

**Syllabus for  
Biomedical Imaging ECE432/CR332**

**Course Description:**

The course presents the fundamentals and applications of common medical imaging techniques, for example: x-ray imaging and computed tomography, nuclear medicine, magnetic resonance imaging, ultrasound, and optical imaging. In addition, as a basis for biomedical imaging, introductory material on general image formation concepts and characteristics are presented, including human visual perception and psychophysics. Prerequisite ECE 431 or ECE410 or CR310 or Permission of the instructor. Three credits.

This course requires substantial programming effort and emphasis is place on good software engineering practices. Students will learn enough signal processing to write their image processing applications.

**Spring 2014 Schedule**

**Professor D. Lyon, Ph.D.,**

**Contact Information**

**Phone** ..... (203)254-4000x3155  
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**E-mail:**..... dlyon@fairfield.edu  
**Web:** .....http://www.DocJava.com

**Office Hours BNW112/BNW133**

Tuesday ..... 2:00-4:00 pm  
Wednesday ..... 1:00-2:00 pm  
Thursday ..... 2:00-4:00 pm

**Or by appointment.**

**TO FIND ME:  
CHECK BNW133 or CALL x3155**

**Course Offerings BNW133**

ECE420..... Tu. 5-7:30

CR320/ECE460.....	W 2-4:30
CR332/ECE432.....	Th 5-7:30

<b>Textbook:</b> .....	Image Processing, in Java by Douglas Lyon
<b>Reference Material:</b> ....	Java Digital Signal Processing, By Lyon and Rao, Java for Programmers, By Lyon
<b>E-mail</b> .....	access is required.
<b>Computer Usage:</b> .....	Students <b>MUST</b> have access to a computer with Java.
<b>Course Notes:</b> .....	<b>Handouts</b> /diskettes/e-mail, web page

### Course Objectives:

This course is designed to support the signal processing and computer systems domain in the Computer Engineering program. When the course is done, Students will have written their own Java applications for doing image processing.

#### Course Learning Goals

- G1. The students will learn the principles of Biomedical Imaging
- G2. The student will become proficient with the usage of the Java language.
- G3. The student will obtain a basic understanding of image filtering

OC1 Students demonstrate the ability to implements a practical image processing program.

OC2. Students build a detection program and deploy it on the web

OC3: Studens build an image seuqnece processing application

OC4. Students make use of statistical analysis to optimize performance.

#### Outcomes:

When the course is done,.

#### Performance Indicators:

Aside from the basics assessment procedures based on homeworks and tests, Students must obtain 75% or better on all tests. Additionally, students must perform at least 75% on the homeworks.

**Student Activities: Learning** a new computer language is very much a hands-on activity, which cannot be learned from lectures or textbook reading alone. It does require those lectures and textbooks, but the real learning results from the laboratory trials and the homework assignments. To achieve the course objectives, the student must have good class attendance and participation, conduct the computer programming tasks during the laboratory periods as well as the assigned homework. Homework assignments and laboratory trials are due at the beginning of the class following the assignments. They are to be placed in an envelope containing the student's name. The contents of the envelope will be a diskette and a paper copy of the requested Java source code.

**Course Requirements:** The schedule of activities and topics to be covered each week are outlined below. Each week will begin with responses to questions and a brief review on the previous week's topics. The first week will begin with administrative announcements and a review of this syllabus.

#### Grading:

Midterm 1/3  
 Final Examination 1/3  
 Homework 1/3 includes tests, quizzes, projects, etc.

Assignments are due at the beginning of class. Assignments handed in during class lose 5 points, after class 10 points. Late submittals lose 10 points per day including weekends and holidays. Missing a test results in a zero unless a written excuse is presented.

Homework requirements:

Print out a listing of the program. Print out the program input and output. You may need to do this at various levels of detail. Hand in a labeled disk with a printout. Place the disk in a #10 letter envelope and staple the envelope to the printout. Come to class early, and demo your homework.

A missed class is not an excuse for missed work. Home works are collected from students who attend class. Missed assignments loose 10 points per day late. HW counts for 1/3 of your grade. Additionally, home works tend to build toward a single project. That project will often culminate in a working system. The home works are building blocks, central to your active learning in the classroom.

Thus, missing home works classes is a most serious matter. I am available for extra help, if you need it. Topics: (coverage paced will be altered to accommodate the class):

**Attendance Policy:** Students are responsible to acquire notes and homework assignment from classmates in case of absence. You are expected to attend class each time it meets. If you are not present at the time I take attendance you will be marked absent. It is your responsibility to inform me directly after class that you arrived late. Exams and projects may be moved up or postponed according to the pace of the course, so you are responsible for being present at each class meeting to hear announcements as well as learn the ideas presented. Numerous absences and/or late arrivals will negatively affect your final grade. You will be given 3 excused or unexcused absences for the entire semester. For each additional absence 10 points will be deducted from your final grade. An unexcused absence from a midterm or final will be counted as a zero. Electronic submissions are not allowed for the midterm or final, except by special permission.

**Ethics:** Students are allowed to help each other, but only for homework. Midterms and Finals must be done without the help of other students. All work should be your own. Duplication of work is cheating. We adhere to the academic dishonesty section of the catalog.

**Disabilities:** Fairfield University School of Engineering complies with the American with Disabilities Act and Section 504 of the Rehabilitation Act. Any student who may require an accommodation under such provisions should contact Aimee Tiu-Wu, Director of Academic & Disability Support Services at (203) 254-4000 ext. 2615 or email: <mailto:atiu-wu@mail.fairfield.edu>atiu-wu@mail.fairfield.edu