

ECE418  
Introduction to Image and Video Processing  
Spring 12

Lecture 1

**Lectures:** Tu Th 9:30-10:50 168 EL

**Lab:** We 2:30-5:30 or Fr 2-5 406B ENGR Hall  
(sign up for 1 of 2 sessions)

**Instructor:** P. Moulin 2265 Beckman  
(pmoulin@illinois.edu)

**Office Hours:** Wed 10-12 357 Everitt  
(+ by appointment, send me email)

**Teaching Assistant:** André Targino  
(targino1@illinois.edu)

**Web Site:** <http://www.ews.uiuc.edu/~ece418/>

**Textbook:** Instructor's notes. The following books are on reserve in the Grainger Library:  
D. Dudgeon and R. Mersereau, *Multidimensional Digital Signal Processing*, Prentice-Hall 1984.

R. Gonzalez and R. Woods, *Digital Image Processing*, 2nd Ed., Prentice-Hall 2002

A. K. Jain, *Fundamentals of Digital Image Processing*, Prentice-Hall, 1989.

W. K. Pratt, *Digital Image Processing*, Wiley, 1991

A. M. Tekalp, *Digital Video Processing*, Prentice-Hall, 1995

M. Ghanbari, *Video Coding - an introduction to standard codecs*, IEE Telecommunications Series, 1999

Yao Wang, Jorn Osterman, Ya-Qin Zhang, *Video Processing and Communications*, Prentice-Hall, 2002.

**Grading** (subject to change)

Lab	25%	
HW	10%	HW usually due on Thursdays
Midterm 1	15%	
Midterm 2	15%	
Final	35% or 20 %	
Optional Project	0 % or 15%	

# 1 Overview of the course

1. Multidimensional Signal Processing ( $\sim 5$  lectures)  
Multidimensional Fourier Transform, sampling and filtering (including decimation and interpolation)
2. Human Visual Perception ( $\sim 3$  lectures)  
Human Visual System, visual masking, noise visibility, color vision
3. Image Scanning and Display ( $\sim 2$  lectures)  
Acquisition and Display of images (camera, digitizers, film, printers); sampling and quantization issues
4. Video Scanning and Display ( $\sim 3$  lectures)  
Monochrome and Color TV, videoconferencing, videophone
5. Image Enhancement ( $\sim 4$  lectures)  
Contrast and color adjustment, noise reduction, edge enhancement
6. Image Compression ( $\sim 4$  lectures)  
How to reduce bit rate while maintaining acceptable quality
7. Video Compression ( $\sim 3$  lectures)  
Role of Motion; compression techniques
8. Image Analysis ( $\sim 3$  lectures)  
Edge Detection, Texture, Image Segmentation