

**Prof. A. Zakhor**

**Spring 2006**

**EE225B – Digital Image Processing**  
Information Sheet

**Lectures:** Wednesdays and Fridays, 12:30 – 2:00 pm  
203 McLaughlin

**Lecturer:** Professor A. Zakhor  
507 Cory Hall  
Ext. 3-6777  
[avz@eecs.berkeley.edu](mailto:avz@eecs.berkeley.edu)  
Office hours: Fridays, 2:00 – 3:00 pm

**Teaching assistant:** Cindy Liu  
307 Cory Hall,  
Ext. 3-1587,  
[hsil@eecs.berkeley.edu](mailto:hsil@eecs.berkeley.edu)  
Office hours: TBA

**Course Assistant:** Rosita Alvarez  
253 Cory Hall,  
Ext. 3-4976,  
[rosita@eecs.berkeley.edu](mailto:rosita@eecs.berkeley.edu)

**Course handouts:** Handouts not picked up during lectures can be found with the course assistant.

**Texts:**

1. J. S. Lim, Two-Dimensional Signal and Image Processing, Prentice Hall, 1990. (**required**)
2. R. C. Gonzalez and R. E. Woods, Digital Image Processing, Prentice Hall, 1990. (**required**).
3. Bovik, Handbook of Image and Video Processing, Academic Press 2000, (**recommended**)
4. N. Netravali and Barry G. Haskell, Digital Pictures, Plenum Press, 1988. (**recommended**)
5. W. K. Pratt, Digital Image Processing, John Wiley and Sons, 1992. (**recommended**)
6. A. M. Tekalp, Digital Video Processing, Prentice Hall, 1995. (**recommended**)

**Other useful references:**

1. D. E. Dudgeon and R. M. Mersereau, Multi-Dimensional Digital Signal Processing, Prentice Hall, 1984.
2. A. V. Oppenheim and R. W. Schaffer, Digital Signal Processing, Prentice-Hall, 1975.

3. T. S. Huang, editor, Two-Dimensional Digital Signal Processing, Topics in Applied Physics, vol. 42 and vol. 43, Springer-Verlag, 1981.
4. S. K. Mitra and M. P. Ekstrom, editors, Two-Dimensional Digital Signal Processing, Dowden, Hutchison, and Ross, 1978.
5. R. C. Gonzalez and P. Wintz, Digital Image Processing, Addison-Wesley, 1979.
6. H. C. Andrews and B. R. Hunt, Digital Image Restoration, Prentice-Hall, 1977.
7. H. C. Andrews, Tutorial and Selected Papers in Digital Image Processing, IEEE Press, 1978.
8. W. F. Schrieber, Fundamentals of Electronic Imaging Systems, Springer-Verlag, 1986.
9. K. Jain, Fundamentals of Digital Image Processing, Prentice Hall, 1989.

### **Outline of Topics:**

1. Image reconstruction from partial information
2. Two-dimensional (2-D) Fourier transform and z-transform;
3. 2-D DFT and FFT, FIR and IIR filter design and implementation.
4. Basics of Image Processing techniques and perception;
5. Image and video enhancement
6. Image and video restoration
7. Reconstruction from multiple images: super resolution
8. Image and video analysis: Image Representation and models; image and video classification and segmentation; edge and boundary detection in images
9. Image compression and coding
10. Video compression
11. Image and Video Communication
12. Image and video rendering
13. Image and video Acquisition
14. Applications of image processing: Synthetic Aperture Radar, computed tomography, cardiac image processing, finger print classification, human face recognition.

### **Homework:**

Homework will be issued approximately once every one or two weeks. They will either consist of written assignments or Matlab assignments or C programming assignments. Homework will be graded, and will contribute 70% to the final grade. Homework handed in late will not be accepted unless consent is obtained from the teaching staff prior to the due date. There will be a term paper that will constitute 30% of your grade. The term paper can either be literature review of a topic of your own choosing, or a report on a project. Either way, you are to submit a proposal to the instructor by end of February. More details on the project will be provided later, and a list of suggested topics for literature review will be provided.