

### Course Description

This course introduces methods to process images on a computer. Topics include the formation and quantification of digital images, morphological image processing, image enhancement in the spatial and frequency domain, image restoration, color image processing, image compression, image segmentation, image representation and description. This course is mathematics-oriented. It requires basic knowledge of linear algebra, calculus and linear filtering. Familiarity with the programming language MATLAB is needed. *Exclusion(s)*: COMP 4421, MATH 4336  
*Prerequisite(s)*: ELEC 3100 AND MATH 2111

### List of Topics

Week 1	Introduction
Week 2	Transforms
Week 3	Morphological Image Processing
Week 4	Image Enhancement in the Spatial Domain 1
Week 5	Image Enhancement in the Spatial Domain 2
Week 6	Image Enhancement in the Frequency Domain
Week 7	Mid-term Exam (Oct. 17)
Week 8	Image Restoration
Week 9	Color Image Processing
Week 10	Image Compression
Week 11	Image Segmentation 1
Week 12	Image Segmentation 2
Week 13	Final Review

### Statement of Objectives/Outcomes:

On successful completion of this course, students will be able to

CO1: Understand the formation and quantification of digital images

CO2: Understand the basic principles behind spatial filtering and frequency domain filtering

CO3: Use filtering concept to enhance images and restore noisy-corrupted images

CO4: Understand the difference between binary images and gray value images, as well as the difference between gray value images and color images.

Textbook:

Rafael C. Gonzalez and Richard E. Woods, *Digital Image Processing*, Prentice Hall, 3rd Edition, 2008.

References:

Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, *Digital Image Processing using Matlab*, Prentice Hall, 2004.

Relationship of Course to Program Outcomes:

Please refer to the Report Section 4.3.2 (iii).

Grading Scheme:

Homework assignments	20%
Midterm Exam	30%
Final Exam	50%