University of California, Berkeley
College of Engineering
Department of Electrical Engineering and Computer Sciences

Prof. A. Zakhor **Spring 2008**

EE225B – Digital Image Processing

Information Sheet

Lectures: Wednesday and Friday, 9:30 – 11:00 am
203 McLaughlin

Lecturer: Professor A. Zakhor
507 Cory Hall
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Office hours: Friday, 11:00 - 12:00 pm, 507 Cory

Teaching Assistant: Hao Zhang
Email: zhanghao@berkeley.edu
Office Hours: Tuesday and Thursday, 4:00 – 5:00 pm
Location to be determined.

Course Reader: Rodny Rodriguez
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Course Assistant: Rosita Alvarez
253 Cory Hall,
Ext. 3-4976,
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Course handouts: Handouts not picked up during lectures can be found with the course assistant.

Texts:

1. R. C. Gonzalez and R. E. Woods, Digital Image Processing, Prentice Hall, 1990, (**required)**.
2. J. S. Lim, Two-Dimensional Signal and Image Processing, Prentice Hall, 1990, **(recommended)**.
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. Schafer, 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, Matlab assignments or C programming assignments. Homework will be graded, and will contribute 50% 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 project that will constitute 50% of your grade. The project can be individual or in a group. You are to submit a proposal to the instructor by the end of February. More details on the project will be provided later, and a list of suggested topics will be provided.