

2008 Course Syllabus

707 Digital Image Processing

2. CATALOG DESCRIPTION

Fundamentals and research directions in image processing: cameras, geometry, calibration, 2D and 3D reconstruction, Fourier transforms, filtering, compression, motion estimation, and applications.

Quarters of Offering	Credits	Level	Class Meeting
Wi Qtr.		3 U G	3 cl.

Course Prerequisites

Prereq: 600, Math 530 or Stat 427 or equiv; or grad standing.

3. PREREQUISITES BY TOPIC

Digital signal processing, probability and random variables, linear algebra, basic geometry.

Courses that require this as a direct

863, 874

4. TEXT(S)

Computer Vision: A Modern Approach, 2003
ISBN: 0-13-085198-1

Author(s)

Forsyth and Ponce

Publisher

Prentice-Hall

References (supplemental reading)

- [1] Fundamentals of Digital Image Processing: Jain
- [2] Introduction to Digital Image Processing: Gonzalez and Woods
- [3] Three-Dimensional Computer Vision: Faugeras, MIT Press

5. COURSE OBJECTIVES

1. Students learn the mathematical underpinnings of digital image processing.
2. Students learn to develop image processing solutions through computer projects and real image experiments, documented with written reports.
3. Students develop an image processing system to meet a broad set of design specifications, working in teams, and presenting the results in formal reports.

6. TOPICS AND (# OF LECTURES)

Camera Models (5)	-- Chapters 1 & 2.
Camera Calibration (3)	-- Chapter 3.
Geometry of Multiple Views and Stereo (5)	-- Chapter 10 & 11.
Introduction to Structure from Motion (3)	-- Chapter 12.
Radiometry, Shadows and Shading (5)	-- Chapter 4 & 5.
Introduction to Optical Flow and Segmentation (3)	-- Handouts.
Linear Filters (3)	-- Chapter 7 & Handouts.
Data Compression (1)	-- Handouts.
Projects (2)	

7. Office Hours

Mondays, Wends & Fridays	12:00 pm – 1:30 pm (460 DL)
Tuesdays & Thursdays	2:30 pm – 4:30 pm (460 DL)

Other times

by appointment (email the instructor)