ECE418
Introduction to Image and Video Processing
Spring 19

Lectures: Tue. Thu. 12:30 PM - 1:50 PM — 2015 ECEB

Lab: Fri. 2:00 PM - 6:00 PM — ENGR 406B1

Instructor: Shuai Huang (`huang816@illinois.edu`) — 124 CSL

Instructor Office Hours: Mon. 1:30 PM - 3:00 PM — 124 CSL
And by appointment (send me email)

Teaching Assistant: Zubin Pahuja (`zpahuja2@illinois.edu`)

TA Office Hours: Mon. 5:00 PM - 7:00 PM — 4036 ECEB

Web Site: `https://courses.engr.illinois.edu/ece418/sp2019/`

Textbook: Instructor's notes by Prof. P. Moulin.

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
Y. Wang, J. Osterman, Y.-Q. Zhang, *Video Processing and Communications*, Prentice-Hall, 2002.

Grading: (subject to change)

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

Exams: Schedule

Midterm 1	(7:00 PM - 8:30 PM,	Wed.	02/27/2019)	2015 ECEB
Midterm 2	(7:00 PM - 8:30 PM,	Wed.	04/03/2019)	2015 ECEB
Final	(8:00 AM - 11:00 AM,	Fri.	05/10/2019)	TBD

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