1. **Office Hours**

   Instructor: Prof. John Kender, 622 Shapiro CEPSR, 212-939-7115, kender@cs.columbia.edu; office hours: W 12:30, T 4, and by appointment.

   Teaching Assistant: Naveed Hasan, CLIC lab, naveed@cs.columbia.edu; office hours: M 3, M 4.

   Teaching Assistant: Albert Lai, CS help room (T) or CLIC lab (W); amlai@columbia.edu; office hours: T 1:30, W 2:30.

2. **Course Structure**

   The course is a survey of existing research systems that allow computers to accept and manipulate visual input, usually from real time cameras, in order to direct further computer processing. These systems presently enable machines to: recognize and interpret human hand and body gestures; analyze imagery such as fingerprint or iris patterns for security data; generate natural language descriptions of medical or map imagery; index into a database of pictures to retrieve related images; summarize visually long video sequences like news reports or comedy shows; steer automobiles automatically; recover CAD/CAM models by inspecting physical examples; monitor large outdoor areas for types of activity; and execute other and more exotic tasks.

   Since the course is a topics course, a survey-of-research course, and a course being offered only for the second time, the schedule is fluid. However, most or all of the topics above will be covered, and additionally, some of the underlying theoretic work in artificial intelligence, computer vision, robotics, and psychology also will be covered.

3. **Course Assignments**

   There will likely be one or two short assignments exercising some of the concepts on actual visual data and/or on theoretic issues. The length and nature of these assignments is dependent on the hardware and software systems that are available in the department’s facilities. If there is one assignment, it will be worth 20% of the course grade; if there are two, they will together be worth 35% of the course grade. There will be no exams.

   At approximately midterm, a five-page proposal for a course paper or project, complete with description, proposed methods, and references. This proposal is worth 15% of the course grade. At approximately finals, either a 30-page research paper surveying some aspect of visual interfaces, or a demonstrable working project documented with a 15-page write-up (not including supplementary documentation such as code listings). Those electing to produce a system need to be able to demonstrate its abilities somewhere on the main campus during finals week, although there are no other restrictions on machine or language. The final paper or project is worth remainder of the course grade, namely 50%, 65%, or 85%, depending on the number of assignments.
Teams of two (and in special cases with explicit instructor approval, teams of three) are permitted, in which case three ground rules apply. First, the amount of work expected is proportional to team size, and the paper or project will be graded relative to this expectation. Second, identical grades will be given to each member of the team, and the instructor will not entertain any appeals concerning individuals’ relative contributions. Third, proposed teaming arrangements become final five weeks before deliverables are due; prior to this time a proposed team can dissolve (or a new one can form) on the approval of a revised proposal.

Timetable and summary:

- **Thursday, October 21**: Proposal due
- **Tuesday, November 9**: Teaming agreements fixed
- **Tuesday, December 14**: Paper or project due

4. **Course Materials**

Course materials will consist mainly of reprints of research articles from various sources. Some of the systems are available for exploration on the Web. Generally, reprints will be made available before the lectures in which they are presented. Throughout the course, the course web page will be updated with links to those pages which demonstrate some of the various concepts covered in the course; see www.columbia.edu/~cs4735.