TRAN 603-851

Introduction to Urban Transportation Planning

Instructor

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Course Description

The course will introduce the concepts of urban travel analysis, community and land activity related to transportation systems, and socio-economic aspect of transportation planning. The knowledge of the analytical models, including the design and use of mathematical models for the estimation of transport demand in the framework of major strategic transportation planning will also be discussed.

Course Objectives

- Understand the principles and practices of urban transportation planning
- Understand the interactions between transportation planning and socio-economic, demographic, and land use characteristics of a region, as well as the context of transportation planning within regional master plans.
- Learn about transportation planning and forecasting models and transportation planning technology.
- Attain the capability to deal with transportation problems within the context of society, data availability and limitations of analysis tools.

Course Content

The course consists of a number of lectures, and several exercises. In the lectures the following subjects will be presented:

- The functions of models in the transportation system analysis.
- Types of models and their applications.
Theoretical foundations (travel choice theory).
Aggregated models for trip generation, distribution, model split and network assignment.
Disaggregated choice models.
Estimation of model parameters and calibration.

The exercises have two functions:
- Getting acquainted with and learning about practice-oriented software for modeling transportation demand and network analysis.
- Solving a transportation planning problem with the use of the relating model tools.

Final Attainment Level

After completing the course the students are expected:

1. To have knowledge of the urban transportation planning process.
2. To have knowledge of the structure of the modeling analysis process in transportation planning, of the related computational models, their theoretical foundations and their behavioral backgrounds.
3. To have insight into the operation of the quantitative analysis process in transportation planning, in the derivation, the operation and the application possibilities of the different types of transportation models, as well as in the estimation process of model parameters based on travel and traffic observations.
4. To attain skills in:
   - Building a system description of a transportation network.
   - Setting up simple operational models.
   - Applying different types of models for the calculation of the transportation demand.
   - Interpreting model results.
   - Working with software for transportation calculations.

Instructional Material

- Class Notes, Handouts, PowerPoint presentations, and narrated lectures
## Tentative Course Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assignment</th>
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| 1    | Introduction: Purpose and Goals of Transportation Planning  
Urban Transportation Planning Process  
Systems Approach to Transportation Planning | Ch. 1, Ch.2, Ch. 3 |
| 2    | Transportation Demand  
Transportation Cost  
Concepts of Demand Elasticity | Ch. 5  
HW 1 Assigned |
| 3    | “Four-Step” Transportation Demand Modeling | Ch. 4 & Ch.5  
HW 2 Assigned |
| 4    | Trip Generation  
Regression Models and ITE Trip Generation Book  
Cross-Classification Models | Ch. 5  
Class Notes  
HW 3 Assigned |
| 5    | Trip Distribution  
Gravity Model  
Calibration of a Gravity Model | Ch. 5  
Class Notes  
HW 4 Assigned |
| 6    | Modal Split (Mode Choice)  
User Utility Theory  
Calibration of a Modal Split Model | Ch. 5  
Class Notes  
HW 5 Assigned |
| 7    | Midterm Exam | |
| 8    | Transportation Network Design  
Transportation Supply Analysis | Ch. 7  
Class Notes  
HW 6 Assigned |
| 9    | Traffic Assignment  
Network Equilibrium: User Equilibrium and System Optimal | Ch. 5  
Class Notes  
HW 7 Assigned |
| 10   | Traffic Impact Studies | Handout  
HW 8 Assigned |
| 11   | Goods Movement (Freight) Planning  
Land Use Planning and Modeling | Ch. 6  
Handouts  
HW 9 Assigned |
| 12   | Final Exam | |
Course Delivery
This is an online course. The course content and instructor-student interaction will be delivered through Moodle. The website for the course can be accessed by logging into Moodle 2 http://njit2.mrooms.net/ using NJIT UCID and password and selecting TRAN 603-851, Summer 2014. Lectures are delivered using Power Point and PDF files and lecture recordings. Lecture material can be discussed asynchronously by posting questions or comments in dedicated discussion forums. Students are strongly encouraged to access the TRAN 603 Moodle website regularly and often throughout the course. This will provide for a timely access to course materials, announcements, useful links, and discussions.

Class Weekly Participation
Class participation includes online discussions. Students are expected to participate in weekly online discussions about course material and current topics related to urban transportation planning. Discussions are carried out in an asynchronous manner where students post questions and comments related to the course material, and reply to questions posted by the instructor.

Homework
There will be ten homework assignments following the lectures. Homework assignments must be completed independently by each student. The homework submission will be through Moodle. The due date for each homework assignment will be a week after the homework posting in Moodle (the submission due date and time will be indicated in the homework submission posting).

Exams
There will be a midterm and a final exam. Each exam will be assigned through Moodle and students will have one week to solve the problems and submit the solutions. The submission will be through Moodle. Needless to say, the exams should be completed by each student independently.

Grading

<table>
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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Homework</td>
<td>30%</td>
</tr>
<tr>
<td>Class Participation</td>
<td>10%</td>
</tr>
</tbody>
</table>

General Policy
Assignments and exams are to be completed by the due dates. You must have a very good reason for requesting an extension. You must contact the instructor to get an extension for the submission.
Makeup Policy
There will be no makeup for exams unless there are justifiable circumstances.

Code of Conduct
The NJIT honor code (http://www.njit.edu/academics/pdf/academic-integrity-code.pdf) will be upheld throughout the term for this course, and students are expected to abide by it. Any breach of code will result in failure of the course at the least and will be brought to the immediate attention of the Dean of Students leading to suspension or dismissal from the university.