CE 392M Public Transportation Engineering (13930) Spring 2002

Instructor:	Dr. Randy Machemehl	
Office:	ECJ 7.202	
Phone:	471-4541	
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Office Hours:	MW, 2:00 - 3:00 p.m., other times by appointment	
Lecture:	TTH, 12:30 - 2:00 p.m., ECJ 7.202	
Grader:	You may ask grading questions by submitting them as homework problems or talking directly to the instructor who will be doing the grading.	
Required Textbook:	None. Class Notes Optional (Available at <i>Speedway Printing</i>) Notes available at http://courses.utexas.edu	

Prerequisites for CE 392M:

Graduate Students: Graduate standing and consent of Instructor Undergraduate Students: Credit for CE 321 or the equivalent.

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 and no credit will be given; 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. You may ask questions of the grader by writing concise notes to him/her and submitting them as homework problems.

Attendance:

Attendance is required. A sign up sheet will be passed around each class period.

Testing and Examination Policy:

Make-up exams will <u>NOT</u> 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 exams, thus avoiding a grade of zero for a scheduled exam. The exam schedule is as follows:

Exam I	Thursday	February 28, 2002
Exam II	Thursday	April 18, 2002
FINAL EXAM	Monday, 9:00a-12:00p	May 13, 2002

Grading Policy:

Grades will be based on the following:

	Percentage
Hour Exam 1 (Thursday, 02/28/02)	20
Hour Exam 2 (Thursday, 04/18/02)	20
Homework Assignments (6-10)	10
Final Exam (Monday, May 13, 2002, 9:00 a.m12:00 noon)	30
Project: Written	15
Project: Oral	5
Total Points	100

Schedule of Milestone for Project

January 24, 2002	Topics Chosen
February 28, 2002	Outline Due
April 25, 2002	Written Version Due
April 30 & May 2, 2002	Oral Presentations

Course Instructor Evaluation Plan:

The College of Engineering Course-Instructor Survey will be used as the basic evaluation tool. All students are encouraged to submit written comments during this survey.

January 14, 2002	Monday	Classes begin.
January 30, 2002	Wednesday	Twelfth class. Last day to drop a course for a possible refund.
February 11, 2002	Monday	Last day to drop a course without a possible academic penalty.
March 11-16, 2002	Mon-Fri	Spring break.
March 25, 2002	Monday	Last day an undergraduate student may, with the dean's approval, withdraw from the University or drop a course except for urgent and substantiated, nonacademic reasons.
May 3, 2002	Friday	Last class day.
May 13, 2002	Monday	CE 392M Final Exam, 9:00 a.m12:00 noon

Important Dates:

NOTE:

A course/instructor survey will be handed out for completion on the last day of class. You must attend class to pass. Graduate standing is required in order to take this class.

"The University of Texas at Austin provides, upon request, appropriate academic adjustments for qualified students with disabilities. Any student with a documented disability (physical or cognitive) who requires academic accommodations should contact the Services for Students with Disabilities area of the Office of the Dean of Students at 471-6259 as soon as possible to request an official letter outlining authorized accommodations. For more information, contact that Office, or TDD at 471-4641, or the College of Engineering Director of Students with Disabilities at 471-4321."

"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 page 7 or go to: <u>http://www.utexas.edu/student/registrar/catalogs/gi00-01/app/appc09.html</u>

College of Engineering Drop Policy:

Undergraduate Students: From the 1st through the 4th class day, an undergraduate student can drop or add a course on ROSE or TEX. From the 5th through the 12th class day, a student can drop through ROSE or TEX; 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 (ECJ 2.200). Departmental advisor and instructor approval may be required.

Graduate Students: From the 1st through the 4th class day, graduate students can drop a course on Rose or TEX. 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. Students with a 20 hr/week GRA/TA appointment or a fellowship 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://www.utexas.edu/depts/dos/sjs/.

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 Deboarding 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 Operations **Right of Way Street Intersection**

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

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POSSIBLE PROJECT TOPICS

- 1. Passenger Waiting Times
- 2. Passenger Boarding Rates
- 3. Passenger De-boarding 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 Coasts 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. A Survey of Transit System Productivity Based on Section 15 Reporting
- 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