CE 460/560 Special Topics in Transportation

Dynamic Traffic Assignment

Dept. of Civil Engineering and Engineering Mechanics
University of Arizona

Instructor: Dr. Yi-Chang Chiu
Meeting: TTh 9:30-10:45 pm at Modern Language 202 (UA Students only) and GoToMeeting
Office Hours: by appointment
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Course Descriptions:

The main objective of this course is to introduce to students the modern concept and issues of urban transportation operational planning. Transportation operational planning has become an increasingly important principle in transportation engineering in recent years due to the emerging need to integrating transportation planning and operation. In this course, students will learn the concepts, theories, modeling techniques and problem solving approaches for transportation operational planning. Upon the completion of this course, students should:
  (1) Understand and be able to discuss concepts and theories of urban transportation long-range planning and operational planning process,
  (2) Understand the static traffic assignment theory and its applications,
  (3) Understand the dynamic traffic assignment theory and its applications,
  (4) Be able to choose pertinent traffic analysis tools for various transportation operational planning applications with varying requirements,
  (5) be able to use DynusT v3.0 in selected operational planning applications, and
  (6) Be able to communicate technical analysis results with others.

Prerequisites:
Undergraduate students should have completed CE363 and CE 469/569 Travel Demand Modeling or other equivalent courses. Students need to feel comfortable with calculus, MS Excel or some basic programming languages such as Matlab or Python, MS Word, basic statistic analysis techniques, computer simulation packages.

Expectation:
Students are expected to have genuine interest in transportation planning and operation linkage as the course materials are highly specialized in transportation planning and operations. Students should review the course materials before coming to the class. Students should be ready to be intellectually challenged in this class and be ready to undertake the course requirements set by the instructing professor.

Course Structure:

The course outlines are summarized as follows. Slight deviation may be likely per the student learning progress in the semester.

	Topics	Schedule	Readings
*	Brief review of four-step transportation planning process	Week 1	▪ Chiu notes and slides
	Static and dynamic traffic assignment theories	Week 2	▪ Chiu notes and slides
	DynuStudio Overview - Getting around the software - Open a project and create a new project - Import GIS datasets - Create demand tables - Batch processing of network attributes - Visualization capabilities	Week 3-5	▪ DynusT/DynuStudio
	DynuStudio More Details - Set up scenarios/strategies - Diagnostics - Comparative analysis	Week 6-8	▪ DynusT/DynuStudio
	First Mid-Term Exam (UA students only)	Week 9	
*	DynusT Network and Traffic - Mesoscopic traffic flow models - Anisotropic mesoscopic simulation in DynusT	Week 9	▪ Chiu notes and slides
*	DynusT Assignment Algorithm - Time-dependent shortest path algorithm - Various assignment algorithms	Week 10	▪ Chiu notes and slides
*	Congestion Pricing	Week 11	▪ Chiu notes and slides
*	Calibration - Network and traffic flow calibration - Two stage calibration (OD and bottleneck)	Week 12	▪ Chiu notes and slides
Module 6	DynuStudio Putting all together - Scenario setup and analysis	Week 13-Week 15	▪ DynusT/DynuStudio
	Final term project presentation	TBD	

Homework Assignments (UA Students Only)

▪ Several homework assignments will be given throughout the semester. The **worst homework grade will be dropped** from the final grade calculation.

- Homework is due at the beginning of the class on the day it is due.
- Homework handed in late will have the following penalties: Up to 1 class late: 5 points; up to 2 classes late: 10 points; up to 3 classes late: 30 points. No credit will be given after the homework solution is posted on D2L. Prior approval from the instructor is needed for a student to be exempted from the above policy for a particular assignment.
- Appeal of homework grade needs to be submitted to the professor through the D2L e-mail within **one week after posting of homework grade**. No appeal would be accepted if the appeal is delivered verbally or if the appeal passes the due date. It is the student's responsibility to regularly check the posting of grades.
- Homework needs to be presented in a professional manner. Each assignment should have a title page indicating name, date, course, and assignment number. Partial credit will be given for solving the problem using the correct method but not yielding the correct answer. No credit will be given to problems with answer but no clearly written calculation. Final answers should be clearly identified. Page numbers should be clearly indicated. Submitting the homework through D2L is preferred but the students have the option to submit in person.
- Discussing with peer classmates is encouraged. However, **each student needs to produce his/her own solutions**. Copying another person's work, without attribution, including copying of any part or the whole of computer files or material from the Internet, is considered plagiarism. It will be prosecuted as a violation of the University of Arizona Student Code of Conduct, in accordance with the Code of Academic Integrity. This code is published on-line at http://dos.web.arizona.edu/uapolicies/. It is the student's responsibility to be familiar with these Codes.
- For group homework assignments, each group needs to elect **a group leader for each assignment**. Only the group leader needs to submit the group homework. For each homework assignment the group leader needs to submit a one-paragraph journal summarizing the participation of each group member. To recognize the group leader's extra work, the group leader receives additional 5% points for each group assignment.
- The instructor reserves the right to choose which homework assignment to grade. In other words, **not all homework assignments will be graded and the choice of graded homework is at the instructor's discretion**. The instructor won't announce which assignment will be graded.
- Only the graded homework assignments are to be included in the final grade calculation.

Exams
One 75-min mid-term exams will be given during the semester. Makeup exams are not usually given except unexpected special extenuating circumstances. However, for a legitimate schedule conflict and with the instructor's approval, a student may be able to take the exam at a different time. Scaling of exam grade may be permitted for the entire class. However, no scaling will be performed for the final grade calculation. Graduate students may be given additional questions at the exam. If this occurs, the total points will be scaled to the same as those for the undergraduate students after adding the additional questions.

Term Project Report
Term project report is expected to be of last conference paper quality. The term project report is required only for graduate students. Detailed report requirements will be given separately at a later time.

GoToMeeting Link
https://global.gotomeeting.com/join/392365373
Use your microphone and speakers (VoIP) - a headset is recommended. Or, call in using your telephone.
Dial +1 (646) 749-3122
Access Code: 392-365-373
Audio PIN: Shown after joining the meeting

Meeting ID: 392-365-373

Recorded Sessions
All GoToMeeting sessions will be recorded and made available to students. Links to each session will be provided in D2L at a later time.

Grading Policy
Different grading policies apply to undergraduate and graduate students as follows.

	Undergraduate	Graduate
Homework	40%	30%
Mid-term Exam	30%	30%
Term Project Report	30%	40%

This course will be graded on a straight scale with the following grade thresholds. The professor reserves the right to make final adjustments.

Total percentage of points earned	Final Grade
90 -100 %	A
80 – 89.9 %	B
70 – 79.9 %	C
60 – 69.9 %	D
< 60%	F

Reference
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