

BMED/ECE 4783 Introduction to Biomedical Image Processing (Elective)

Catalog Description: BMED 4783 Intro-Medical Imaging Proc (3-0-3)
Prerequisite(s): ECE 2025 and [MATH 3770 or ISYE 3770 or CEE 3770 or BMED 2400]
A study of mathematical methods used in medical image acquisition and processing. Concepts, algorithms, and methods associated with acquisition, processing, and display of two- and three-dimensional medical imaged are studied.

Textbook: Digital Image Processing, Gonzalez and Woods, 3rd edition, Prentice Hall (2007)

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Topics Covered:

1. Linear 2-D Transforms
2. Image Formation and Representation
3. Image Enhancement and Restoration
4. Image Analysis
5. Image Compression
6. Reconstruction from Projections

Course outcomes:

Students who complete this course will:

Outcome 1: Know the basics of methods common to medical image acquisition and medical image processing (Student Outcome e)

Outcome 2: Understand and apply basic image processing techniques - enhancement and restoration (Student Outcomes e and k)

Outcome 3: Understand and apply advanced image processing techniques - segmentation, registration, and motion analysis - to medical problems (Student Outcomes e and k)

Correlation between course outcomes and student outcomes:

BMED 4783											
	Biomedical Engineering Student Outcomes										
Course outcomes	a	b	c	d	e	f	g	h	i	j	k
1					X						
2					X						X
3					X						X

The Wallace H. Coulter Department of Biomedical Engineering Student Outcomes:

- a. an ability to apply knowledge of mathematics, science, and engineering;
- b. an ability to design and conduct experiments, as well as to analyze and interpret data;
- c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, societal, political, ethical, health and safety, manufacturability, and sustainability;
- d. an ability to function on multidisciplinary teams;
- e. an ability to identify, formulate, and solve engineering problems;
- f. an understanding of professional and ethical responsibility;
- g. an ability to communicate effectively;
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i. a recognition of the need for, and an ability to engage in lifelong learning;
- j. a knowledge of contemporary issues;
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;