applications in biomedicine.

Prerequisites EEL 3003(C) or EEL 3111C(C)

Co-requisites None

Rationale and Placement in Curriculum Biophotonics is the science of generating and harnessing light (photons) to image, detect and manipulate biological materials. This technical elective course is highly interdisciplinary and is designed to bring together students with various engineering or physics backgrounds

Course Objectives The student will be able to explain the principles of optics and lasers, the basics of biology, the interaction of light with cells and tissues, and the application of various optical imaging and sensing techniques in biomedicine.

Course Textbook(s) and/or Other Assigned ReadingRequired:

Introduction to Biophotonics by Paras N. Prasad

Recommended Reading:

Biomedical Optics: Principles and Imaging by L. V. Wang, H.-I. Wu

Introduction to Modern Optics by Grant R. Fowles

Optical Imaging and Microscopy : Techniques and Advanced Systems by Peter Török and Fu-Jen Kao

Introduction to Biomedical Imaging by Andrew G. Webb

Weekly Schedule of Topics Week 1 Introduction, Fundamentals Light And Matter
Week 2 Principles of Lasers, Current Laser Technology, Nonlinear Optics
Week 3 Light-Matter Interactions, Photobiology
Week 4 Basics of Biology
Week 5 Bioimaging: Principles of Optical Microscopy
Week 6 Fluorescence Microscopy
Week 7 Confocal Microscopy, Diffusion Optical Tomography
Week 8 Multiphoton Microscopy, Nonlinear Optical Imaging
Week 9 Optical Coherence Tomography
Week 10 MEMS Introduction, MEMS-Based Bioimaging
Week 11 Bioimaging Applications: Cellular, Tissue and In Vivo Imaging
Week 12 Optical Sensors Fiber-Optic Sensors SPR Biosensors
Week 13 Laser Tweezers
Week 14 Terahertz Spectroscopy and Imaging

Grading Scheme 20% Homework
20% Project
60% Exams

Instructor(s) Dr. Huikai Xie

EEE 4553 Introduction to Biophotonics

1. Catalog Description – (3 credits) Introduction to the principles of optics, lasers and biology, the interaction of light with cells and tissues, and various optical imaging, sensing and activation techniques and their applications in biomedicine.
2. Pre-requisites – EEL 3003 or EEL 3111C
3. Course Objectives – The student will be able to explain the principles of optics and lasers, the basics of biology, the interaction of light with cells and tissues, and the application of various optical imaging and sensing techniques in biomedicine.
4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) – 3 credits of Engineering Science
5. Relationship of course to program outcomes (ABET only – undergraduate courses) – EE2, a
6. Instructor – Dr. Huikai Xie
 - a. Office location: 221 Larsen Hall
 - b. Telephone: 352-846-0441
 - c. E-mail address: hkx@ufl.edu
 - d. Class Web site: e-Learning (Sakai)
 - e. Office hours: Tuesday, Thursday 5:00 p.m.-6:30 p.m.
7. Teaching Assistant - TBD
 - a. Office location:
 - b. Telephone:
 - c. E-mail address:
 - d. Office hours:
8. Meeting Times and Location – Tuesday 8th-9th period, Thursday 9th period, 328 Benton
9. Class/laboratory schedule - 3 class periods each week consisting of 50 minutes each
10. Material and Supply Fees – None
11. Textbooks and Software Required -
 - a. Title: Introduction to Biophotonics
 - b. Author: Paras N. Prasad
 - c. Publication date and edition: May 2003
 - d. ISBN number: 0-471-28770-9
12. Recommended Reading -
 - Biomedical Optics: Principles and Imaging, L. V. Wang, H.-I. Wu, 2007, Wiley.
 - Introduction to Modern Optics, Grant R. Fowles, 2nd ed., 1989, Dover Publications.

- Optical Imaging and Microscopy : Techniques and Advanced Systems, Peter Török and Fu-Jen Kao, 2004, Springer.
- Introduction to Biomedical Imaging, Andrew G. Webb, 2002, IEEE Press.
- Biophotonics International, available online: <http://www.photonics.com/bio/>

13. Course Outline -

- Week 1 Introduction, Fundamentals Light And Matter
- Week 2 Principles of Lasers, Current Laser Technology, Nonlinear Optics
- Week 3 Light-Matter Interactions, Photobiology
- Week 4 Basics of Biology
- Week 5 Bioimaging: Principles of Optical Microscopy
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- Week 14 Terahertz Spectroscopy and Imaging

14. Attendance and Expectations - Cell phones and other electronic devices are to be silenced. No text messaging during class or exams.

This class requires a project. Each project team consists of two to three students and is required to turn in a one-page project proposal, a progress report and a final report. There is also a final project presentation and each team will be given about 15 minutes for their presentation.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

15. Grading –

- 20% Homework
- 20% Project
- 60% Exams

This course is co-listed with the graduate class. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve more advanced concepts with respect to the undergraduate section. The project portion of the graduate section will require more theoretical analysis with respect to the undergraduate section.

16. Grading Scale –

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59

“A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better).”

Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

17. Make-Up Exam Policy - If you have a University-approved excuse and arrange for it in advance, or in case of documented emergency, a make-up exam will be allowed and arrangements can be made for making up missed work. University attendance policies can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Otherwise, make-up exams will be considered only in extraordinary cases, and must be taken before the scheduled exam. The student must submit a written petition to the instructor two weeks prior to the scheduled exam and the instructor must approve the petition.

18. Honesty Policy – UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

19. Accommodation for Students with Disabilities – Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide documentation to the student who must then provide this documentation to the course instructor when requesting accommodation.

20. UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
- UF Counseling & Wellness Center, psychological and psychiatric services, 3190 Radio Rd, 392-1575, online: <http://www.counseling.ufl.edu/cwc/Default.aspx>,
 - Career Resource Center, Reitz Union, career and job search services, 392-1601.
 - University Police Department, 392-1111 or 911 for emergencies

21. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such

violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

22. Course Evaluation – Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at: <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at: <https://evaluations.ufl.edu/results>.