Welcome to CE 367G: Design & Evaluation of Ground-Based Transportation Systems! Spring 2025 (unique #16870)

Lectures: Tu/Th 12:30 to 1:45 pm, in 3.402 ECJ Laboratory Sections: Mondays 3:30-5:30 pm, in 2.218 ECJ

I. Office Hours for Instructor, Dr. Kara Kockelman, P.E.

Tuesdays & Wednesdays 10:30 am-noon, in 6.904 ECJ

& by phone: 512-471-0210 (office), email <u>kkockelm@mail.utexas.edu</u> for appointment

Note: PhD student Keya Li (keya li@utexas.edu) will serve as the course TA and lab instructor. Her office hours will typically be on Mondays during the lab slot (3:30-5:30 pm, in 2.218 ECJ), and she & Lin Su (sulin@utexas.edu) and myself can also answer questions by email. WSB professional engineer Michael Skoviera is excited to deliver a guest lecture in the lab slot (about bringing transportation design projects to fruition) and to support OpenRoads (CAD software) instruction in 2 other lab slots. The lab room is open every week, but we will use it just 3 times formally, as a group.

II. Prerequisites: Transportation Systems, is a prerequisite for undergraduates intending to enroll in CE367G. Instructor consent may waive this requirement.

III. Grading: Student performance in CE367G will be assessed using the following scoring system:

Homework Assignments	40%
Class Participation	10%
First In-Class Exam	20%
Final Exam	30% (on Saturday May 3, 1 to 3 pm)

IV. Homework Solutions & Academic Dishonesty:

Use of unauthorized sources of homework solutions (e.g., websites like Chegg & ChatGPT & CoPilot, previous semester student solution copies, & instructor CDs) is considered scholastic dishonesty, plagiarism and a violation of UT's Standard of Academic Integrity. The University Honor Code (at https://deanofstudents.utexas.edu/conduct/standardsofconduct.php and https://deanofstudents.utexas.edu/conduct/standardsofconduct.php and https://deanofstudents.utexas.edu/conduct/academicintegrity.php defines plagiarism as the following:

• When a person represents another's material as their own work without attribution.

• When a person misrepresents citation or attribution for purposes of an academic advantage.

• When a person submits essentially the same work for two assignments without the permission of the Faculty Member.

CE367G students are encouraged and authorized to work on homework assignments together and prepare for exams together. However, all written work handed in by a student is considered to be his/her own work, prepared without *unauthorized* assistance. Students who violate University rules on scholastic dishonesty (*e.g.*, anything which gives unfair academic advantage to a student) are subject to disciplinary penalties, including the **possibility of failure in the course and/or dismissal from the University**.

Related to this: **Sharing of Course Materials is Prohibited:** No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers,

homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have my explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. We are familiar with sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course.

V. Examinations: Our two in-class exams are *tentatively* scheduled for the following times:

Midterm Thursday, March 6 (tentative)

Final Exam Saturday, May 4, 1 to 3 pm

Make-up exams will *not* generally be given to any student. If a student is absent from a scheduled exam due to medical or other problems beyond her/his control and can plainly demonstrate this, the instructor can choose to give the student a completely different exam, additional assignments, and/or change the weighting of the student's various graded contributions.

VI. Laboratory Sections: Several lab sections are intended for additional depth in important technical areas, to hone abilities useful for analysis of multi-faceted projects. There will be demonstrations & some hands-on learning of computer-aided design (CAD) software and the MS Excel Solver tool in one or two of these lab times (using Bentley's OpenRoads assignments, with software access Guide here: https://communities/other_communities/other_communities/other_communities/be_careers_network_for_acade_mia/b/news/posts/studentserver-guide).

VII. Text/Reader and Course Notes: A hard copy of the Course Packet should be purchased for \$35+ (vs. \$220 new) via Jerome Kubala (512-497-6662; jerome.kubala@gmail.com). The Packet consists of selected pages from Garber and Hoel's (G&H's) *Traffic and Highway Engineering* (Fourth Edition, 2009), which thoughtfully presents many of the ideas present in AASHTO's "Green Book" – or *Policy on Geometric Design of Highways and Streets* (including all key tables for horizontal and vertical alignment designs). The Packet also contains a great deal of Green Book content & several sections of the *Highway Safety* Manual (2010). The Green Book and HSM 2010 with 2014 supplement (https://compass.astm.org/document/?contentCode=AASHTO%7CAASHTO%20HSM-1%7Cen-US) are also available online, via the UT library system. Both our **tests are open notes, open book**, so you will want to have hard copies of key tables with you at both exams.

Lecture slides are available online (on Canvas) for students to print (3 or 6 slides per page and doublesided is best). Other valuable reading may include additional content from the PET Guidebook and the Transportation Research Board's *Highway Capacity Manual* (HCM). Some reading assignments listed below are found on-line at the Victoria Transport Policy Institute (VTPI) <u>http://www.vtpi.org/tca/</u>.

VIII. Add/Drop Dates: From the 1st through the 12th class day, an undergraduate student can drop a course via the web and receive a refund, if eligible. From the 13th through the university's academic drop deadline, a student may Q drop a course with approval from the Dean, and departmental advisor.

IX. Evaluation Plan: UT's Course/Instructor Survey form will be used as the basic evaluation tool. All students are encouraged to submit written comments during this survey. Other formal assessment opportunities may arise mid-semester; and students are strongly encouraged to provide feedback at

any time during the course, in person, via other students or anonymously, to the TA and/or the instructor.

X. Other: UT provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, 471-6259 (voice) or 410-6644 (video phone) or http://ddce.utexas.edu/disability/.

A student who misses classes or other required activities, including examinations, for the observance of a religious holy day should inform the instructor as far in advance of the absence as possible, so that arrangements can be made to complete an assignment within a reasonable time after the absence.

Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the instructor's courses in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

XI. Student Outcomes, Course Content & Order of Topics:

CE367G is designed to achieve 3 of the ABET's 7 Student Outcomes for graduation in civil engineering, as follows: 1. An ability to identify, formulate, and **solve complex engineering problems** by applying principles of engineering, science, and mathematics. 2. An ability to **apply engineering design** to produce solutions that meet specified needs with consideration **of public health**, **safety**, **and welfare**, as well as global, cultural, social, environmental, **and economic factors**. 4. An ability to 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**.

CE 367G covers various aspects of transportation relating to the design of ground-based transportation systems (emphasizing roadway and non-motorized travel). The **course objectives** are that students are able to **design safe, cost-effective, and sustainable networks**, are **familiar with design standards, and are comfortable with various tools for project evaluation**. Primary topics include physical design for safe and efficient transport to meet passenger and freight needs, multi-modal and multi-objective planning, crash prediction, cost considerations, environmental impacts, and operational analysis. A great variety of other topics apply as well. A tentative scheduling of the course topics is shown below.

Lesson # & TOPICS TO BE COVERED	Relevant Reading in G&H, AASHTO's Green Book (GB), & VTPI website
1 Introduction of Course	G&H Ch. 1 & 2: pp. 3-52
2 Methods for Evaluating Transp. Alternatives: Engineering Economics	G&H Ch. 13: 653-684
3 Anticipating Project Costs & Benefits	VTPI's Transport. Cost & Benefit Analysis: Ch 5.6 at http://www.vtpi.org/tca/
4 Sight Distance Calculations: Stopping, Passing and Intersection	G&H Ch. 3: pp. 88-94, & Ch. 7: pp. 301-320; GB: 3-1 to 3-18, 3-106 to 3-111, 9-28 to 9-54
5 Horizontal Alignment Design: Circular Curves & Superelevation	G&H Ch. 15: pp. 770-783; GB: 3-18 to 3-58
6 Design of Superelevation Development	G&H Ch. 15: pp. 783-787; GB: 3-59 to 3-84

7 Vertical Alignment Design	G&H Ch. 15: pp.756-770; GB: 3-149 to 3-164
*** Midterm Exam *** (approx. timing)	
8 Design of Roadway Cross Sections & Roadsides	G&H Ch. 5: pp.195-200, & Ch. 15: pp.745-754; GB: 4-1 to 4-36
9 Complete Streets, Context-Sensitive Design, and Pedestrian Facilities	G&H Ch. 5: pp.203-208; GB: 4-56 to 4-74 <u>ITE Journal Sept 2011 articles:</u> (1) Walkable Urban Thoroughfares & (2) Roundabouts as Context Sensitive Solns
10 Intersection Design	G&H Ch. 7: pp.265-322; GB: 9-55 to 9-114
11 Interchange Design	G&H: Ch. 8: pp.327-378; GB 10-1 to 10-62
12 Anticipating Crash Counts & Severity as a Function of Design Decisions	G&H Ch. 5: pp. 151-208, plus <u>Hiqhway Safety</u> <u>Manual</u> pages in course reader
13 Key Traffic Variables for Evaluating System Level of Service	G&H Ch. 6: pp.213-258, & Ch. 9 & 10: pp. 381-528
14 Regulatory Controls Impacting Transportation Project Plans	G&H Ch. 11: pp. 551-586
*** Final Exam *** Saturday May 3, 2025: 1 to 3 pm	

Note: This course carries an **Independent Inquiry** flag. Such UT courses are designed to engage students in the process of inquiry over the course of a semester, providing them the opportunity for independent investigation of a question, problem, or project.