1.225J (ESD 205) Transportation Flow Systems

First Meeting: Introduction

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Outline

- Introduction
  - Teaching Staff
  - Course Information
  - Problem Sets and Quiz
  - Course Outline
  - Books on Reserve (Barker Library)
  - Academic honesty
  - Lecture notes are posted on the website by noon on the day of class
- Lecture 1

Teaching Staff

- Instructor: Professor Ismail Chabini

- Instructor: Professor Amedeo R. Odoni

Course (Subject) Information

- **Description:**

  Design, operation, and management of traffic flows over complex transportation networks. Covers two major topics: traffic flow modeling and traffic flow operations. Includes deterministic and probabilistic models, elements of queueing theory, and traffic assignment. Concepts and methods are illustrated through various applications and examples.

- **Requirements:**

  You are responsible for completing three and a half problem sets and one quiz. Unless otherwise instructed, the writing of the assignments is required to be individual.

- **Grades:**

  - Problem sets: 70% (You may use a one time 48-hour extension)
  - Quiz: 30%

- **Readings:**

  There is no textbook that completely covers the material of the subject. Additional materials will be given out in class.

The Five Twos in 1.225

- Two type of flows: Air and Road
- Two types of problems: Modeling and Operation Problems
- Two levels of analyses: Component Level and Network Level
- Two time-scale of analyses: static vs. dynamic
- Two type of approaches/tools: analytical and simulation-based

Course Outline

- Part I: Traffic Flow Modeling

Lecture	*Date*	*Topic*	*Reading*	*Problem Sets*
1	10/28/02	Introduction; Cumulative Plots	R1 (pp. 25-29, pp. 11-20)	PS1 Out
2	10/30/02	Airport Runway Capacity	R2 (except subsection 2.4)	
3	**11/01/02**	Modeling Road Traffic	R3, R4, R5	
Rec. 1	**11/05/02**	Recitation 1		
4	11/07/02	Network Model and Shortest Paths	R6 (1.2), R7, R8	**On 11/09/02** PS1 In, PS2 Out
5	11/14/02	Traffic Assignment	R6(except transit related materials), R9	
Rec. 2	11/15/02	Recitation 2		
6	11/19/02	Introduction to Optimization	R10	

Course Outline

- Part II: Traffic Flow Operations

Lecture	*Date*	*Topic*	*Reading*	*Problem Sets*
7	**11/20/02**	Highway Control: Ramp Metering	R11, R12, R13	PS2 In, PS3 Out
	11/21/02	No Class (Happy Thanksgiving!)		
8	11/26/02	Queuing Theory	R15	
R3	11/27/02	Recitation 3		
9	11/28/02	Simulation Models	R16	(**on 11/30/02**) PS4 Out/PS3 In
10	12/03/02	Control of Isolated Signals	R17 (pp. 1-24)	
R4	12/04/02	Recitation 4		
11	12/05/02	Operational Problems in Traffic Systems	R18, R19, R20	(on **12/07/02**) PS4 In
12	12/10/02	Air Traffic Operation Problems	TBD	
13	12/12/02	Wrap-up Lecture; Quiz Review		
	12/17/02	Quiz		

Some Books on Reserve (Barker Library)

- Daganzo, Carlos F., Fundamentals of Transportation and Traffic Operations, Pergamon Press, 1997 (Barker Reserve).
- Daganzo, Carlos F., Logistics Systems Analysis, Springer-Verlag, 1991 (Barker Reserve).
- Sheffi, Y., Urban Transportation Networks, McGraw Hill, 1981 (Barker Reserve).
- Larson and Odoni, Urban Operations Research, Prentice Hall, 1980 (Barker Reserve).
- Papageorgiou, M., Concise Encyclopedia of Traffic and Transportation, Pergamon Press, 1997 (Barker Reference).
- Hillier and Lieberman, Introduction to Operations Research, McGraw-Hill, 1995 (Barker Reserve).
- Watson, H., Computer Simulation in Business, John Wiley & Sons, 1981 (Barker Reserve).
- Nersesian, R. and G. Boyd Swartz., Computer Simulation in Logistics, Quorum Books, 1996 (Barker Reserve).
- Smith, J.U.M., Computer Simulation Models, Griffin & Co. 1968
- Highway Capacity Manual, Transportation Research Board, National Research Council, 1985 (Barker Reference)

Academic Honesty

- The MIT Department of Civil and Environmental Engineering adheres to the strictest standards of academic honesty. An important aspect of achieving these standards is to be sure that students are aware of expectations of faculty as regards academic honesty. This statement is an attempt to clarify the faculty's expectations in this subject.

- **Assignments:**
  Assignments performed by students for submission have a dual purpose. They are intended as educational devices, including the teaching of skills such as working in teams. They are also evaluation tools for the faculty in judging the quality of performance of individual students. Our policies are intended to balance these two purposes and, unless otherwise stated, apply to all assignments.
  Students currently taking this class can work together to conceptualize general approaches to assignments. However, unless otherwise specified for a particular assignment, the work you submit should be done completely on your own. This includes text, numerical calculations, mathematical derivations, diagrams, graphs, computer programs and output, references, and any written source you use in your submission. It is inappropriate to use assignments submitted in previous years as a source.

- **Quiz:**
  All work on a quiz should be performed only by you.

- If you have any questions about how these policies relate to a specific situation, you should speak to Professor Chabini or Professor Odoni for clarification.