EE 416 Introduction to Digital Image Processing

Designation: Elective

Catalog Description:

Credits: 3

Pre- and Co-requisites: Pre: 315 or consent.

Class/Lab Schedule: 3 hour lecture.

Topics Covered:
- Basic digital image concepts
- Fundamentals of image representation in Matlab
- Intensity Transformations and Spatial Filtering
- Frequency Domain Processing
- Image Restoration
- Color Image Processing
- Wavelets
- Image Compression

Textbook and Other Required Materials:

Course Objectives and Relationship to Program Objectives:
Students should be able to (i) understand and analyze image processing problems and (ii) design algorithms to solve image processing problems and meet design specifications [1, 2, 4].

Course Outcomes and Their Relationship to Program Outcomes
The course outcomes are closely related to the topics covered
- Understand the relevant aspects of digital image representation and their practical implications [1,5,11].
- Have the ability to design pointwise intensity transformations to meet stated specifications. [1, 2, 3, 5, 11]
- Understand 2-D convolution, the 2-D DFT, and have the ability to design systems using these concepts. [1, 2, 3, 5, 11]
- Have a command of basic image restoration techniques [1,5,11].
- Understand the role of alternative color spaces, and the design requirements leading to choices of color space [1,2,3,5,11].
• Appreciate the utility of wavelet decompositions and their role in image processing systems [1,5,11].
• Have an understanding of the underlying mechanisms of image compression, and the ability to design systems using standard algorithms to meet design specifications [1,2,4,5,11].

**Contribution of Course to Meeting the Professional Component**
Engineering topics: 100%.

**Computer Usage:**
Matlab is used throughout the course.

**Design Credits and Features:**
EE416 has 1 design credit. Homework problems require the solution of open-ended design problems (problems for which multiple approaches can be taken to reach the stated objectives).

**Instructor(s):** Todd R. Reed.

**Person(s) Preparing Syllabus and Date:** Todd R. Reed, 4/29/06; revised 5/30/06.