Syllabus, last edited January 27, 2014

Instructor:

Wesley Snyder, Professor of ECE. EB2, 2074. Office hours 12:25-2:15, and other times by appointment. Class meets in room 1220 EB2. Please make appointments by telephone (986-0358) and not by email whenever possible.

Prerequisites:

- A course in which the student is introduced to concepts of probability. ECE 514 accomplishes this, but so do a variety of other courses.
- A course in advanced (graduate-level) calculus, such as MA 511/512 or MA 501/502
- A course in linear algebra, such as MA 405
- ECE 558 or equivalent
- Ability to program in C or C++

This is an introductory course in Computer Vision, the art of programming machines to recognize the content of images. This class will teach the student how to write software to remove noise from images, segment images and recognize shapes. The intent of the class is to cover fundamental material, not state-of-the-art research.

The student will be expected to read the required supplementary notes, work homework problems, and do programming assignments. The programs must be written in C or C++. I can provide a software package which may make reading and storing images slightly easier, and it is available for the Mac (the Intel version), Linux, and it may be possible to make a version for Windows.

The student must either have or obtain standard software development environments (compiler, editor, etc.) This capability is included on Windows machines in Visual Studio and certain third-party systems and is built-in on most macs and linux machines. The Mac development environment, Xcode, is particularly nice and more-or-less free. Various options are available on Linux machines.

The student must write or obtain software to read and write images. I will provide test images in JPEG, RAW, and IFS formats. I recommend the IFS tool set (but IFS is not available under every possible release of Windows).
Images and software are downloadable from the imaging web site, www.ece.ncsu.edu/imaging. From there, to get images, click on archive and browse the data base. To get software, click on software, and pick your platform.

**Text**

Class handouts. The handouts are chapters from a book the instructor is writing. The book is on line on the class web site.

**Policy on Absences**

Roll is not taken. If a student misses a class, he/she is responsible for determining what material was covered in that class. If a test is missed, a written statement from the doctor is required. See http://www.ncsu.edu/policies/academic_affairs/courses_undergrad/REG02.20.3.php.

**Academic Integrity**

I take Academic Integrity very seriously. Project write-ups will include a section written by the student describing the background of the project. This is required because people learn best by describing what they are doing to others. If you copy the material you do not get this learning experience. **Copying material from the Web, from another student, from my notes, or from any other source without proper quotes and citation is an academic integrity violation and will result in failure of the course, as well as a report to the academic integrity office, which may, under some circumstances, result in expulsion from the University. Any material which is copied must be in quotes or indented, so it is very clear that it is copied, and the source of such material must be cited.**

Homework problems and project assignments are to be done by individual students, without collaboration with other students. You are strongly encouraged to talk with me if you have problems.

On the subject of sharing what you know with colleagues, the following is a copy from a presentation by H.J. Trussell:

*Guidelines for Working Together*

Working together is common in all professions. It is important to exchange ideas and learn from your colleagues and peers. In the academic environment, the emphasis is on learning. An unfortunate by-product of the academic environment is that the instructors have the responsibility of judging how well students have learned what they are supposed to learn. This results in grading individual assignments. The grading is based on the assumption that the work on a submitted assignment represents the individual students efforts. There are group assignments, of course, but let’s stick with individual assignments, which is all that is required for this course.

How do you separate the benefits of working together and exchanging information from the requirement to do your own work? It is not that hard. I suggest a couple of basic guidelines.

(1) If you copy a part of a solution from a group that you are working with and do not understand the reason for the step you are copying,
you are not doing your own work. You should be able to understand and defend each step of a solution.

(2) If you are blindly copying work from a group or individual without thinking of the reasons for the steps in the solutions, you are not doing your own work.

Let’s consider a couple of scenarios that are somewhat common. Students are working together and discussing the solution by writing on a white board or paper. All students are involved to some extent, asking questions and offering suggestions. Finally, the board or paper contains a solution that the group agrees is the correct solution. They all copy the contents to their assignment. This is blind copying. Each of the students needs to rewrite the solution for themselves individually without looking at the common solution. This reinforces the reasoning for each of the steps in the solution and aids the learning process. It also offers a second individual check on the solution. The most common evidence in a plagiarism case is the copying of irrational errors.

A modified version of this occurs between two students. Student A, who might even be a tutor, has worked the problem. Student B asks for help on the problem. Student A explains how to solve the problem. Student B thinks the explanation is good that s/he understands the reasoning, and so copies the solution. Both students are in violation of ethical conduct. Student A has given the entire answer and allowed Student B to copy the work. Student B has not done the work individually. Student A should not show the entire solution to Student B, but talk Student B through the problem, rewriting the solution if necessary. In the case of seeing the entire solution, the problem can be greatly helped if Student B checks his/her understanding of the solution by reworking the solution from scratch. In this case, Student B reinforces the understanding and has generated original work.

The pressures to copy the work of others can be great. There are time deadlines. It may seem that there is not enough time to rework the solution on your own. You may not have done well on previous homeworks or tests and need every point you can get. None of these reasons are grounds for copying. If you don’t understand the solution, you don’t deserve credit for turning in a solution you didn’t create yourself. If you didn’t leave enough time to solve the problem, then you have to take the consequences, even if the lack of time was not entirely your fault. If there are legitimate reasons that you didn’t have time, e.g., illness, death in the family, etc., just tell the instructor. This falls under the late assignment policy on the course syllabus.

Finally, the few points you may get for turning in copied work is not worth the risk of getting caught and going before the Student Conduct Board. Instructors in ECE are encouraged to turn in cheaters, since an
academic integrity violation that is on record will affect the outcome of a second offense. If the instructor doesn’t turn in students, the instructors in subsequent class have no way of knowing if an incident in their class is really the first.

I hope the guidelines give the directions you need for understanding the ethical boundaries of collaboration. Peer learning is a powerful concept and is encouraged. If you have any questions, please ask your instructors for a detailed opinion on the matter. Good luck, HJT

**Auditors**

To receive audit credit in this class, you must attend most of the classes. I do not normally take roll, but I notice people. In addition, an auditor is required to do the last project in the class. This is usually something to do with the Hough transform. **Late Assignments**

Assignments are not normally accepted late. Exceptions may be made in the event of illness or family emergency (must be documented).

**Determination of grades**

Grades will be weighted as follows:
- Homework 30% (project assignments will count more than individual homeworks, but will be included in the overall homework grade)
- Mid-Term Exam 30%
- Final Exam 40%

**Students with disabilities:**

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. For more information on NC State’s policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.1), http://www.ncsu.edu/policies/academic_affairs/courses_undergrad/REG02.20.1.php.

N.C. State University Polices, Regulations, and Rules (PRR):

"Students are responsible for reviewing the PRRs which pertain to their course rights and responsibilities. These include: http://policies.ncsu.edu/policy/pol-04-25-05 (Equal Opportunity and Non-Discrimination Policy Statement), http://oied.ncsu.edu/oied/policies.php (Office for Institutional Equity and Diversity), http://policies.ncsu.edu/policy/pol-11-35-01 (Code of Student Conduct), and http://policies.ncsu.edu/regulation/reg-02-50-03 (Grades and Grade Point Average)."