Course Description

The purpose of this course is to (1) understand the causes of urban traffic congestion; (2) measure and analyze the consequences of congestion on users and communities; (3) set forth a vision for managing congestion and (4) evaluate strategies and policies that achieve the vision.

Prerequisites: Course in Traffic / Urban Transportation

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Course Objectives

Students who finish this course should be able to:

1. Identify the causes of recurring and nonrecurring congestion.
2. Measure and quantify traffic congestion.
3. Measure / assess the consequences of traffic congestion on mobility, accessibility, traveler safety, roadway productivity, and transportation/traveler costs.
4. Understand the potential effectiveness of various congestion relief strategies

Topical Outline

I. Background
1. A Brief Review of Core Concepts in Urban Transportation (**Ch. 1, p. 1-10)
2. Historical Perspective of Urban Traffic Congestion (*Ch. 3.)
II. Causes Metrics, and Consequences of Traffic Congestion

1. Causes of Traffic Congestion (*Ch. 4-7)


3. Consequences of Traffic Congestion (*Ch. 9-13)

HOMEWORK #1

III. Overview of Typical Congestion Relief Strategies (*Ch. 14; ^Innovative DOT)

1. Nonrecurring Congestion

2. Recurring Congestion

IV. Pivot Point Approach in Evaluating Congestion Relief Strategies

1. Traffic as a function of supply and demand

2. Traditional Treatment of Demand in Traffic Impact Studies

3. Demand and Supply Elasticities

4. Demand/Supply Equilibrium and Pivot Point Analysis
   a. Incremental Method
   b. Exact Method

HOMEWORK #2
V. Relieving Nonrecurring Congestion (*Ch. 15)

1. Supply Strategies
2. Demand strategies

HOMEWORK #3

Spring Recess:

VI. Relieving Recurring Congestion

1. Supply Strategies (*Ch. 16, 17)
   a. Estimating Road Space for Traffic Flow Requirements
      (1) Smeed’s Model approach – class notes
      (2) Vehicles-in-motion (VIM) approach – class notes
   b. Operational Improvements
   c. Adding New Capacity
      - The Issue of Induced Demand

HOMEWORK #4

2. Demand Strategies (*Ch. 18-23; ^^Shared Mobility)
   a. Indirect
      1) Employer–based and Institutional
      2) Parking Supply and Pricing
      3) Land Use, Transit, Non-motorized Modes
      4) Various Incentives
      5) Shared Mobility
b. Direct

1) Regulatory Restrictions
2) Congestion Pricing
   a. Economist Rationale
   b. Road/Cordon Pricing Applications
   c. Social/economic impacts

3) Value Pricing
   a. To Provide a Desired LOS
   b. HOT Lanes Applications

**HOMEWORK #5**

**VII. Traffic and Transportation Impact Assessment of Proposed Land Developments – An Overview** (^^^Best Practices… etc.)

**HOMEWORK #6**

**VIII. Transportation Sustainability Impacts of Advanced Technologies, Land Use Policies, and Governance** (^Innovative DOT)

1. Impacts of Information, Communication, and Transportation Technologies (**Ch.4)**
   a) Active Transportation and Demand Management (ATDM) / Integrated Corridor Management (ICM)
   b) Autonomous / Connected Vehicles

2. Impacts of Land Use Policies and Governance
   a) Sprawl vs. Smart Growth benefits and costs
   b) Separated vs. Integrated Transportation-Land Use Decisions
3. Impacts of Financing Strategies

- Term Papers Are Due
IX. FINAL EXAM (May 9?, 16)

Texts and Required Readings:


*** Congestion Mitigation and Air Quality Improvement, Federal Register/ Vol. 82, No.11/Wednesday, Jan 18, 2017.


Additional Material: as assigned in class
**Course Requirements**

**Homework Assignments** - must be turned in by the due date for credit.

**Grading Policy**

1. 6+ homework assignments = 20% of final grade
2. Term Paper = 40%
3. Final Exam = 40%