

University of Connecticut – CE 2710 Transportation Engineering Spring 2018 Syllabus

Class meets:	Lectures: CAST 212, MW 3:35-4:25 PM Discussions: CAST 204, Th 10&11AM; 1PM	Website (HuskyCT): lms.uconn.edu
Instructor:	John N. Ivan, CAST 332 (860) 486-0352; john.ivan@uconn.edu	Office hours: MWTh 2-3:30PM (or by appointment)
Teaching Assistant:	Md-Julfiker Hossain, CAST 205 (307) 761-3864; mdjulfiker.hossain@uconn.edu	Office hours (CAST 210): M 9-11 AM; W 10 AM - noon
UG Academic Assistant:	Jennifer Newton (860) 922-9886; jennifer.newton@uconn.edu	Office hours (CAST 210): Tu 10-11 AM; 2-5 PM

Course Text: Nicholas. J. Garber and Lester. J. Hoel, *Traffic and Highway Engineering*, 5th Edition, Cengage Learning, 2015. This text is available at the UConn COOP and also as an e-Book, including rental options. Other materials will be distributed in class or on the course website at HuskyCT (address listed above), including this syllabus and all project, homework and discussion assignments and solutions.

Course Prerequisites:

- PHYS 1501 *Physics for Engineers I (required)*: particle dynamics and basic applied mechanics (PHYS 1201 and 1401 are also acceptable)
- CE 2410 *Geomatics and Spatial Measurement (recommended)*: use of topographic maps

Course Description: Design of transportation facilities. Traffic flow and capacity analysis. Travel demand analysis and planning methods.

Course Purpose: This course is required of all undergraduate majors in Civil Engineering. It introduces students to the fundamentals of planning, operation and design of transportation facilities.

Course Outcomes: Students successfully completing the course will be able to ...

1. ... collect and analyze data for traffic engineering and design studies.
2. ... estimate the capacity and level of service for interrupted and uninterrupted flow facilities.
3. ... estimate travel demand for transportation facilities.
4. ... design the alignment and cross-section of roadways in accordance with applicable design standards.
5. ... select appropriate design standards for urban streets and rural highways that consider safety and neighborhood context.

Accreditation Outcomes: This course addresses the following ABET Engineering Accreditation Commission Student Outcomes (see www.abet.org for more information about these):

- 1) **identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics:** Students learn how principles of science and mathematics are used to derive fundamental engineering concepts in design and traffic operation.
- 2) **apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline:** Students conduct a project in which they design the horizontal and vertical alignment of a road in a real world context, considering physical and environmental constraints.
- 3) **develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions:** Students complete a project in which they collect traffic data in the field and analyze it.
- 4) **communicate effectively with a range of audiences:** Students develop communications skills through the written reports for the course projects.
- 5) **recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts:** Students study how transportation systems affect and are affected by social and environmental factors, and that professional responsibility is not limited only to

technical proficiency. Students learn about the impact on society of past and current transportation projects through discussion and analysis of current events, videos, and guest speakers.

- 6) **recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge:** Some assignments require the students to consult state-of-the-art documents to learn that the field of transportation engineering is constantly changing, thus gaining an appreciation for the importance of keeping up-to-date with these changes.
- 7) **function effectively as a member or leader of a team that establishes goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment:** Students work in teams to complete homework and several course projects.

Course Communications: Please check your UConn email and the message board at HuskyCT regularly (at least every other day), as the instructor and TA will occasionally post announcements there that are not repeated in class. If you have a question about the homework, exams, projects or other items of interest to other students in the course, please post it on the HuskyCT message board under the appropriate topic, and either the instructor or the TA will answer it there so that everyone can benefit from the answer. If you contact us by email with a coursework question, we will answer your question on the message board.

Grading and Course Work: All coursework except for examinations will be completed and graded in teams assigned by the instructor. One grade will be assigned for the work on each homework assignment and project. However, the final grade for each team member will be influenced by evaluations of each of the team members by one another about each member's performance relative to a team performance agreement (TPA), which each team will complete together and sign at the beginning of the semester. In this TPA, each team member will commit to some level of performance, which may or may not be the same for all team members, along with how much credit each team member will get for the team's grade on the group work. Each team will submit their TPA by January 22; no assignments will be graded for any team that has not submitted a TPA. As an incentive for each team to involve all members in the work, on any exam during the semester, if every member of the team earns at least 90%, each team member will earn 1 bonus point on the exam.

Class discussions: The Thursday discussion periods will be interactive sessions rather than lectures. Use of the class time will include interactive group discussions, students working problems in front of the class and other hands-on activities. We will be working problems from the textbook, so be sure to bring your textbook to class with you on Thursdays! Each team must participate in at least one class activity during each discussion period to receive full credit for class participation. Here is how the participation grade will work:

- Each week one student will be selected randomly from each team to work a problem for the class.
- If the student completes the problem without needing any assistance, the team earns 10 points toward class participation.
- If the student encounters difficulty, he/she can ask for help (not from his/her team), and the team will lose 1 point each time help is requested.
- The point is that each team should prepare for any member to be selected to work in front of the class.

Team work and plagiarism: Obviously, with all of the class work outside of the examinations being done in teams, it is expected that you will work with classmates on problem assignments. The idea of group collaboration is NOT that each team member works on a different homework problem or part of a problem and then you submit what each has worked on individually. Instead, the point is to bring together different viewpoints and thought processes in order to find a better solution to the problem, and so that different team members may shed new light on the problem and the others can then see it in a different way. If you each work individually on each part of the homework or project, then you each will only learn how to do the problems that you personally worked out, and then you will not all have learned how to do questions that might be asked on the examinations.

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Note that passing off the work of others as your own violates the University of Connecticut code on plagiarism and requires that actions be taken which may include dismissal from the university. More information about plagiarism and the University of Connecticut policy on Academic Misconduct is contained within the Student Code at the link listed below.

Grading Rubric:

Element	%	Comment
Team Homework & Class Participation	12.5	Homework will be completed in teams, and due in the discussion periods on Thursdays starting with the second week of classes. Homework will be reviewed in the class in which it is due, so <u>no late homework will be accepted</u> . Each homework submission must include the <u>team number and the names of the team members</u> . Part of the Team homework score will also be earned through class participation of individual team members in the discussion periods (as described above).
Team Projects	25	The course includes two team projects; the topics will be assigned later. Late projects will be downgraded by 5% per 24-hour period after the due date in which they are submitted. Have a staff-person in the CEE office stamp any late project submissions with the date and time before submitting them in my mailbox or under my door. Each project is worth 12.5%.
Individual Mid-term Exams	37.5	There will be 3 mid-term examinations as noted on the class schedule. <u>The dates on the syllabus are tentative and will be confirmed at least two weeks prior to the actual date</u> . In lieu of offering make-up exams, if any student earns a higher score on the final than on any number of the three mid-term exams, the final score will count instead of those exams.
Individual Final Exam	25	The final exam has not yet been scheduled. Watch HuskyCT and other campus notices for confirmation of the details. The spring 2017 deadline for students to request rescheduling finals for KNOWN conflicts will be April 21 st . Please remember that when students have bunched finals, the University will move the middle most final(s) in order to break up the bunched schedule. Complete information can be found at this link: http://dos.uconn.edu/finals-rescheduling/

Class conduct: My intention is to maintain a classroom environment that is conducive to learning. I will not tolerate any disruptive behavior that detracts from this environment, including, but not limited to, mobile phone or computer use (not related to the class), talking and eating. Any student engaged in behavior that I determine to be disruptive will be asked to cease the behavior, and if he/she refuses or continues, will be asked to leave. I also will not tolerate any abusive, offensive or demeaning actions or communication aimed at any person participating in the class. These expectations extend to any online forums or other electronic communication used for class discussions.

University Policies and Regulations:

- **Absences from Final Examinations:** <http://catalog.uconn.edu/academic-regulations/grade-information/#exam-absence>
- **Class Attendance:** <http://catalog.uconn.edu/academic-regulations/grade-information/#attendance>
- **Credit Hour:** <http://policy.uconn.edu/2012/08/22/credit-hour/>
- **People with Disabilities, Policy Statement:** <http://policy.uconn.edu/2011/05/24/people-with-disabilities-policy-statement/>
- **Policy Against Discrimination, Harassment and Related Interpersonal Violence:** <http://policy.uconn.edu/2015/12/29/policy-against-discrimination-harassment-and-related-interpersonal-violence/>
- **The Student Code:** <http://community.uconn.edu/the-student-code-preamble/>

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Final Exam Scheduling: Note that the University has specific guidelines for determining student eligibility for rescheduling bunched final exams. Please remember that when students have bunched finals, the University will move the middle most final(s) in order to break up the bunched schedule, and that there is a deadline by which students must make their rescheduling requests. Complete information can be found at this link: <https://dos.uconn.edu/finals-rescheduling/>

Schedule of Topics, Readings, Homework and Project Due Dates and Examinations:

Week of	Monday	Wednesday	Thursday (discussion sections)
15-Jan	HOLIDAY - NO CLASS	Introduction (1-48)*	Team Performance Agreements; review of pre-requisites
22-Jan	Roadway components, design controls (729-788) Team Performance Agreements Due	Stopping and passing sight distance; minimum curve radius; design speed and super-elevation (51-88)	HW 1 DUE
29-Jan	Vertical alignment: crests and sag curves (788-802)	Design of horizontal curves (802-820)	HW 2 DUE
5-Feb	Combining horizontal and vertical alignment	Designing for urban settings; bicycle facilities (822-826, HuskyCT)	HW 3 DUE; PROJECT 1 ASSIGNED
12-Feb	Spot speed studies, volume studies (93-126,143)	Traffic flow elements, flow-density relationships (251-271)	HW 4 DUE; Review for Exam 1
19-Feb	EXAM 1 (HW 1-4)	Highway Level of Service (447-448)	HW 5 DUE; Return Exam 1
26-Feb	LOS of freeways and multilane highways (448-472)	LOS of Two-lane highways (472-493)	HW 6 DUE
5-Mar	Intersection design (305-354)	Intersection control, signal warrants and operation (365-386)	HW 7 DUE; PROJECT 1 DUE
12-Mar	SPRING RECESS	SPRING RECESS	SPRING RECESS
19-Mar	Traffic Signal Phasing and Timing Plans (386-429)	Signal capacity and saturation flow rates (515-537, 542-554)	HW 8 DUE; Review for Exam 2
26-Mar	EXAM 2 (HW 5-8)	Delay and LOS for signalized intersections (537-542)	HW 9 DUE; PROJECT 2 ASSIGNED
2-Apr	Introduction to travel demand (583-627)	Trip generation (627-636)	HW 10 DUE; Return Exam 2
9-Apr	Trip distribution and mode choice analysis (636-659)	Route choice analysis (660-671)	HW 11 DUE
16-Apr	Video: Divided Highways	Video: Divided Highways (cont.)	HW 12 DUE; Review for Exam 3
23-Apr	EXAM 3 (HW 9-12)	Highway Safety (149-247); Review for Final exam; Instructor evaluation	HW 13 DUE; PROJECT 2 DUE; Return Exam 3; TA evaluation

*Numbers in parentheses indicate pages to read in Garber and Hoel.