

# Digital Image Processing

## **Course Information:**

Code: CSE-850  
Credit Hours: 3  
Instructor: Dr. M. Usman Akram  
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<http://biomisa.org/usman/>

## **Course Home Page:**

<http://biomisa.org/usman/digital-image-processing>

## **Class Hours:**

Wednesday (1730-2030) CRMTS-05

## **Office Hours:**

Wednesday (1600-1730)

## **Semester:**

Fall 2013

## **Text:**

- Digital Image Processing by Rafael C. Gonzalez, Richard E. Woods, Addison Wesley, 3<sup>rd</sup> Ed. 2008.

## **Reference**

- Digital Image Processing Using Matlab by Rafael C. Gonzalez and Richard E. Woods, Pearson Education, 2009.
- Digital Image Processing by Kenneth R. Castleman, Prentice Hall International Edition, 1996.
- <http://www.imageprocessingplace.com/>

## **Prerequisites by Topic:**

- Basic knowledge about linear algebra, matrices and complex variables
- Concepts related to signals and systems and digital signal processing
- Know how with MATLAB or any programming language

## **Course Objective:**

1. To develop thorough understanding of digital image processing fundamentals
2. To explore the properties of discrete transforms and their importance with respect to image processing
3. To study various image enhancement techniques in spatial and frequency domains, fundamentals of image compression, introduction to color image processing, wavelets and morphological image processing
4. To have a basic understanding of some topics of machine learning to combine these ideas with image processing techniques to produce good projects

***Grading:***

Sessional Exams:	25%
Quizzes (4-6):	10%
Computer and numerical assignments:	10%
Final Project:	15%
Final Exam:	40%

***Quizzes:***

Ten-minute surprise quizzes will be given periodically

***Computer Assignments & Project:***

For computer assignments, sharing of programming tips and discussing general concepts is allowed. Collaborating on program writing is not. The term-project will be conducted in groups. One to three students can form a group. It is very important to have hands on image processing algorithms. Almost 25% marks are directly related to it inform of computer assignments and projects etc. The project will be monitored throughout the semester on periodic basis and marks will be assigned accordingly.

***Topical Outline:***

1. Introduction to Image processing
2. Image processing Fundamentals
3. Image Enhancement & Restoration
4. Morphological operations
5. Feature extraction (edges, corners)
6. Segmentation
7. Texture analysis
8. Wavelets
9. Introduction to Machine Learning and basic types of classifiers, Performance parameters for evaluation