

CE391H & CRP384: URBAN TRANSPORTATION PLANNING

Fall 2018 (#15625 & #01324)

Lecture: 11:00 am – 12:30 pm, Mondays & Wednesdays, in ECJ 3.406

I. Office Hours for Dr. Kara Kockelman

Mondays & Wednesdays 1:00-2:30 pm (tentative), 6.904 ECJ

Or, by appointment: 471-0210 (Office phone number) & kcockelm@mail.utexas.edu

II. Prerequisites

Graduate students are not required to have satisfied any specific courses as prerequisites for this course. However, undergraduates and graduate students outside the transportation engineering and planning majors should receive permission from the instructor before enrolling in this course.

III. Grading

For purposes of grading, the performance of students enrolled in this course will be assessed using the following scoring system:

Homeworks	40% of score/grade
Course Project	25% (20% for report + 5% for presentation)
Examination(s)	30%
Participation* (& Quizzes)	5%

* Participation score may be up to 5% of your grade, and is based on participation in the class (including attendance, in cases where attendance is poor). Pluses and minuses will be used in final course grades.

IV. Examinations*

Only one course examination (a significant “midterm”) is expected, towards the end of the semester (e.g., possibly on Weds. November 28), and this may take place outside of lecture hours (e.g., as a take-home exam). The UT-scheduled final examination slot (Friday, December 14th, from 9am-12pm) may be used for student oral presentations of final-project work, if times during the final week of class do not work well.

* The instructor reserves the right to periodically administer, grade, and use in student evaluation “pop”/unannounced quizzes. Students should come to class prepared to contribute to each class’s lecture and discussion by staying up-to-date with homeworks and reading.

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.

V. Homework Assignments

Homework problems will be assigned roughly every two weeks and must be handed in at the *beginning* of the period in which they are due. After this time, they will be considered late and given *no credit*. However, **all assigned problems must be completed** (within 3 weeks of their due date and at least one week before the final exam) to help ensure that each student learns the course material. Alternatively, a student’s participation score will be adversely affected.

VI. Course Project

The course project is a multi-person team endeavor for students to apply travel demand forecasting models at the regional scale for the Austin, Texas or Tyler, Texas zone systems and networks. Teammates will learn and apply TransCAD software with feedback of travel times and costs for multiple system equilibria. They will specify, model, and compare results of at least 3 different scenarios. These scenarios may involve transportation system modifications (e.g., new transit services or added highway links), travel demand management practices (e.g., new road tolls, higher speed limits, and/or congestion pricing),

changing land use patterns (e.g., more balanced job-household settings, infill development, transit-oriented design, and urban growth boundaries), and/or changing demographics (e.g., added user classes with shifting values of time, different population and job growth-rate scenarios, and greater preference for shared fleets). Such work will be followed by an oral presentation to the class (of roughly 15 minutes per team, plus 5 minutes for questions & answers).

VII. Texts and Course Notes

The recommended textbook for this course is Ortúzar and Willumsen's *Modelling Transport*. Chapters of that text will be assigned for reading, along with sections of NCHRP reports 716 and 365 (available at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_716.pdf and <http://ntl.bts.gov/lib/21000/21500/21563/PB99126724.pdf>) and the SHRP2 C46 Primer on activity-based travel demand models (http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2_C46.pdf). Copies of assigned book chapters may be made available via a Course Packet for purchase from *Canopy Course Notes*, 512-497-6662 via Jerome Kubala, for approx. \$15. Updated versions of lecture notes will be posted periodically online, for students to download. Any additional, required materials will be made available.

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.

For graduate students: From the 1st through the 4th class day, graduate students can drop a course via the web and receive a refund. During the 5th through 12th class day, graduate students must initiate drops in the department that offers the course and receive a refund. After the 12th class day, no refund is given. No class can be added after the 12th class day. From the 13th through the 20th class day, an automatic Q is assigned with approval from the Graduate Advisor and the Graduate Dean. From the 21st class day through the last class day, graduate students can drop a class with permission from the instructor, Graduate Advisor, and the Graduate Dean. Students with 20-hr/week GRA/TA appointment or a fellowship may not drop below 9 hours.

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 are likely to 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 Information

1. The University of Texas at Austin 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/>.

2. According to *The General Information Catalog* "a student who is absent from a class or examination for the observance of a religious holy day may complete the work missed within a reasonable time after the absence, if *proper notice* of the planned absence has been given". The deadline for proper notification of such an absence is the fifteenth day of the semester.

3. Students in this course 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. To ensure your actions never compromise your and our class's integrity, please visit http://deanofstudents.utexas.edu/sjs/acint_student.php. 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. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. An “F” grade will be the recommended penalty in most cases of scholastic dishonesty. One should refer to the Student Judicial Services website at <http://deanofstudents.utexas.edu/sjs> to access the official University policies and procedures on scholastic dishonesty as well as further elaboration on what constitutes scholastic dishonesty. For further elaboration on what constitutes scholastic dishonesty see http://deanofstudents.utexas.edu/sjs/scholdis_what_is.php

XI. Course Objectives, Academic/Learning Goals, Content, & Schedule

This course covers various aspects of urban and regional transportation system performance forecasting. By the end of this course, students should have a solid understanding of the theory and methods underlying the practice of urban and regional travel demand modeling and should be able to:

- describe Americans’ evolving travel choices, and their variations as a function of demographics and land use patterns;
- identify key data sources and methods for planning activities, including model specification, forecasting and validation, for personal vs. commercial travel;
- define and apply key elements of different modeling paradigms for aggregate and disaggregate approaches to city-wide and region-wide transportation system performance forecasts;
- apply travel demand modeling software for system-wide forecasts of activity participation rates, destination and mode choices, traffic and travel time & cost outcomes; and
- evaluate the differences in distinctive land use-transportation scenarios, including changes in travelers’ net benefits.

To attain these objectives, we will systematically proceed through a series of topic modules in class, and students will undertake multiple homework assignments and a team-base course project. A tentative scheduling of the course topics is shown here, along with suggested readings (which can largely be found online).

Course Motivation

1. **Introduction to Course** (<1 lecture) READING: Course syllabus
2. **U.S. Travel Data Trends** (2 lectures) READING: Commuting in America 2013, NHTS 2009 Summary of Travel Trends, BTS Pocket Guide.
3. **Technology Trends** (1 lecture) READING: Zhao & Kockelman’s Anticipating the Regional Impacts of CAV Travel in Austin, Texas
4. **Land Use Patterns** (1 lecture) READING: Residential Construction Trends in America’s Metropolitan Areas (EPA 2012)
5. **Transportation’s Costs & Benefits** (2 lectures) READING: Chapter 1 of Kockelman et al.’s *Economics of Transportation Systems*
6. **The Regulatory Environment** (1 lecture)

Useful Data Sets for Regional Transportation Planning Applications

7. **Land Use Data Sets** (1 lecture) READING: Chapters 1-3 in NCHRP 716
8. **Travel Data Sets** (2 lectures) READING: Chapters 3 & 4 in NCHRP 716
9. **Network Details** (1 lecture or less)

Model Applications

10. **Travel Choice Modeling Frameworks** (1 to 2 lectures)
11. **Trip Generation & Attraction Models** (1 to 2 lectures) READING: Chapter 4 of NCHRP Report 716 and Chapter 4 of Ortúzar & Willumsen’s *Modeling Transport*
12. **Trip-Distribution Models** (2 to 3 lectures) READING: Chapter 4 of NCHRP Report 716 and Chapter 5 of Ortúzar & Willumsen’s book

13. **Mode Choices** (2 lectures) READING: Chapter 4 of NCHRP Report 716 and scan Chapters 6, 7, & 8 of Ortúzar & Willumsen's book
14. **Time of Day Choices** READING: Section 4.9 of NCHRP Report 716 & section 11.5 of Ortúzar & Willumsen's *Modeling Transport*
15. **Network Assignment of Traffic** (2 to 3 lectures) READING: Chapters 10 & 11 of Ortuzar & Willumsen's book
16. **Activity-based Methods** (2 lectures) READING: Scan TRB's Activity-based TDM Primer (2015), Ch. 14 of Ortuzar & Willumsen's book, Chapter 6 of NCHRP Report 716
17. **Models for Freight Movements** (2 lectures) READING: Chapter 13 of Ortúzar & Willumsen's book
18. **Long-distance Travel Choices** (1 lecture)
19. **An Introduction to Land Use Modeling** (1 lecture)
20. **Intro to Microsimulation Models for Self-Driving Vehicles** (using POLARIS &/or MATSim) (1-2 lectures, as time permits)