



**PRAIRIE VIEW A&M UNIVERSITY
DEPARTMENT OF PHYSICS**

**PHYS-4163: Special Topics -
Introduction to Biophysics and Biomedical Imaging
COURSE SYLLABUS
Spring-2012 - PHYS-4163-P01 (CRN 22854)**

Faculty: Premkumar B. Saganti, Ph. D.
Co-Faculty: Gloria Regisford, Ph. D.
Harriette Howard-Lee Block, Ph. D.

Instructors: Maria Fadri-Moskwik, PhD (mfadri@bcm.edu)
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Lecture / Lab Sessions: Wednesdays
5:00 – 7:50 PM
Room: 103

Office Hours: Wednesday 2:00 PM – 4:00 PM

Text Book(s): **Fundamentals of Light Microscopy and Electronic Imaging**, Murphy (2001), New York. Wiley-Liss.
Medical Imaging Physics, Hendee and Ritenour (2002), New York. Wiley-Liss.
Introduction to Matlab (2nd ed), Etter (2005), Upper Saddle River, NJ. Prentice Hall.
Molecular Biology of the Cell, Alberts (2007), NY Garland Science.
Course Booklet – Drs Fadri, Udan, Reyes, (2012), University Readers

Supplementary Material and Help:

1. A comprehensive set of course material taught and tested will also be made available through WebCT and can be accessed via <http://ecourses.pvamu.edu/>
2. Selected information and material will also be made available through the website - <http://www.pvamu.edu/pages/2811.asp>
3. A series of tutorial sessions are also being made available through the physics department for individual problem discussions.

COURSE DESCRIPTION:

This course is designed to provide students with the required foundation for understanding the principles of biophysics and their application in the biological sciences and medical applications. The course will prepare the students to utilize elementary concepts of modern biophysics and to appreciate problems in the current biomedicine and biomedical research. Students will demonstrate understanding of the contributions of biology, physics, and engineering to the interdisciplinary field of biomedical imaging. Topics to be covered include: The fundamentals of digital image acquisition and processing, optical, confocal and fluorescence microscopy, membrane biophysics, x-ray imaging, ultrasound, and magnetic resonance imaging.

COURSE GOAL and OUTCOME:

The primary goal of this course is to understand the fundamental concepts in the fields of medical imaging and biophysics principles. The primary outcome of this course is to achieve knowledge in all medical imaging modalities and their applications in research.

PERFORMANCE EVALUATIONS and GRADING:

- A set of problems will be assigned from each chapter discussed in the class and are expected to be worked-out independently / individually and turned in for credit by the specified time.
- A list of short summaries will be assigned on selected subject areas with emphasis on the current advancements and applications.
- Exams (60%); Quizzes (15%); Presentations (10%); Reports (10%); Participation (5%)
- GRADES → **A:** 90-100; **B:** 80-89; **C:** 70-79; **D:** 60-69; **F:** <60

ATTENDANCE POLICY:

Class will start and end at the prescribed times. Attendance in every class is expected and is the student's responsibility. Absence or tardiness may result in lowered grades. Excessive absenteeism, whether EXCUSED or UNEXCUSED, may result in a student's course grade being reduced or assignment of a grade of "F". Absences are accumulated beginning with the first day of class. More detailed information is available from the **Registration and Term Information Fall 2005** (http://acad.pvamu.edu/content/registrar/files/fall2005_revised.pdf).

ASSISTANCE FOR STUDENTS WITH DISABILITIES:

Lecture class room and additional tutorial session will all be held in New Science building and this building is accessible to people with disabilities. My office is also located in New Science building (Room 330-AD). For any further clarification and requirements, you may contact the Office of Disability Services on campus located in Evans Hall Room 315, Tel: (936) 857-2610.

CONDUCT AND ETHICS:

A strict code of ethics will be imposed in the class room lecture sessions, in all the examinations, and on all homework assignments. It is imperative that the student will make every effort to ensure that he / she will abide by the university standards and expectations and pledge to refrain from any unethical activity and plagiarism.

COURSE TIME-LINE

This schedule may be modified as needed

Week	Topics	Activities and Assignments
Jan 18th	Imaging in the biological sciences: from molecules to humans	Quiz-01
Jan 25th	Principles of optical microscopy: using light microscopy in pathology	
Feb 1st	Fluorescence microscopy: cytology and disease diagnosis	Quiz-02
Feb 8th	Confocal microscopy: intravital/live imaging	
Feb 15th	Image capture and image processing	
Feb 22nd	EXAM-01	EXAM-01
Feb 29th	Membrane biophysics and electron microscopy	Quiz-03
Mar 7th	Intro to Human Physiology, Biomedical Imaging and Image Processing	Guest speaker
Mar 14th	SPRING BREAK MIDSEMESTER GRADES DUE	
Mar 21st	Intro to Skeletal Physiology and X-Ray/CT Imaging	Quiz-04
Mar 28th	Pregnancy, Parturition, Gestation, and Ultrasound	
Apr 4th	Cancer, Tumorigenesis, and Tumor Physiology and Intro to MRI	Quiz-05
Apr 11th	fMRI: Functional MRI and Advances	Guest speaker
Apr 18th	EXAM-02 Guest lecture: Nanoparticle drug delivery	EXAM-02
Apr 25th	Presentations!	
May 2nd	EXAM STUDY DAYS	STUDY DAYS
TBA	FINAL EXAM	

University Rules and Procedures

Disability statement (See Student Handbook):

Students with disabilities, including learning disabilities, who wish to request accommodations in class, should register with the Services for Students with Disabilities (SSD) at (936) 857-2693/2694 early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation of their disability to the SSD coordinator.

Academic misconduct (See Student Handbook):

You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

Forms of academic dishonesty:

1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.
2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.
3. Fabrication: use of invented information or falsified research.
4. Plagiarism: unacknowledged quotation and/or paraphrase of someone else's words, ideas, or data as one's own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one's own work also constitutes plagiarism.

Nonacademic misconduct (See Student Handbook)

The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

Sexual misconduct (See Student Handbook):

Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.

Attendance Policy:

Prairie View A&M University requires regular class attendance. Excessive absences will result in lowered grades. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in assignment of a grade of "F". Absences are accumulated beginning with the first day of class.

Student Academic Appeals Process

Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.