CSCI 510/EENG 510 Syllabus
Image and Multidimensional Signal Processing

Instructor
Associate Professor William A. Hoff, Room BB314H (Brown Hall)
Phone: 303-273-3761 Email: whoff@mines.edu
Office hours: M 2-4, W 2-3, or by appointment.

Meetings
- Class is held in BB316A Mondays and Wednesdays from 4:30 pm - 5:45 pm.
- Occasionally there are outside talks and seminars related to this course, which I encourage you to attend.

Websites
- The course website is http://inside.mines.edu/~whoff/courses/EENG510/. Visit this often, as it will contain lecture notes, homework assignments, grades, etc.
- Please use Piazza to ask questions about the material – this is often the quickest way to get help. Go to http://piazza.com/ to sign up.

Description (from Bulletin)
This course provides the student with the theoretical background to allow them to apply state of the art image and multi-dimensional signal processing techniques. The course teaches students to solve practical problems involving the processing of multidimensional data such as imagery, video sequences, and volumetric data. The types of problems students are expected to solve are automated mensuration from multidimensional data, and the restoration, reconstruction, or compression of multidimensional data. The tools used in solving these problems include a variety of feature extraction methods, filtering techniques, segmentation techniques, and transform methods. Students will use the techniques covered in the course to solve practical problems in projects.

Prerequisites
Students should have undergraduate level knowledge of vectors, linear algebra (i.e., matrix operations, solution of linear equations), elementary statistics, and a programming language (e.g., Matlab and/or C).

Required Text
- The authors have a website (http://www.imageprocessingplace.com). Available there is a list of corrections, additional images, software, and other resources.
Course Format

This course will be run in a “flipped” mode; meaning that students are expected to watch video lectures at home at their own pace, and class time will be used primarily for working through problems and examples. For this to work, students must come prepared to class. Prior to each class, watch the assigned videos and read any assigned reading material.

Computer Tools

Computer tools will be used frequently in class and for assignments. We will use Matlab (including the image processing toolbox) most often, since it is interactive, easy to write code, and there is a lot of existing software available. Matlab is installed on the PCs in Brown Hall. You will need to get a logon on the “adit” server if you don’t already have it. If you want, you can get a student version of Matlab (including the image processing toolbox) from www.mathworks.com for $99. We will also occasionally use the OpenCV C++ library, which is available for free from http://opencv.org/.

Project

Each student will do a final project on image and multidimensional signal processing. Details are given on the course website. Students will work on projects during the second half of the semester. A final report and presentation at the end of the semester is required. The last week of class will be used for project presentations. Class may go a little longer on those days. More details are provided on the course website.

Assessment and Grading

Students will be assessed using the following elements. Late assignments will be reduced in grade unless there is prior approval by the instructor.

- Homework assignments: 35%
- Midterm exam (closed book, handwritten notes ok): 30%
- Final project: 35%

There is no final exam.

Homework Policy

Homework is due by the start of class (4:30 pm) on the due date. Please email me your solutions for the problems (in order) as a single Word or PDF document. If you do a problem on paper by hand, please scan it in and paste it into the document (although I would prefer it typed!).

You are allowed to seek or give help to other students on homework assignments. However, unless I instruct otherwise, you must actually work through each problem yourself and hand in your own work. Direct copying is unacceptable.

Calendar

A calendar listing of important dates and course topics is posted on the web site. While every effort will be made to follow this schedule, it may be updated from time to time.