Rising and volatile energy costs, concerns about climate change, the obesity epidemic—transportation planning is increasingly at the crossroads of sustainability and public health debates. However, our traditional transportation planning tools were designed around a narrow set of questions: where will there be traffic congestion, and how do we mitigate it? Somehow, these questions no longer seem to cut it—if they ever did.

In this course, we will learn about the basic policies, practices, and methods of analysis that are central to contemporary transportation planning in the United States. In the classroom and in the computer lab, we will learn the ins and outs of standard transportation planning methods (the “four step model” as well as others). In addition, we will look at practical innovations that are being implemented in some regions around the country, as well as some innovations that still loom on the horizon.

Though this course has a largely domestic focus, the methods we explore are (for better or worse) international standards. While the regulatory frameworks in other countries are often considerably different from those that apply in the U.S. context, many of the methods of analysis and planning introduced in this course are common in most of the world.

We will cover the following topics:

1. **Travel demographics and travel behavior.** What influences our decisions about how we get around? What constraints do some people face on their travel decisions?
2. **The urban transportation planning process.** What national, state, and local laws, regulations, and frameworks guide our actions in designing, altering, and regulating the transportation network? What “evidence” do we supply to justify our transportation plans?
3. **The ‘four-step’ travel demand model.** How did this statistical model become the standard worldwide for predicting auto traffic flows and transit ridership, and how does it work? How does the model help us predict the effect of expanding or removing a road, or building a new transit line?
4. **Performance metrics and evaluations.** Once we’ve implemented a change to the transportation network, how do we evaluate whether it’s ‘working’ the way we want it to? How does our choice of monitoring strategy influence our functional understanding of what is a ‘good’ transportation network?

**Learning Objectives**

This course focuses on two of the required components under planning skills for the Planning Accreditation Board (PAB) accreditation of planning schools:

- 2a – research (tools for assembling and analyzing ideas and information from prior practice and scholarship, and from primary and secondary sources).
January 19, 2019

- 2c – quantitative and qualitative methods (data collection, analysis and modeling tools for forecasting, policy analysis, and design of projects and plans).

After this course, you should have:
- a firm understanding of the basics of the transportation planning process in the United States.
- a firm understanding of travel demographics – who travels how, and why – in the United States.
- a firm understanding of both ‘supply’ (travel options) and ‘demand’ (desired travel) and the conjunction of those two: realized travel.
- a survey understanding (rather than a deep, fundamental understanding) of the statistical methods (principally the 4-step model) used in planning changes to the transportation system.

Prerequisite
This course requires a basic knowledge of statistical methods. The first term of our two-term sequence in the planning program is sufficient. Students from other programs may wish to confer with me prior to enrolling.

Readings
All readings will be available electronically, either via the Rutgers library or the Rutgers proxy, if you are off-campus. I will place some hard-to-find readings on Sakai.

Assignments and Grading
There are five assignments (listed below) and a final exam. You will do three assignments as a group of 2-3 students. One will be a brief analysis of the travel demographics of a place, which consists of a short paper and an even shorter (5-slide, roughly) presentation. The other two will use the CUBE travel demand modeling software; these will be time-consuming. In addition, there will be two assignments that you will do on your own: a demand analysis exercise and an ethics memo. There will be a final exam for the course that will consist of several short essays and a number of other short-answer questions.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Team</th>
<th>Distributed:</th>
<th>Due:</th>
<th>% weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Travel Demographics Analysis</td>
<td>2-3 Students</td>
<td>Week 2</td>
<td>Week 5</td>
<td>15%</td>
</tr>
<tr>
<td>2. Demand Analysis Exercise</td>
<td>Individual</td>
<td>Week 4</td>
<td>Week 7</td>
<td>15%</td>
</tr>
<tr>
<td>3. CUBE Exercise 1</td>
<td>2-3 Students</td>
<td>Week 9</td>
<td>Week 10</td>
<td>15%</td>
</tr>
<tr>
<td>4. CUBE Exercise 2</td>
<td>2-3 Students</td>
<td>Week 10</td>
<td>Week 11</td>
<td>15%</td>
</tr>
<tr>
<td>5. Ethics in Travel Forecasting Memo</td>
<td>Individual</td>
<td>Week 13</td>
<td>Week “15”</td>
<td>10%</td>
</tr>
</tbody>
</table>

Total for Assignments 70%
Final exam (week 14) 20%
Participation, attendance, vim and vigor 10%
Total 100%
Course Outline

Note: “(R)” marks required readings, and “(S)” marks optional/supplemental readings.

### PART 1: URBAN TRANSPORTATION PLANNING OVERVIEW

#### WEEK 1: Transportation planning overview (and welcome!)

**TOPIC:** The process of planning transportation systems


#### WEEK 2: Transportation system characteristics and data

**In class introduction to datasets for answering transportation-related research questions**

**TRAVEL DEMOGRAPHICS ASSIGNMENT DISTRIBUTED**

**TOPIC:** Transportation system characteristics


**TOPIC:** Macro dimensions of urban travel


#### WEEK 3: The transportation planning process and the laws that guide it

**TOPIC:** The transportation planning process


PART 2: UNDERSTANDING TRAVEL BEHAVIOR

WEEK 4: Travel demographics part 1

DEMAND ANALYSIS ASSIGNMENT DISTRIBUTED

TOPIC: Micro-dimensions of urban travel


TOPIC: Who rides transit?


WEEK 5: Travel demographics part 2

TRAVEL DEMOGRAPHICS ASSIGNMENT DUE & STUDENT PRESENTATIONS

TOPIC: Men, women, and travel


TOPIC: Age and travel


**TOPIC: Race, ethnicity, nativity, and travel behavior**


**WEEK 6: Travel demographics part 3**

**Guest Lecture: Rodney Stiles, NYC Taxi and Limousine Commission**

**TOPIC: Commuting and trip-chaining**


**TOPIC: Income, poverty, and travel behavior**


TOPIC: Emerging trends in travel behavior


PART 3: PREDICTING DEMAND FOR TRAVEL

WEEK 7: Regional travel demand modeling part 1
DEMAND ANALYSIS ASSIGNMENT DUE

TOPIC: Introduction to transportation modeling and forecasting


TOPIC: Assumptions and inputs

WEEK 8 Regional travel demand modeling part 2, meet in class, later move to the lab

TOPIC: Trip generation


TOPIC: Trip distribution


TOPIC: Mode choice


WEEK 9: Cube session 1, in the lab
CUBE ASSIGNMENT 1 DISTRIBUTED

TOPIC: Traffic assignment


TOPIC: Calibration, validation, and forecasting

### WEEK 10: Cube session 2, in the lab

**CUBE ASSIGNMENT 1 DUE**

**CUBE ASSIGNMENT 2 DISTRIBUTED**

**TOPIC: Critiques of transportation forecasting and decision making**


### WEEK 11: How measuring travel demand relates to the urban development process

**TOPIC: Measurement, assumptions, and decisions about development**


### WEEK 12: Improvements to the 4-step model and alternative approaches, in the lab

**TOPIC: Refocusing on people**


**TOPIC: Activity-based models**
(R) Goulias, Konstadinos G. (2007). “Activity based travel demand model feasibility study” (Read the executive summary)

**WEEK 13: TBD**

**WEEK 14: Ethics in transportation planning and course wrap-up AND FINAL EXAM**

**ETHICS MEMO DISTRIBUTED**


**ETHICS MEMO DUE FRIDAY OF WEEK 15 (EXAM WEEK) BY MIDNIGHT**