

PLAN 739: Transportation Planning Models

Spring 2021

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Office Hours: Tuesday 3:30 to 4:30 or by request

Course Meetings: Tuesday 5:00-7:30pm
Virtual Classroom

Course Description

This course provides a detailed introduction to the topic of travel demand modeling and the TransCAD modeling software. Regional travel demand models are the primary tool used to assess transportation infrastructure investments in the United States and are a key component of long-range transportation plans. Results from these models have the potential to influence billions of dollars in transportation spending each year. This course will help you become a sophisticated consumer of model data and prepare you to work with (or challenge) model output as planners, consultants, and advocates. The course also provides a strong foundation for students that want to pursue a career in travel demand modeling.

At the end of this course you will:

- Understand the current state of practice and art in transportation modeling,
- Understand critical assumptions of the models and how these assumptions influence model predictions,
- Be familiar with and able to use TransCAD software, and
- Understand critiques of the four-step modeling approach and identify alternate approaches to selecting transportation investments.

Course Requirements:

Project: The learning objectives of this course are achieved through the student's participation in a course project that leads to the development of a simplified travel demand model that is used to develop and present a long range transportation plan for the City of Asheville and Buncombe County, North Carolina. This projects creates a frame work for synthesizing course materials and techniques in a learning environment that somewhat mirrors practical experience. The project is administered and graded as individual assignments that build on each other.

Attendance: Participation in the class and effective collaboration with your classmates is essential in this course. To facilitate a collegial learning environment and provide opportunities for hands-on learning of the software, attendance is mandatory.

Grading

Assignments	Due	Points
1. Model Development Weekly Labs	See schedule of deliverables.	10
2. Term Project		80
3. Attendance/Participation		10

Late Assignments

Any assignments turned in late will incur a penalty of a half-grade (letter graded assignments) or half the standard deviation (numeric graded assignments). For example, if a paper is a day late, the grade would change from a B to a B-. If the paper were two days late, the grade would change from a B to a C+.

Readings

Readings for each session are detailed in the remainder of the syllabus. Readings should be completed prior to class. The required texts are:

- Travel Demand Forecasting: Parameters and Techniques. NCHRP Report 716. [Sakai]
- [MP] Travel Demand Modeling Procedures Manual PLAN 739. 2020. [Sakai]
- Hollander, Transport modeling for a complete beginner, 1st edition [Encouraged]

Several related books are on reserve at the House Undergraduate Library.

- Ortuzar & Willumsen, Modelling Transport, 4th edition
- Hanson & Giuliano, Geography of urban Transportation, 3rd edition
- Meyer, Urban Transportation Planning
- Hensher & Button, Handbook of transport modeling, 2nd edition

Honor Code

The UNC Honor Code states: "It shall be the responsibility of every student at The University of North Carolina at Chapel Hill to obey and to support the enforcement of the honor code, which prohibits lying, cheating, or stealing when these actions involve academic processes or University, student or academic personnel acting in an official capacity."

This standard does not preclude discussions of assignments with other students. However, I expect that each person turns in their own work. You must also provide citations for any ideas that are not your own.

Course Schedule

Date	Topic	Recommended Readings
19-Jan	An Introduction to Travel Demand Modeling	Hollander Ch. 1 NCHRP Ch. 2 Review O & W, Ch. 2 Mathematical Prerequisites
26-Jan	Data Development: Part 1 - Travel Surveys and Land Use Data	MP Ch. 1,2 NCHRP Ch. 3 O&W Ch. 3, 15
2-Feb	Data Development: Part 2 – Networks and Path Building Lab	
9-Feb	Trip Generation Lab	MP Ch. 3, 4 Hollander Ch. 6 O& W Ch. 4 & 5
16-Feb	Semester Break	
23-Feb	Trip Distribution Lab	MP Ch. 5 Hollander Ch. 8 O& W Ch. 4 & 5
2-Mar	Mode Choice Lab	MP Ch. 6 Hollander Ch. 7 O&W Ch. 6, 7
9-Mar	Highway Assignment Lab	MP 7,8 O&W Ch. 10
16-Mar	Scenario Building Lab	MP 10
23-Mar	Special Topic in Travel Forecasting (Don Bryson, VHB) Project Work Time	Special readings as assigned

30-Mar	Doing more with Travel Models Project work time	Hollander, Ch. 10 Victoria Transport Policy Institute, Evaluating Transportation Equity, Todd Litman.
6-Apr	Time of Day, External Travel and Commercial Vehicles Project work time	O& W Ch. 13.1
13-Apr	Project work time	
20-Apr	Special Topic in Travel Modeling (Kyle Ward, Caliper) Project work time	Special readings as assigned
27-Apr	Advanced Practice Project work time	Hollander, Ch. 12-13
4-May	Final presentations	
TBA	Final report due	

Schedule of Deliverables

Deliverable	Assigned	Due
Tech Memo 1 FY SE Data	26-Jan	9-Feb
Lab 1 - Path Building	2-Feb	9-Feb
Lab 2 - Trip Generation	9-Feb	23-Feb
Tech Memo 2 Survey Analysis	9-Feb	2-Mar
Lab 3 - Trip Distribution	23-Feb	2-Mar
Lab 4 - Mode Choice	2-Mar	9-Mar
Lab 5 - Highway Assignment	9-Mar	16-Mar
Tech Memo 3 Goals and Objectives	16-Mar	23-Mar
Tech Memo 4 Needs Assessment		6-Apr
Tech Memo 5 Alternatives Analysis		22-Apr
Tech Memo 6 Final Recommendations		29-Apr
Plan Presentation		4-May
Executive Summary		11-May

Additional Readings

Optional readings that provide more depth.

Role of Travel Demand Modeling in Transportation Planning

Beimborn, Kennedy, and Schaefer. Inside the Black Box: Making Transportation Models Work for Livable communities.

Trip Generation & Trip Distribution

Bhatta, B. 2011. Are intrazonal trips ignorable? *Transport Policy* 18(1).

Mode Split

Meyer, Michael. 2001. *Urban Transportation Planning: a Decision Oriented Approach 2nd Edition*, Ch. 5

Advanced Practice

Ettema, et al. 2011. Social Influences on Household Location, Mobility and Activity Choice in Integrated Micro-Simulation Models. *Transportation Research Part A*.

Farooq & Miller. 2012. Towards Integrated Land Use and Transportation: A Dynamic Disequilibrium Based Microsimulation Framework for Built Space Markets. *Transportation Research Part A*.

Critiques & Alternate Approaches

Flyvbjerg, Bent, Mette Skamris Holm, and Søren L. Buhl. 2005. How (In)accurate Are Demand Forecasts in Public Works Projects? The Case of Transportation. *Journal of the American Planning Association*. 71(2): 131-146.

Hatzopoulou & Miller. Transport policy evaluation in metropolitan areas: The role of modeling in decision-making. *Transportation Research Part A* 43(4): 323