Instructor: Benn Coifman coifman.1@osu.edu
Office: Hitchcock 491B (292-4282) and Caldwell 211 (688-8324)
Office Hours: Tu Th 1:48-2:48

Course web page: http://www.ceegs.ohio-state.edu/~coifman/eece694f06/

Recommended Texts: (Come to first class before buying)
- Course packet at CopyEz (copied from James Banks, Introduction to Transportation)
- Matlab documentation.
- Matlab Student version (see link from course web page)

Lectures: Tu Th 12:30-1:48, Bo 437

Final Exam: Tu, Dec 5, 1:30 - 3:18 PM (verify)

1) Course Description:
An interdisciplinary course bringing together electrical engineering tools and transportation applications. Students will gain valuable experience working in teams while learning traffic flow, surveillance and control.

2) Topical Outline
The course will be divided into 5 topic areas.
   a) Traffic flow theory- what are we monitoring and why?
   b) Existing traffic surveillance and control- hardware and software- how do we monitor and control traffic today and what are the shortcomings?
   c) Signals, shocks and disturbances- the waves that propagate through the traffic stream- how do they travel and how do they affect traffic?
   d) New traffic surveillance technologies and traffic control methods that could be deployed today.
   e) Traffic surveillance technologies and traffic control methods that could be deployed in 5-10 years.

3) Method of Evaluation
   Basic individual assignments 20%
   Pop quizzes bonus points to above
   Advanced individual assignments bonus points to above
   Group assignments 40%
   Group project and individual final exam 40%

You must turn in ALL assignments and do ALL of the tests to pass. After meeting the first criteria, you must get at least 50% of the total points to get a "C" or better (if I grade hard, I may modify that to "B" or better).
4) Individual Assignments
Basic individual assignments are meant to test the students' knowledge of basic concepts presented in lecture and readings. All students will be expected to complete these assignments, they are not expected to consume a large amount of time.

Advanced individual assignments are for graduate students and others specifically interested in transportation systems. Undergraduates are NOT expected to turn in these assignments but they will help further your understanding of transportation systems.

Students will be graded on content and presentation. The student is expected to exercise professional judgement as to what to present and what not to present (e.g., you may lose credit for presenting too many figures, or too few). Naturally, you will receive feedback on your performance throughout the course and this fact will be considered when grading.

Unless you explicitly receive permission of the instructor, you may not discuss the individual assignments with anyone except the instructor until after the solutions are provided.

5) Group Assignments
Students will work in groups to extract meaningful information from traffic data. Each group will submit a single report (see sections 8-9 for guidelines) and each member will receive the same single grade. All members of the group will be expected to know the solution(s) used by the group. You may be asked short answer questions in class questions along the lines of, "how did your group ___?" as well as providing your estimated percentage split of the work, and identifying which member is most deserving of a bonus. Thus, even if one person does all of the work, they must educate the rest of the team or the entire team will lose points. However, you are strongly encouraged to work together on these group assignments (if it does not explicitly say "group assignment" then ask, you do not want any questions to arise when work is suppose to be done alone). If problems arise, we will address them during the quarter.

(semi) weekly assignments
1) load loop detector data and parse
   <change group members>
2) map loop detector data to the respective stations
   <change group members>
3) aggregate single loop measurements
   <change group members>
4) pulse matching and single vehicle measurements (length at two adjacent stations during ff)
   <change group members>
5) visualization
   <change group members>
6*) load GPS data and visualize- convert from latitude and longitude to relative position
7*) convert GPS data to more meaningful measures, parse GPS data by distance on tour.
8*) compare GPS and loop data
9*) examine vehicle trajectory data and validate simple car following models.
Often the assignments build on one another, so you will be provided working solutions after the due date.

Note that after each assignment the groups will be redistributed, potentially at the instructor's discretion. Whenever the groups change, any follow up work on a previous assignment is to be completed with the old group that originally submitted the work.

Unless otherwise noted or you explicitly receive permission of the instructor, you may not discuss the group assignments with anyone outside of your group and the instructor until after the solutions are provided.

6) **Late homework will receive the following penalties:**
   30% will be deducted from homework handed in after the class period in which it is due, or, 90% will be deducted from homework handed in after the solutions have been provided, or, no credit for homework handed in a week after the solutions are provided.

7) **Group Projects**
   Starting with group assignment 6, students will be offered the opportunity to participate in a group project. The group projects will be more involved than the group assignments, students will propose a topic to the instructor and he will help refine it as necessary. Possible topics include: tracking propagation of waves past many detector stations, vehicle reidentification, image processing, GPS data management, or other ideas that you may have.

Students will be required to either participate in a group project OR continue doing group assignments 6-9. In the case of the former, the grade for the final and project will be grouped together.

8) **The key to writing a good report:**
   You must be of four minds as you write. Simultaneously know the intelligent layman's view (your audience) and your advanced knowledge from experience. Similarly, you must focus on each sentence as you write it and still know what the entire document will say. Namely, be efficient with your writing, use exactly enough words to clearly present a sound argument. This last point is often overlooked, do not discuss topics until you have introduced them and do not introduce a given topic several times. The narrative should flow in a professional manner from start to finish and BE SURE TO PROOF READ YOUR WORK BEFORE TURNING IT IN.

9) **Collaborative work and working together:**
   The homework assignments are designed to ensure the students master skills and concepts presented in the course and/or beneficial for their professional career. If another student makes ANY contribution to your assignment, (1) note who you worked with and what their contributions to your submission were, (2) make sure you understand all of the concepts to the extent that you could successfully undertake similar work on your own. As an incentive, there is a good chance you will see one or more pop quiz in this course that emphasizes material from the assignments. The individual assignments are to be done alone, period, end of story (okay, questions to the instructor are welcome). On the group assignments, collaborative work among the group is encouraged and expected, but not to the point where one student does the work for
another. It is assumed that all of the students in this course understand these principles, but for completeness, the University's guidelines for academic misconduct are copied below.

If you are unsure what is an acceptable level of collaboration for a given assignment, then ask. If you do not feel comfortable citing and crediting your collaborators, then you have probably stepped over the line of acceptability. Most importantly, if you do not understand an important concept for an assignment, then please drop by or set up an office hour so that we can discuss the matter one-on-one and ensure that you learn the material.

CE/EE 675- Initially, the groups will consist of no more than two students and will have no more than one graduate student per group. In general, the groups can have:

at most one grad student from any given department.
at most two grad students total
at most three students total

1.0 Academic Misconduct (3335-31-02) [as reported at http://www.osu.edu/offices/oaa/procedures/1.0.html]

Academic misconduct is defined as any activity which tends to compromise the academic integrity of the institution, or subvert the educational process. Examples of academic misconduct include, but are not limited to:

- violation of course rules as contained in the course syllabus or other information provided the student; violation of program regulations as established by departmental committees;
- providing or receiving information during quizzes and examinations such as course examinations and general examinations; or providing or using unauthorized assistance in the laboratory, at the computer terminal, or on field work;
- submitting plagiarized work for an academic requirement. Plagiarism is the representation of another's works or ideas as one's own; it includes the unacknowledged word for word use and/or paraphrasing of another person's work, and/or the inappropriately unacknowledged use of another person's ideas;
- falsification, fabrication, or dishonesty in reporting research results;
- serving as, or enlisting the assistance of, a "ringer" or substitute for a student in the taking of examinations;
- alteration of grades or marks by the student in an effort to change the earned grade or credit; and
- alteration of University forms used to drop or add courses to a program, or unauthorized use of those forms

10) Lecture format:

- Necessary discussion for the weekly assignment
- Daganzo chapters 1 and 4 (students will be responsible for chapters 2 and 3, but they will not be covered in lecture) and/or the course packet.
- New material on parameter measurement