

Brooklyn College
Department of Computer and Information Sciences

CISC 3640 [51.1] Digital Image Processing

3 hours; 3 credits

Components of a digital image processing system. Applications of image processing. Elements of human visual perception. Image sensing and acquisition. Image sampling and quantization. Analysis, manipulation, storage, and display of graphical images from sources such as photographs, drawings, and video. Major techniques in image processing: image analysis including morphological image processing and image segmentation, image enhancement, restoration, compression, and watermarking.

Syllabus:

1. What is digital image processing?
2. Components of a digital image processing system
3. Digital image fundamentals
 - a. Elements of visual perception
 - b. Image sensing and acquisition
 - c. Image sampling
 - d. Image quantization
4. Image enhancement
5. Image restoration
6. Color image processing
7. Image compression
 - a. Lossless compression techniques
 - b. Lossy compression techniques
8. Morphological image processing
9. Image segmentation

Textbook:

R. C. Gonzalez and R. E. Woods, Digital Image Processing, Prentice Hall, 2002.

Bibliography:

1. W. K. Pratt, Digital Image Processing, John Wiley and Sons, 2001.
2. T. Bose, Digital Signal and Image Processing, John Wiley and Sons, 2004.
3. I. J. Cox, M. L. Miller and J. A. Bloom, Digital Watermarking, Morgan Kaufmann Publishers, 2001.
4. F. Halsall, Multimedia Communications, Addison-Wesley, 2001.
5. K. R. Rao, Zoran S. Bojkovic, Dragorad A. Milovanovic, Multimedia Communication Systems, Prentice Hall, 2002.

6. R. Steinmetz, K. Nahrstedt, *Multimedia Fundamentals*, Prentice Hall, 2002.
7. M. Arnold, M. Schmucker, S. D. Wolthusen, *Techniques and Applications of Digital Watermarking and Content Protection*, Artech House, 2003.
8. Mark S Drew, Ze-Nian Li, *Fundamentals of Multimedia*, Prentice Hall, 2004.