**Study guide for Test #2 Digital Image Processing**

You will have 75 minutes for the test. You may use: 1) calculator (your own, you cannot share during the test), 2) One sheet, one-side of hand-written notes – in your own hand writing

The test will cover, in general: 1) Lectures, 2) Homework, 3) Textbook (see syllabus), 4) Lab

*Notes:* Most of the test material will be from lecture and homework. The focus will be on material since the first test. However, much of the later material builds on previous material. Remember, when you take the test, work smart – be sure to work the problems you know first.

**TOPICS:**

**Image Enhancement**

* Histogram modification: stretch, shrink, slide, equalization, specification
* ACE filters
* Color: pseudocolor-spatial/frequency methods, gray scale/histogram enhancement applied to color images
* frequency domain methods:, lowpass/highpass/bandpass filtering, high freq emphasis, equivalent spatial masks
* image sharpening: unsharp masking, HP, directional difference filters, homomorphic filtering, edge-detector based methods
* image smoothing: LP, mean, nonlinear: median, Kuwahara, anisotropic diffusion

**Image Restoration**

* enhancement vs. restoration
* restoration process model
* degradation model: blur masks, PSF, noise
* noise models
* noise removal, spatial filters, order filters, linear vs. Non-linear, adaptive filters
* degradation function: PSF, OTF/MTF, estimation
* Frequency domain filters: inverse, Wiener, CLS, GM, adaptive methods, BP, BR, notch
* geometric transforms: spatial-tiepoints, gray‑level-average, nearest neighbor, bilinear, the procedure

**Image Compression**

* System model: mapper, quantizer, coder; reversible?
* fidelity criteria: objective vs. subjective (Chap. 3)
* Definitions: compression, uncompressed, decompressed, compression ratio, entropy, variable bit rate, uniform/nonuniform quantization, equal/unequal length code
* Redundancy: coding, interpixel, interband, psychovisual
* lossless vs. lossy methods, typical compression ratios
* lossless methods: Huffman, RLC
* lossy methods: JPEG

 **Your Project**