Course Description

This course provides a broad overview of urban transportation planning in the United States, including historic and emerging issues faced in the field and the tools that are available to address these challenges. The course is designed for students who intend to specialize in transportation planning or engineering, as well as for those who would like an introduction to the field. The course is divided into three major sections:

- **Section I: Context, History, and Foundational Concepts.** The first section of the course describes the context of urban transportation planning in the United States, including past, present, and future travel patterns and trends; major phases and developments in transportation history; and key challenges that transportation planners and engineers currently face. This section also introduces concepts that are foundational to a thorough understanding of transportation planning, including the relationship between transportation and land use and perspectives on traffic congestion.

- **Section II: Institutions and Key Impacts.** The second section of the course outlines the institutional structure of transportation planning in the United States. This section describes the transportation planning process and introduces key decision makers and legislation at the federal, state, and regional levels. Additionally, this section explores several impacts of the transportation system, including air quality, greenhouse gas emissions, public health, and safety.

- **Section III: Standards and Analytical Tools.** The final section of the course introduces technical methods that planners and engineers commonly use to evaluate and plan for urban transportation systems. After describing standards and practices related to parking, street design, and traffic impact analysis, this section focuses primarily on the four-step travel demand model using the Cube software package. This section concludes with a critique of traditional transportation modeling methods and an overview of emerging alternatives.
Course Objectives

UP 430/CEE 417 is designed to establish a fundamental knowledge base for understanding and analyzing urban transportation systems. By the end of the semester, students will be able to:

- Explain the history and context of transportation planning in the United States
- Summarize travel patterns and trends in meaningful ways
- Describe foundational concepts such as the transportation-land use connection and congestion, and understand the implications of these concepts for policy and practice
- Recognize key decision makers and regulatory frameworks in the transportation planning process
- Identify and describe key impacts of the transportation system
- Assess the effectiveness of MPO plans in addressing transportation impacts
- Understand the evolution and policy implications of parking and street design standards
- Implement and critique methods used to analyze urban transportation systems, including traffic impact analysis and travel demand modeling
- Engage in meaningful dialogue about key policy issues and current events in transportation planning

Course Format

This course will be taught through a combination of lectures, labs, and discussions. The first eight weeks of the course will be taught primarily through lectures, while the second eight weeks will be taught through lectures and tutorials in a lab setting. Students are expected and encouraged to actively engage in both lectures and labs, contributing their questions, ideas, and experiences to a rich discussion of the course content.

Course Requirements

Attendance and Participation. Active participation—measured in terms of both strong attendance and regular engagement in class discussions and activities—is essential in this course. Students are expected to complete the assigned readings prior to class and to come prepared for thoughtful discussion. Although our class is large, the lectures will be interactive and students will be expected and encouraged to engage in active dialogue about key concepts and real-world examples. Lab attendance is also critical for success on the final project, as students will be developing and practicing the technical skills necessary to complete their project.

Memo. Students will complete three technical memos that require the use of analytical methods common in the field of transportation planning. Two of the memos will be completed on an individual basis; discussion among students about these assignments is allowed (and encouraged), but each student must turn in his or her own work. One memo will be completed in small groups assigned by the instructor. The three memos will cover the following topics/techniques:

- Memo 1 (individual): Travel Patterns/Trends Analysis
- Memo 2 (individual): MPO Plan Analysis
- Memo 3 (group): Traffic Impact Analysis

Lab Problem Set. During the second half of the semester, students will complete an extended problem set designed to reinforce and apply the principles of travel demand modeling. The problem set will be distributed several weeks before it is due, and students are encouraged to complete each section as the corresponding topics are covered in class.
**Final Group Project – Report and Presentation.** The final project in this course will require students to apply concepts and techniques learned throughout the semester to a hypothetical transportation planning problem. Students will complete this project in groups assigned by the instructor. Project deliverables will include (1) a presentation to the class during the final two sessions of instruction and (2) a technical report due on Friday, May 3. Further details will be distributed later in the semester.

**Readings**

All readings will be posted on Compass and/or available through the University of Illinois library. Readings for each session are listed at the conclusion of this syllabus. During the second half of the course, the readings will draw primarily from the following resources (abbreviations/keys provided in brackets):

- [NCHRP 716] NCHRP Report 716: *Demand Forecasting – Parameters and Techniques*.

**Grading**

*Weights.* Course requirements will be weighted in the final grade as follows:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Attendance and Participation</td>
<td>15%</td>
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<tr>
<td>Memo 1 (individual): Travel Patterns/Trends Analysis</td>
<td>15%</td>
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<tr>
<td>Memo 2 (individual): MPO Plan Analysis</td>
<td>15%</td>
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<tr>
<td>Memo 3 (group): Traffic Impact Analysis</td>
<td>15%</td>
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<tr>
<td>Lab Problem Set</td>
<td>10%</td>
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<tr>
<td>Final Group Project – Report and Presentation</td>
<td>30%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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*Grading Scale.* Numeric grades will be converted into letter grades using the scale outlined below. The course will not be graded on a curve, and **there will be no rounding** applied to numeric grades.

- **A:** 94.0–100
- **B−:** 80.0–83.99
- **D+:** 67.0–69.99
- **A−:** 90.0–93.99
- **C+:** 77.0–79.99
- **D:** 64.0–66.99
- **B+:** 87.0–89.99
- **C:** 74.0–76.99
- **D−:** 60.0–63.99
- **B:** 84.0–86.99
- **C−:** 70.0–73.99
- **F:** Less than 60.0

*Late assignments.* Students are expected to turn in all assignments on time. However, I understand that challenges arise in the busy lives of students. To accommodate these challenges, I will allow each student one “free pass” in which an assignment can be submitted up to one day (24 hours) late without penalty, regardless of the reason—no excuse or notification needed. This free pass is not divisible; it must be used in full if the assignment is submitted at any time past the deadline (i.e. at 5:01 PM or later on the due date). Once the free pass is used, late submissions will incur a penalty of 10 percentage points per day barring extraordinary circumstances (e.g., prolonged documented illness, family emergency); these circumstances may not be used to avoid use of the initial free pass. If the late submission is a group assignment, all group members must use their free passes and any group members who have already used their free pass will incur the 10-point penalty. Use your free pass wisely, and communicate with me proactively about any challenges, illnesses, or emergencies that arise—I am here to work with you and help you do your best!
Course Policies and Other Items/Resources

**Attendance.** Attendance is mandatory and necessary for adequate performance in this course, and will be taken at every class session. Attendance will be reflected not only in the “Attendance and Participation” portion of the final course grade as described above, but also in the quality of work submitted throughout the semester. Students are expected to notify the instructor in advance of any sessions that will be missed. Make-up lab sessions will not be offered.

It is the instructor’s decision as to when a student’s absences become excessive and should be reported. If in the opinion of an instructor the attendance of a student becomes so irregular that his or her scholarship is likely to be impaired, the instructor may submit an irregular attendance form to the Associate Dean of the student’s college. A copy is forwarded to the student, who should contact the instructor immediately to work out a solution. If irregular attendance continues without excuse, the instructor may request the student be withdrawn from the course. This request for withdrawal would result in a grade of E for the course. Extemuating circumstances will always be considered when supporting evidence is presented. See Rule 1-501 and Rule 1-502 in the Student Code for more information.

**Academic Integrity.** This course follows the guidelines set forth by the University Student Code. See http://www.admin.uiuc.edu/policy/code/article_1/a1_1-401.html for specific guidelines, examples, and punishment associated with academic dishonesty. In written work, any ideas that are not your own must be properly cited. The consequences for plagiarism may include receiving no credit for an assignment or, at the discretion of the instructor, failure of the course.

**Class Climate.** The Department of Urban and Regional Planning (DURP) is committed to maintaining a learning environment that is rooted in the goals and responsibilities of professional planners. By enrolling in a class offered by the Department of Urban and Regional Planning, students agree to be responsible for maintaining an atmosphere of mutual respect in all DURP activities, including lectures, discussions, labs, projects, and extracurricular programs. See Student Code Article 1-Student Rights and Responsibilities, Part 1. Student Rights: §1-102.

**Electronic Devices.** Research shows that students who use laptops in the classroom are distracting not only to themselves, but also to the students around them (Sana, Weston, and Cepeda, 2013). Furthermore, students who take notes by hand tend to retain information better than those who take notes by laptop (Mueller and Oppenheimer, 2014). To create a mutually beneficial learning environment, students are encouraged not to use their laptops in class. However, recognizing that everyone learns differently, I will allow laptops for classroom purposes only; all other programs, including Internet browsers and email, must be turned off before class begins. Students who use their laptops for non-classroom purposes will be asked to stop using them during class time, and this policy may be revised if excessive violations occur. Additionally, students must silence or turn off their cell phones before the beginning of class.

**Academic Accommodations.** This course will accommodate students with documented disabilities. Please refer to http://disability.illinois.edu/disability-resource-guide for more information and provide the appropriate documentation at the beginning of the semester.

**Counseling.** The University Counseling Center is committed to providing a range of services intended to help students develop improved coping skills in order to address emotional, interpersonal, and academic concerns. The Counseling Center provides individual, couples, and group counseling. All of these services are paid for through the health services fee. The Counseling Center offers primarily short term counseling, but they do also provide referrals to the community when students could benefit from longer term services. https://counselingcenter.illinois.edu/.
Safety and Security in the Classroom. Emergencies can happen anywhere and at any time. It is important that we take a minute to prepare for a situation in which our safety or even our lives could depend on our ability to react quickly. When we’re faced with any kind of emergency—like fire, severe weather, or if someone is trying to hurt you—we have three options: run, hide, or fight. For more information please refer to the General Emergency Response Recommendations at http://police.illinois.edu/emergency-preparedness/run-hide-fight/resources-for-instructors/.
## Course Schedule

*(Subject to revision)*

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Notes</th>
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<tbody>
<tr>
<td><strong>Section I: Context, History, and Foundational Concepts</strong></td>
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<tr>
<td>1</td>
<td>Jan 15</td>
<td><strong>NO CLASS</strong> – TRB Annual Meeting</td>
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<tr>
<td></td>
<td>Jan 17</td>
<td>Course Overview and Major Themes</td>
<td><strong>Course Entry Survey Due</strong></td>
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<tr>
<td>2</td>
<td>Jan 22</td>
<td>Travel Patterns and Trends</td>
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<td></td>
<td>Jan 24</td>
<td>Transportation History (Part 1)</td>
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<td>3</td>
<td>Jan 29</td>
<td>Transportation History (Part 2)</td>
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<td>Jan 31</td>
<td>Transportation and Land Use Connections</td>
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<td>4.1</td>
<td>Feb 5</td>
<td>Congestion</td>
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<tr>
<td><strong>Section II: Institutions and Key Impacts</strong></td>
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<td>4.2</td>
<td>Feb 7</td>
<td>Transportation Planning Process (Part 1)</td>
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<td>5</td>
<td>Feb 12</td>
<td>Transportation Planning Process (Part 2)</td>
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<td>Feb 14</td>
<td>Environmental Impacts (Part 1)</td>
<td><strong>Memo 1 Due</strong></td>
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<td>6</td>
<td>Feb 19</td>
<td>Environmental Impacts (Part 2)</td>
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<td></td>
<td>Feb 21</td>
<td>Public Health and Safety</td>
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<tr>
<td><strong>Section III: Standards and Analytical Tools</strong></td>
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<tr>
<td>7</td>
<td>Feb 26</td>
<td>Parking</td>
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<td>Feb 28</td>
<td>Street Design</td>
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<td>8</td>
<td>Mar 5</td>
<td>Traffic Impact Analysis</td>
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<td>Mar 7</td>
<td>Introduction to Travel Demand Modeling</td>
<td><strong>Memo 2 Due</strong></td>
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<tr>
<td>9</td>
<td>Mar 12</td>
<td>Cube Introduction + Networks (lecture + lab)</td>
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<td>Mar 14</td>
<td>Guest Lecture: Sharif Ulla, PE, PTP</td>
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<td>10</td>
<td>Mar 19</td>
<td><strong>NO CLASS</strong> – Spring Break</td>
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<td>Mar 21</td>
<td><strong>NO CLASS</strong> – Spring Break</td>
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<tr>
<td>11</td>
<td>Mar 26</td>
<td>Trip Generation Modeling (lecture)</td>
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<td></td>
<td>Mar 28</td>
<td>Trip Generation Modeling (lab)</td>
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<tr>
<td>12</td>
<td>Apr 2</td>
<td>Trip Distribution Modeling (lecture)</td>
<td><strong>Memo 3 Due</strong></td>
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<td>Apr 4</td>
<td>Trip Distribution Modeling (lab)</td>
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<td>13</td>
<td>Apr 9</td>
<td>Mode Choice Modeling (lecture)</td>
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<td>Apr 11</td>
<td>Mode Choice Modeling (lab)</td>
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<td>Apr 16</td>
<td>Traffic Assignment Modeling (lecture)</td>
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<td>Apr 18</td>
<td>Traffic Assignment Modeling (lab)</td>
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<td>15.1</td>
<td>Apr 23</td>
<td>Critiques and Emerging Practices</td>
<td><strong>Lab Problem Set Due</strong></td>
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<tr>
<td><strong>Final Projects and Course Wrap-Up</strong></td>
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<tr>
<td>15.2</td>
<td>Apr 25</td>
<td>Final Presentations</td>
<td></td>
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<tr>
<td>16</td>
<td>Apr 30</td>
<td>Final Presentations + The Future</td>
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<td>–</td>
<td>May 3</td>
<td>Final Report Due to Compass by 12:00 PM (noon)</td>
<td><strong>Final Report Due</strong></td>
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Readings

Course Overview and Major Themes

Travel Patterns and Trends
- Choose one of the following:

Transportation History (Part 1): The Walking City and the Rise and Fall of Transit

Transportation History (Part 2): The Rise of the Automobile

Transportation and Land Use Connections
Congestion

Transportation Planning Process (Part 1): The Federal Role

Transportation Planning Process (Part 2): Metropolitan Planning Organizations

Environmental Impacts (Part 1): The NEPA Process and Air Quality Conformity

Environmental Impacts (Part 2): Transportation and Greenhouse Gas Emissions

Public Health and Safety
Parking

Street Design

Traffic Impact Analysis
- Institute of Transportation Engineers. (2006). “Transportation Impact Analyses for Site Development.”
- Additional resources that may be helpful for Memo 3:

Introduction to Travel Demand Modeling

Cube Introduction + Networks
- NCHRP 716, Chapter 3
- NCHRP 365, Chapter 2
- O&W, Chapter 15

Trip Generation Modeling
- O&W, Chapter 4
- NCHRP 365, Chapter 3

Trip Distribution Modeling
- O&W, Chapter 5
- NCHRP 365, Chapter 4
Mode Choice Modeling

- O&W, Chapter 6
- NCHRP 365, Chapters 5 and 6

Traffic Assignment Modeling

- O&W, Chapter 10
- NCHRP 365, Chapters 9 and 10

Critiques and Emerging Practices

- (optional) NCHRP 716, Chapter 6

The Future