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

Prof. A. Zakhor   **Spring 2018**

EE225B – Digital Image Processing

Information Sheet

Lectures: Tuesday and Thursday, 9:30 am - 11:00 am.
                        299 Cory

Lecturer: Professor A. Zakhor
                        507 Cory Hall
                        Ext. 3-6777
                        Email: avz@eecs.berkeley.edu
                        Office hours: Thursday, 11:00am - 12:00 pm in
                        507 Cory

Texts:

1. R. C. Gonzalez and R. E. Woods, Digital Image Processing, Prentice
    Hall, Forth edition, (**required**).
2. Bovik, Handbook of Image and Video Processing, Academic Press 2000,
    (**recommended**).
3. N. Netravali and Barry G. Haskell, Digital Pictures, Plenum Press, 1988,
    (**recommended**).
4. W. K. Pratt, Digital Image Processing, John Wiley and Sons, 1992,
    (**recommended**).
5. 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 sensing and acquisition, sampling, quantization
2. * Spatial transformations, filtering in space domain and frequency domain.
3. * Image restoration, enhancement, reconstruction; computed tomography
4. * Wavelets and multi-resolution processing
5. * Image and video compression and communication; watermarking
6. * Morphological Image processing
7. * Color processing
8. * Edge detection; feature extraction; SIFT, MSER
9. * Image segmentation
10. * Neural networks and deep learning
11. * 3D image processing
12. * Applications to augmented reality and virtual reality

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 55% 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 35% of your grade. The project can be individual or a group. You are to submit a proposal to the instructor by the end of March. More details on the project will be provided later, and a list of suggested topics will be provided. In addition, 10% of your grade will be for class participation.