

## **PLAN 739: Transportation Planning Models**

Spring 2019

Instructor: Leta Huntsinger, PhD, PE  
Principal  
Transportation Systems Planning Manager, WSP  
919-836-4086  
[leta.huntsinger@wsp.com](mailto:leta.huntsinger@wsp.com)

Office Hours: Per request

Course Meetings: Thursday 5:00-7:30pm, Mitchell Hall  
Room 121A

### **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:**

**Projects:** The major requirement for this course will be a final project that requires students to synthesize course material and techniques. The final project will be supplemented with smaller weekly assignments.

**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 (dates subject to change)	Points
1. Weekly Assignments/Quizzes a. Weekly Labs (10) b. Assignment 1 – Survey Data (15) c. Assignment 2 – Review SE Data (15)	TBA	40
2. Final Project Presentation & Report a. Modeling analysis and plan development for a key transportation corridor	Presentation (4/25), Report (TBA)	50
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. 2018. [Sakai]
- Hollander, Transport modeling for a complete beginner, 1<sup>st</sup> edition [Purchase]

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

- Ortuzar & Willumsen, Modelling Transport, 4<sup>th</sup> edition
- Hanson & Giuliano, Geography of urban Transportation, 3<sup>rd</sup> edition
- Meyer, Urban Transportation Planning
- Wachs, Ethics in Planning
- Hensher & Button, Handbook of transport modeling, 2<sup>nd</sup> 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
10-Jan	Role of travel demand modeling in transportation planning	Hollander Ch. 1 NCHRP Ch. 2 Review O & W, Ch. 2 Mathematical Prerequisites
17-Jan	The Role of data in understanding and modeling travel behavior Networks and paths Lab	MP Ch. 1,2 NCHRP Ch. 3 O&W Ch. 3, 15
24-Jan	Trip Generation Lab	MP Ch. 3, 4 Hollander Ch. 6 O& W Ch. 4 & 5
31-Jan	Trip Distribution Lab	MP Ch. 5 Hollander Ch. 8 O& W Ch. 4 & 5
7-Feb	Mode Choice Lab	MP Ch. 6 Hollander Ch. 7 O&W Ch. 6, 7
14-Feb	External travel & Commercial vehicles Class exercise	O& W Ch. 13.1
21-Feb	Time of Day and Highway Assignment Lab	MP 7,8 O&W Ch. 10
28-Feb	Model calibration and validation Class Exercise Lab	MP 9 Hollander Ch. 4
7-Mar	Special Topic in Travel Modeling and Forecasting [David Jackson, Cambridge]	Special readings as assigned
14-Mar	Spring break	

21-Mar	Scenario building Lab	MP 10
28-Mar	Special Topic in Travel Modeling and Forecasting [Rhett Fussell, WSP] Project work time	Special readings as assigned
4-Apr	Project work time	
11-Apr	Advanced and Emerging Practice Project work time	Hollander, Ch. 13 O&W Ch. 14 NCHRP Ch. 6
18-Apr	Critiques, alternate approaches, and good modeling practice Project work time	Hollander, Ch. 10 - 12 Metropolitan Travel Forecasting: Current Practice and Future Direction, National Research Council, pp. 65-89.
25-Apr	Final presentations	
TBA	Final report due	

## **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.

Meyer and Miller. Chapter 5 Transportation Demand Analysis.

<http://mtsplan.com/services.html>

### ***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 2<sup>nd</sup> Edition*, Ch. 5

McFadden Nobel Lecture

[http://www.nobelprize.org/nobel\\_prizes/economics/laureates/2000/mcfadden-lecture.pdf](http://www.nobelprize.org/nobel_prizes/economics/laureates/2000/mcfadden-lecture.pdf)

### ***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.

The Accuracy of Transit System Ridership Forecasts and Capital Cost Estimates

[http://www.trforum.org/forum/downloads/2009\\_13\\_RidershipForecasts\\_paper.pdf](http://www.trforum.org/forum/downloads/2009_13_RidershipForecasts_paper.pdf)

Bartholomew and Ewing. Integrated Transportation Scenario Planning. Summary Report

[http://faculty.arch.utah.edu/bartholomew/Integrated\\_Transp\\_Scenario\\_Planning.html](http://faculty.arch.utah.edu/bartholomew/Integrated_Transp_Scenario_Planning.html)

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

Dewar and Wachs. 2006. Transportation planning, climate change, and decision making under uncertainty. <http://onlinepubs.trb.org/onlinepubs/sr/sr290DewarWachs.pdf>