UP 430/CEE 417: Urban Transportation Planning

Department of Urban and Regional Planning
Department of Civil and Environmental Engineering
University of Illinois at Urbana-Champaign
Spring 2022

Instructor: Dr. Lindsay Braun
lmbraun@illinois.edu
M208 Temple Buell Hall (TBH)

Office Hours: Tuesdays and Wednesdays by appointment; please sign up at https://calendly.com/lmbraun/office_hours

Course Sessions: Mondays and Wednesdays 10:30–11:50 AM, 386 Armory

Teaching Assistant: Amanda Merck, merck2@illinois.edu

TA Office Hours: Wednesdays 2:00–3:00 PM, open “Zoom room” linked here and on Canvas

Credit Hours: 4.00

Course Description

UP 430/CEE 417 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 content is divided into 12 learning modules that cover the following major topics:

- **Context, History, and Foundational Concepts** (Modules 1–3). The first section of the course describes the context of urban transportation planning in the United States, including 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 distinction between mobility and accessibility and the relationship between transportation and land use.

- **Institutions and Key Impacts** (Modules 4–8). The second section of the course outlines the institutional structure of transportation planning in the United States. This section describes the transportation planning process; introduces key decision makers and legislation at the federal, state, and regional levels; and considers past, present, and future mechanisms for financing transportation investments. Additionally, this section explores several impacts of the transportation system, including congestion, environmental justice and equity, safety and security, public health, air quality, and greenhouse gas emissions.

- **Standards and Methods** (Modules 9–11). The third section of the course introduces technical methods that planners and engineers commonly use to evaluate and plan for urban transportation situations.
systems. In particular, this section focuses on standards and practices related to parking, traffic impact analysis, street design, and travel demand modeling. These topics provide a strong skill basis for students interested in pursuing careers in transportation, in both the public and private sectors.

- **The Future (Module 12).** The final section of the course explores the future of transportation planning with a particular emphasis on connected and autonomous vehicles (CAVs). This section will examine CAV technology and regulations; key opportunities (benefits) and challenges (risks) associated with CAV development; and strategic paths forward for the transportation planning field.

**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
- Interact with major secondary data sources in the transportation planning field
- Describe foundational concepts (e.g., transportation-land use connection, distinction between mobility and accessibility) and understand the implications of these concepts for policy and practice
- Recognize key decision makers and regulatory frameworks in the transportation planning process
- Understand how transportation investments are funded, the limitations of current finance structures, and potential alternatives to address these limitations
- Identify and describe key impacts of the transportation system (e.g., environment, health, safety, equity)
- Assess the effectiveness of MPO plans in addressing transportation impacts
- Understand the evolution and policy implications of parking and street design standards
- Describe and critique methods used to analyze urban transportation systems
- Summarize the challenges and opportunities associated with connected and autonomous vehicles
- 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 and in-class activities (e.g., labs, discussions, debates). Students are expected and encouraged to actively engage in both lectures and in-class activities, contributing their questions, ideas, and experiences to a rich discussion of the course content.

Due to COVID, **class sessions during the first three weeks of the semester will be held online.** We will meet synchronously over Zoom during our regular class time for these sessions. In-person instruction is expected to begin during the week of February 7 as long as public health conditions allow. We may need to meet virtually on occasion after that point for reasons related to COVID; if this becomes the case, students will be notified as soon as possible.

**Course Requirements**

*Participation.* Active engagement with the course materials, with the instructor, and with other students in the class is essential for success in this course. In addition to strong attendance (with exceptions for illness and quarantine periods when class is being held in person), engagement can be demonstrated in multiple ways. Students are expected to complete the assigned readings prior to class and to come to lectures prepared for
thoughtful participation. Lectures will be interactive and students will be expected and encouraged to engage in active dialogue about key concepts and real-world examples. Additionally, all students can demonstrate engagement through proactive communication with the instructor and classmates. Note that regularly engaging in distracting behaviors (e.g., repeated tardiness, texting, laptop use unrelated to class) will result in a lower participation grade.

**Assignments.** Students will complete four assignments that require the use of analytical methods common in transportation planning. Two assignments will be completed in small groups assigned by the instructor; peer evaluations of individual contributions will form part of the grade for these assignments. Two assignments will be completed individually; discussion among students about these assignments is allowed (and encouraged!), but each student must turn in their own work. The assignments will cover the following topics/techniques:

- Assignment 1 (group): Travel Data Analysis
- Assignment 2 (individual): MPO Plan Evaluation
- Assignment 3 (individual): Parking Needs Analysis
- Assignment 4 (group): Vision Zero Strategy

Note that graduate students will serve as group leaders for Assignments 1 and 4, and the specific requirements for Assignment 2 will differ for undergraduate and graduate students.

**Labs.** Students will complete four labs over the course of the semester, collaborating in small groups during class but submitting individual work. Students who miss class on designated lab days will be expected to complete the work outside of class (collaboration with classmates is still allowed). Individual lab submissions will be due to Canvas the Friday after each lab session for a check of completion and understanding.

**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>Participation</td>
<td>14</td>
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<tr>
<td>Assignment 1 (group): Travel Data Analysis</td>
<td>15</td>
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<tr>
<td>Assignment 2 (individual): MPO Plan Evaluation</td>
<td>15</td>
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<tr>
<td>Assignment 3 (individual): Parking Needs Analysis</td>
<td>15</td>
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<tr>
<td>Labs (x4)</td>
<td>16</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+: 97.0–100.0
- B+: 87.0–89.99
- C+: 77.0–79.99
- D+: 67.0–69.99
- F: Less than 60.0
- A: 94.0–96.99
- B: 84.0–86.99
- C: 74.0–76.99
- D: 64.0–66.99
- A-: 90.0–93.99
- B-: 80.0–83.99
- C-: 70.0–73.99
- D-: 60.0–63.99

Detailed instructions for completing each assignment will be provided. Submitted assignments will be graded and returned promptly with detailed feedback. The general grading rubric is as follows:
• An “A” assignment demonstrates original thought and synthesis of ideas and sophisticated, cogent analysis. It is clearly written and presented. Outstanding work.
• A “B” assignment includes above average analysis with appropriate evidence to support ideas. It is clearly written and presented. Good work.
• A “C” assignment shows a basic level of understanding, with analysis limited to obvious arguments. Writing is competent. Developing but adequate work.
• A “D” assignment misunderstands or misrepresents the material, or is so poorly written or presented as to obscure the analysis. Inadequate work.

Late Assignments. Students are expected to turn in all deliverables (assignments, labs, etc.) on time. However, I understand—now more than ever—that challenges, unanticipated obligations, and illnesses will arise. If you are unable to meet a particular deadline, it is your responsibility to make prior arrangements with me regarding the deliverable. Otherwise, work submitted past the deadline will receive a five-percentage-point deduction, and work submitted later than five days past the deadline may not be considered for grading unless consent has been given by the instructor. Please 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!

Readings

There is no required text for this course. All readings will be posted on Canvas and/or available through the University of Illinois library. Readings for each session are listed at the conclusion of this syllabus.

Course Policies and Other Items/Resources

Attendance. Attendance and active participation are necessary for adequate performance in this course. This is not a “normal” semester, and flexibility will be given for absences related to illness and quarantine (when class is being held in person). However, students are expected to notify the instructor in advance of any sessions that will be missed. It is the instructor’s decision as to when a student’s absences, without proactive communication with the instructor, become excessive and should be reported. If in the opinion of an instructor the attendance of a student becomes so irregular that their 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. Extenuating 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 Accommodations. This course will accommodate students with documented disabilities. To obtain disability-related academic adjustments and/or auxiliary aids, students should contact both the instructor and the Disability Resources and Educational Services (DRES) as soon as possible. You can contact DRES at 1207 S. Oak Street, Champaign, by phone at (217) 333-1970, or via email at disability@illinois.edu.

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.
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/.

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 DURP, 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.

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/.

Netiquette. In any social interaction, certain rules of etiquette are expected and contribute to more enjoyable and productive communication. The following are tips for interacting via email or other online messages, adapted from guidelines originally compiled by Chuq Von Rospach and Gene Spafford (1995):

- Remember that the person receiving your message is someone like you, deserving and appreciating courtesy and respect.
- Be brief; succinct, thoughtful messages have the greatest effect.
- Your messages reflect on you personally; take time to make sure that you are proud of their form and content.
- Use descriptive subject headings in your emails.
- Think about your audience and the relevance of your messages.
- Be careful when you use humor and sarcasm; absent the voice inflections and body language that aid face-to-face communication, internet messages are easy to misinterpret.
- Cite appropriate references whenever using someone else's ideas, thoughts, or words.
# Course Schedule

*(Subject to revision)*

<table>
<thead>
<tr>
<th>Module</th>
<th>Date</th>
<th>Topic</th>
<th>Notes</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Section I: Context, History, and Foundational Concepts</strong></td>
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<tr>
<td>0</td>
<td>Jan 19</td>
<td>Course Overview and Major Themes</td>
<td>Online session</td>
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<td>1</td>
<td>Jan 24</td>
<td>Transportation Data 1: Travel Patterns and Trends</td>
<td>Online session</td>
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<td>Jan 26</td>
<td>Transportation Data 2: Sources and Methods</td>
<td>Online session</td>
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<td>Jan 31</td>
<td>Transportation Data 3: Sources and Methods (continued)</td>
<td>Online session; Lab 1</td>
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<td>Feb 2</td>
<td>Transportation History 1: Walking City + Transit</td>
<td>Online session</td>
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<td>Feb 7</td>
<td>Transportation History 2: Rise of the Automobile</td>
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<td>Feb 9</td>
<td>Transportation and Land Use 1: T → LU</td>
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<td>Feb 14</td>
<td>Transportation and Land Use 2: LU → T</td>
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<td><strong>Section II: Institutions and Key Impacts</strong></td>
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<td>Feb 16</td>
<td>Transportation Planning Process 1: Federal Role</td>
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<td>Transportation Planning Process 2: MPOs and States</td>
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<td>Feb 23</td>
<td>Transportation Finance 1: Current Status</td>
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<td>Feb 28</td>
<td>Transportation Finance 2: Future Alternatives</td>
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<td>Mar 2</td>
<td>Transportation Finance 3: Future Alternatives (continued)</td>
<td>Lab 2</td>
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<td>6</td>
<td>Mar 7</td>
<td>Congestion: A Problem or a Solution?</td>
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<td>Mar 9</td>
<td>Equity, EJ, and Travel of Disadvantaged Groups</td>
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<td>Mar 14</td>
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<td><strong>NO CLASS</strong> – Spring Break</td>
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<td>Mar 21</td>
<td>Transportation Safety</td>
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<td>Mar 23</td>
<td>Transportation Safety (continued)</td>
<td>Lab 3; A2 Due Friday</td>
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<td>Mar 28</td>
<td>Transportation and Public Health</td>
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<td>Mar 30</td>
<td>Environmental Impacts 1: NEPA and Air Quality</td>
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<td>Apr 4</td>
<td>Environmental Impacts 2: Greenhouse Gas Emissions</td>
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<td><strong>Section III: Standards and Methods</strong></td>
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<td>Apr 6</td>
<td>Planning for Parking</td>
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<td>Apr 11</td>
<td>Traffic Impact Analysis</td>
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<td>Apr 13</td>
<td>Street Design 1: Traditional Standards</td>
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<td>Apr 18</td>
<td>Street Design 2: New Approaches</td>
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<td>Apr 20</td>
<td>Street Design 3: New Approaches (continued) + Visualization</td>
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<td>Apr 25</td>
<td>Transportation Modeling 1: Standard Practices</td>
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<td>Apr 27</td>
<td>Transportation Modeling 2: Critiques and Alternatives</td>
<td>A3 Due Friday</td>
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<td><strong>Section IV: The Future</strong></td>
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<td>12</td>
<td>May 2</td>
<td>Autonomous Vehicles 1: Overview, Opportunities, Challenges</td>
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<td>May 4</td>
<td>Autonomous Vehicles 2: Paths Forward</td>
<td>Lab 4</td>
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<td>May 11</td>
<td>Assignment 4 Due</td>
<td>A4 Due Wednesday</td>
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</table>

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Readings

Module 0: Course Overview and Major Themes

Course Overview and Major Themes


Module 1: Transportation Data

Travel Patterns and Trends


Sources and Methods


Module 2: Transportation History

Walking City and the Rise and Fall of Transit


Rise of the Automobile

Module 3: Transportation and Land Use

Transportation ➔ Land Use

Land Use ➔ Transportation

Module 4: Transportation Planning Process

Federal Role

Metropolitan Planning Organizations (MPOs) and States
Module 5: Transportation Finance

Current Status


Future Alternatives


Module 6: Congestion and Equity

Congestion: A Problem or a Solution?


Equity, Environmental Justice, and Travel of Disadvantaged Groups

Module 7: Safety and Health

Transportation Safety

Transportation and Public Health

Module 8: Environmental Impacts

NEPA and Air Quality

Greenhouse Gas Emissions
Module 9: Parking and Traffic Impact Analysis

Planning for Parking


Traffic Impact Analysis

- Institute of Transportation Engineers. (2006). “Transportation Impact Analyses for Site Development.”

Module 10: Street Design

Traditional Standards


New Approaches

Module 11: Transportation Modeling

Standard Practices


Critiques and Alternatives


Module 12: Autonomous Vehicles

Overview, Opportunities, and Challenges


Paths Forward


Links to policy statements on autonomous vehicles:

- Human Factors and Ergonomics Society (HFES)
- National Association of City Transportation Officials (NACTO)
- Institute of Transportation Engineers (ITE)
- Association of Pedestrian and Bicycle Professionals (APBP)