CE 392M
Public Transportation Engineering (15615)
Fall 2018

Instructor:	Dr. Randy Machemehl
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Office Hours:	MW 3:00 – 4:00, other times by appointment
Lecture:	TTH 12:30-2:00pm, ECJ 3.110
Required Textbook:	*Urban Transportation Systems,* by Sigurd Grava, McGraw-Hill, 2003, ISBN 9780071384179
Course Supplement:	Available at Jenn's Copy and Binding at Guadalupe and Dean Keeton
Prerequisites:	Graduate Students: Graduate standing and consent of instructor Undergraduate Students: Credit for CE 321 or the equivalent.

Academic/Learning Goal for CE 392M:
The goal for CE 392M is be able to characterize public transportation modes in terms of their most appropriate urban area applications. This goal includes being able to conceptually plan and design integrated public transportation systems, that is, systems including multiple modes.

Homework:
Homework problems are normally due the next class meeting after assigned. All problems must be handed in at the beginning of the period in which they are due. After this time, they are considered late; however, all assigned problems must be handed in before the final exam or the instructor will consider the student's work incomplete and will award grades accordingly.

Attendance:
Attendance at all scheduled class meetings is mandatory. A sign up sheet will be circulated each class period.

Testing and Examination Policy:
Make-up exams will NOT generally be given. If a student is absent from a scheduled exam due to medical or other problems beyond his/her control, the instructor may increase the grade percentage for the other exam, thus avoiding a grade of zero for a scheduled exam. The exam schedule is as follows:

Mid-Semester Exam	Thursday	11 October 2018
FINAL EXAM	Wednesday 2:00 pm-5:00 pm	19 December 2018

Grading Policy: Grades will be based on the following:

ITEM	DATE	PERCENTAGE
Mid-Semester Exam	Thursday, 11 October	30
Homework Assignments (6-10)		15
Final Exam	Wednesday, December 19, 2:00 pm-5:00 pm	35
Project: Written		15
Project: Oral		5
Total Points		100

The plus/minus (+/-) grading system will be used in the final course grade calculation.

Individual Projects
Each student will be expected to develop a semester project and present the results in written and oral form during the last week of class. A possible list of project topics is provided at the end of this handout, however, students may, with instructor approval, choose topics not on the list. The approximate schedule for individual projects is as follows:

1. Topics Chosen: Thursday, 6 September 2018
2. Outline Due: Thursday, 27 September 2018
3. Written Version Due: Tuesday, 20 November 2018
4. Oral Presentations: Tuesday, 4 December & Thursday, 6 December 2018

Course Instructor Evaluation Plan:
The School of Engineering Course-Instructor Survey will be used as the basic evaluation tool. All students are encouraged to submit written comments during this survey. The survey will be handed out for completion on the last day of class.

Important Dates:

3 September	Monday	Labor Day holiday.
4 September	Tuesday	Last day of the official add/drop period; after this date, changes in registration require the approval of the chairman and usually the student's dean.
14 September	Friday	Twelfth class. Last day to drop a course for a possible refund.
10 December	Monday	Last day a graduate student or a law student may, with the required approvals, drop a class or withdraw from the University. Last class day.
19 December	Wednesday	CE 392M Final Exam, 2:00 – 5:00 pm.

NOTE:

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 232-2937 (video phone) or http://diversity.utexas.edu/disability/.

Web-based, password-protected class sites will be associated with all academic courses taught at The University. Syllabi, handouts, assignments and other resources are types of information that may be available within these sites. Site activities could include exchanging email, engaging in class discussions and chats, and exchanging files. In addition, electronic class rosters will be a component of the sites. Students who do not want their names included in these electronic class rosters must restrict their directory information in the Office of the Registrar, Main Building, Room 1. For information on restricting directory information, see the Undergraduate Catalog or go to: https://registrar.utexas.edu/students/records/restrictmyinfo.

College of Engineering Drop Policy:

> ***Undergraduate Students:*** From the 1st through the 4th class day, an undergraduate student can drop or add a course via the web. From the 5th through the 12th class day, a student can drop via the web; adds must be done in the department offering the course. For any drops beginning with the 13th class day, a student must initiate the drop process in the office of the Dean (2407 Speedway). Departmental advisor and instructor approval may be required.
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> ***Graduate Students:*** From the 1st through the 4th class day, graduate students can drop a course via the web. Beginning with the 5th class day, graduate students must initiate any adds or drops in their department.

Graduate students can drop or add a class until the last class day with permission from the departmental Graduate Advisor and the Dean. Graduate students with GRA/TA/Grader positions or with Fellowships may not drop below 9 hours in a long session.

University Scholastic Dishonesty Policy:

Students who violate University rules on scholastic dishonesty 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. For further information, visit the Student Judicial Services web site: http://deanofstudents.utexas.edu/conduct/academicintegrity.php.

Accommodations for Religious Holidays:

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holiday. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holiday, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

TOPICAL COURSE OUTLINE

Section 1 - Introduction, Demand Estimation, and Statistical Tools

- Industry Characterization
  - Operational Problems
  - Federal Legislation Regarding Public Mass Transportation
  - Characterization of Transit Modes
- Sketch Planning Models
- Statistical Tools
- Hypothesis Testing
- Correlation, Parametric and Non-Parametric
- Regression
- Sampling from Semi-Infinite and Finite Populations

Section 2 - Conceptual Framework for Estimating Transit Demand

- Latent Corridor Demand
- Transit Demand Versus Auto System Congestion
- Personal Choice of Travel Modes
- Corridor Analysis
- Walking Distances and Coverage Areas
- Estimating Design Capacities for Transit Systems

Section 3 - Route Design

- Routing Considerations, Pattern Types
- Terminal or Stop Spacing
  - Operator Versus User Cost
  - User Access Versus On-Board Time
  - Model Development

Section 4 - Basic Vehicle Scheduling Relationships

- Vehicle Capacity
- Route Capacity
- Vehicle Requirements Versus Passenger Demand
- Cycle Time
- Modeling of Passenger Boarding and Alighting Times
  - Poisson Processes
  - Probabilities and Combinations

Section 5 - Driver Scheduling

- Demand Estimates Per Analysis Period
- Labor Contract Constraints
- Vehicle Schedule
- Driver Schedule

Section 6 - Networks

- Concepts
- City Forms
- Network Types
- Progression of Networks and Modes
- Network Evaluation

Section 7 - Rail Transit Summary

- Selection Considerations
- Capacity Comparisons, Local Bus, HOV Lanes, Light and Rapid Rail
- Cost Comparisons
- Design
  - Guideway
  - Stations
  - Vehicles
  - Capacity Calculations
  - Rail Transit Ways
    - Geometrics
    - Clearances
    - Track Gauge
    - Track Superstructure
  - Terminal Design Concepts
- Light Rail Transit (LRT) Operations
  - Right of Way
  - Street Intersection
  - Simulation of LRT
  - Introduction to VISSIM
  - LRT-Auto Inter-action

Section 8 - Propulsion Systems

- Vehicle Motion
- Resistance to Motion
- Propulsion
  - Internal Combustion Engines
  - Electric Motors
  - Energy Efficiency
  - Emissions Considerations

Section 9 - Para-Transit Concepts

- Dial-a-Ride
- Taxi
- Car Pools
- Van Pools

Jitneys
Subscription Bus
Transport Brokerage

Section 10 - Evaluation

Impact Versus Administrative Evaluation Processes
Engineering Economic Analyses

POSSIBLE PROJECT TOPICS

1. Passenger Waiting Times
2. Passenger Boarding Rates
3. Passenger Alighting Rates
4. Fare Elasticity: Changes in Demand Versus Changes in Fare
5. Fare Collection Systems
6. "Free" Transit
7. Driver Scheduling
8. Vehicle Scheduling
9. Spacing of Transit Terminals
10. Comparative Costs of Transit Modes
11. Rural Public Transportation
12. Public Transportation Marketing
13. Energy: Case Studies
14. Perceptions of Public Transportation
15. New Technology
16. Labor and the Managerial Process
17. Financing Public Transportation
18. The Management of Public Transit
19. Rapid Transit Mode Selection
20. The Role of Private Industry
21. Urban Transportation and Land Use
22. The History of Federal Participation in Urban Public Transportation
23. The Pros and Cons of Regional Rail (Commuter Rail) systems
24. Estimation of Time Rates of Passenger Arrivals at Transit Terminals
25. Transit Vehicle Dynamics and Passenger Comfort
26. Traffic Signal Priority for Bus Transit
27. Traffic Signal Priority for LRT
28. Examining the relationship between car sharing and traditional public transportation