

**CE 376: Transportation System Operations  
Fall 2008**

**Course:**

Time: MW 8:00 - 9:50 am  
Room: L160, Technological Institute  
Office Hours: MW 1:00–1:50 pm, and by appointment  
Lab: A310, Technological Institute  
Lab hours: Tuesday and Thursday after 4:00 pm.

**Instructor:**

Name: Marco Nie  
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**Description:** This course covers the fundamentals of traffic engineering. The objective is to introduce students to basic concepts, models, and methods related to the branch of traffic science that deals with the movement and control of vehicles on surface streets and freeways. Specifically, these include traffic flow quantities, microscopic and macroscopic traffic flow models, as well as traffic signal operations. Students will not only gain hands-on experience with commercially available traffic control/simulation software, but also learn how to simulate traffic using computer codes developed by themselves. Students taking this course are expected to learn some of the essential knowledge in traffic engineering and to be able to apply their knowledge to traffic systems design and operations and to urban transportation planning.

The course is designed for upper level undergraduate students and entry-level graduate students.

**Prerequisites:** Basic undergraduate calculus and statistics courses. Knowledge of MATLAB is preferred but not required.

**Text:**

Nicholas J. Garber and Lester A. Hoel. (2002) Traffic and Highway Engineering, Third Edition, PWS Publishing Company.  
Supplemented by class notes.

**References:**

Fred L. Mannering, Walter P. Kilareski and Scott S. Washburn. (2005) Principles of Highway Engineering and Traffic Analysis, John Wiley & Sons, Inc.  
James H. Banks. (2002) Introduction to Transportation Engineering, Second Edition, McGraw-Hill.

**Homework and projects:** Homework will be assigned approximately once a week. There will be a course project that involves the optimal design of traffic signals.

**Exams:** There will be one in-class mid term exam. The exam will be closed-book but you may

bring one 8-1/2 by 11 inch sheet of paper to the exam. No final exam will be given.

**Grading:** The final grade will be assigned on the following basis:

Homework	40%
Mid term exam	30%
Course project	25%
Participation	5% Students are expected actively participate in class discussions

**Late submissions:** Students are expected to submit their homework and project reports in time. Late homework will not be accepted unless it is the result of an officially excused absence.

**Working Together:** Working together on homework is accepted. However, students are expected to write up their own versions of solutions. Students are required form teams to do the course project. A team may not have more than two members who will submit a joint project report and receive the same grade. Working together on exams, of course, is forbidden.

**Calculator:** Students may use a graphic calculator on exams and homework. Students may not use laptop computers and/or any machine with symbolic manipulation capabilities on exams.

Date	Week	Topic	Text	Assignment	Due
24-Sep	1-2	Overview	Chapter 1, 2 + notes		
29-Sep	2-1	Characteristics of transportation system	Chapter 3	HW1	
1-Oct	2-2	Traffic data collection and analysis	Chapter 4		
6-Oct	3-1	Traffic data collection and analysis	Chapter 4	HW2	HW1
8-Oct	3-2	Elements of Traffic Flow Theory	Chapter 6+ notes		
13-Oct	4-1	<b>Canceled due to conference leave</b>			
15-Oct	4-2	Elements of Traffic Flow Theory	Chapter 6+ notes	HW3	HW2
20-Oct	5-1	Signal Operations - I	Chapter 6 + notes	Project	
22-Oct	5-2	Data collection (?)	Chapter 8	HW4	HW3
27-Oct	6-1	Signal Operations - I	Chapter 8		
29-Oct	6-2	Car-following	Chapter 6 + notes	HW5	HW4
3-Nov	7-1	Queue Analysis	Chapter 6 + notes		
5-Nov	7-2	Queue Analysis	Chapter 6 + notes	HW 6	HW5
10-Nov	8-1	Review + macro traffic flow models	Chapter 6 + notes		
12-Nov	8-2	<b>Midterm</b>			
17-Nov	9-1	Macro traffic flow models	Notes		
19-Nov	9-2	Macro traffic flow models	Notes	HW7	HW6
24-Nov	10-1	Capacity analysis	Chapter 9		
26-Nov	10-2	Signal Operations -II	Chapter 8 and 9		
1-Dec	11-1	Signal Operations -II	Chapter 8 and 9	HW8	HW7
3-Dec	11-2	Last class (review)			
8-Dec		<b>Exam begins.</b>			
10-Dec					HW8 Course Project

Figure 1: Tentative course schedule, Fall 2008