Assignments/Announcements

• No lab sections this week
• Read Chap. 1 by Mon. 8/27
• Read Chap. 2 (except last two sections on Image Transforms & Probability and Random Variables—read through page 93) by Wed. 8/29
Today

- Course details
- Introduction
Course Details

• Who am I?
• Who are you?
Course Details

• Course website:
  – http://faculty.ucmerced.edu/snewsam/CSE107/index.htm

• Search for “newsam” at Google.
  – Go to my UC Merced faculty page.
  – Go to Teaching.
Required Textbook

Course Prerequisites

• Math 24, Math 32, and CSE 31.
• Or consent of the instructor.
Programming Language

• We will use MATLAB for the projects.
• I do not assume you are familiar with MATLAB—you will have an opportunity to learn as much as you need.
Course Grading

• 5% Lecture attendance and participation
• 25% Homework assignments
• 25% Lab assignments
• 20% Midterm exam
• 25% Final exam
Course Policies

• Do not use computers or smart phones (for non-course activities) in class.
• See course website for other policies.
Questions?
CSE107
Introduction
Computer Vision <=> Computer Graphics
Image Processing

computer vision (CV)  computer graphics
image processing (IP)
Image Processing <=> Computer Vision

image processing  computer vision

acquisition

compression

enhancement

restoration

segmentation

representation (features)

pattern recognition

understanding
Image Processing and Computer Vision

analysis in the spatial domain

analysis in the frequency domain (Fourier analysis, etc.)
Why study IP & CV?

• Vision is a very rich percept.
• Images are abundant.
Human visual system: curse and blessing

- HVS (human visual system)
  - +Proof of concept
  - - Still largely black box
Why are IP & CV difficult?

- Images are complex!
  - Perspective.
  - Lighting conditions.
  - Occlusion.
  - Object variation.
  - Low-level != high-level (semantics)
- Humans solve the vision problem with deceptive ease.
  - Millions of years of evolution.
  - Learning.
  - Context.
IP & CV topics: compression

• Images contain lots of data.
  – Storage challenges.
  – Communication challenges.

• One page letter:
  – 500 words x 4.5 letters/word x 1 byte/letter ~ 2.2KBytes

• Consumer digital camera image:
  – 3504x2336 pixels x 3 bytes/pixel ~ 23.4MBytes
  – 1 image ~ 11000 pages

• Satellite image:
  – 27648x11584 pixels x 4 bytes/pixel ~ 1.2GBytes
  – 1 image ~ 57000 pages