

Basic Info

Instructor Marshall Tappen
Office: HEC-230
Email: mtappen@cs.ucf.edu

Webpage <http://www.cs.ucf.edu/~mtappen/cap5415/>

Meeting Times TuTh 12:00PM – 1:15PM in HEC 302

1 Course Description

This class is an introduction to the basic problems and techniques in computer vision. We will cover both the classic and modern approaches to the basic problems in computer vision. Several weeks will also be devoted to statistical techniques and models of images.

2 Coping with the Instructor

Please feel free to contact me with any questions or concerns about the course. This includes concerns such as

- Unclear Problem Set questions
- The pacing of material in the class
- Unclear explanations
- Any other complaints

Also, I have the tendency to speak quickly – especially when I get excited about something, and what's more exciting than computer vision? I try to be conscious of this, but if you find me speaking too quickly, please do not be afraid to raise your hand and ask me to go over something again. Also, if I repeatedly speak too quickly, please don't be afraid to send me an e-mail asking me to speak slower.

3 Grading

Grades will be assigned based on Problem Set scores and the score on a Final Project. No exams will be given. The breakdown is:

Problems sets	30%
Solo problems (see below)	30%
Project(see below)	40%

3.1 Problem Sets

Six problem sets will be assigned throughout the course of the Semester. Each problem set will be a mixture of programming and mathematical exercises. You are encouraged to collaborate on the problem sets. However, some problems will be designated *Solo problems*. *You are not to collaborate with other students on the solo problems.*

Tentatively, the problem sets will be assigned and due on the following dates:

PS #	Out	Due
1	Aug. 28	Sep. 11
2	Sep. 11	Sep. 25
3	Sep. 25	Oct. 9
4	Sep. 9	Oct. 23
5	Oct. 23	Nov. 13

This schedule is tentative. The course webpage will serve as the “official” schedule for due dates.

3.2 Programming Environment

Students will be required to complete the programming portions of the problems sets with *an interpreted environment*, such as MATLAB, Octave, or Numerical Python. All exceptions must be cleared with the instructor.

3.3 Late Policy

All assignments are to be turned on the assigned day. If you cannot turn in an assignment on time, please contact me. I will generally be willing to let you turn in one assignment late. Even if you have already turned in a late assignment, please still contact me.

3.4 Project

Students will be required to complete a project that involves implementing some vision algorithm. Each student will submit a 4-5 page write-up at the end of the semester. You are encouraged to work in groups and tackle more substantial projects. Groups will be required to submit a 7-8 page writeup. Groups should consider trying to choose a project that has the potential for publication.

By November 6, students will be expected to submit a brief proposal to the instructor. Please consult with the instructor before finalizing the topic of your project.

4 Schedule [Tentative]

This schedule is tentative. The course webpage will serve as the “official” schedule

Week	Dates	Topics Covered
1	Aug. 21 and 23	Introduction, Linear and Non-Linear Image Filtering
2	Aug. 28 and 30	Fourier Transforms, Sampling
3	Sep. 4 and 6	Image Pyramids, Image Statistics, Denoising
4	Sep. 11 and 13	Statistical Methods for Classification
5	Sep. 18 and 20	Detection and Recognition
6	Sep. 25 and 27	Edge and line detection, Binary operations
7	Oct. 2 and 4	Segmenting Images
8	Oct. 9 and 11	Imaging geometry, perspective projection, lens models, camera calibration
9	Oct. 16 and 18	Epipolar geometry, Stereo, Algorithms for stereo
10	Oct. 23 and 25	Probabilistic Models of Images, Markov Random Fields
11	Oct. 30 and Nov. 1	Optic Flow, Image motion
12	Nov. 6 and 8	Structure from Motion
13	Nov. 13 and 15	Reflectance models, practical aspects of imaging
14	Nov. 20 and 22	Super-resolution, MRF models of images
15	Nov. 27 and 29	Vision for Graphics, Project Presentations