

**CPLN 550 INTRODUCTION TO TRANSPORTATION PLANNING  
(WILLIAMS HALL 25 | TR 10:15AM-11:45AM)**

- Instructor: Associate Professor Erick Guerra, 312 Duhring Wing
- Direct Contact: E-mail is the best way to reach me: [erickg@upenn.edu](mailto:erickg@upenn.edu). Replies in 1-2 business days during regular hours.
- Questions: Please post course-related questions to Canvas. Emailing course-related questions will delay responses.
- Office Hours: TBD and by appointment. Sign up: <http://www.wejoinin.com/ibambe@gmail.com>

### **COURSE OVERVIEW**

This course provides an overview and introduction to urban transportation planning and policy. Although the focus is on US transportation, the course will also pay special attention to transportation issues in the fast-growing cities of the developing world. The first section of the course focuses on histories and theories of transportation. How and why do we travel? How have we gotten where we are today? The next section looks at larger policy questions, such as who transportation planning benefits and how we evaluate transportation systems. The third section on 4-step modeling and predicting transportation demand. The final section applies what we learn in the first three sections to look at more specific policies, such as congestion charging, bicycle planning, and traffic calming.

Throughout the course, I introduce a series of labs and lectures to familiarize you with available transportation data and a variety of transportation planning methods. Please be sure to download R, R-Studio, and any indicated datasets prior to a lab session. Labs will be essential for completing semiweekly homework assignments

### **COURSE REQUIREMENTS**

Student evaluations are based on two exams and five homework assignments. The homework assignments will help you develop the ability to describe existing transportation and land use conditions and use data to predict demand or evaluate transportation planning policies and investments. The midterm and final exam will ask you to write short answers and memos responding to specific question prompts and will require you to draw on the readings, lectures, and assignments covered throughout the course. The final exam will emphasize the last half of the course but test your knowledge and comprehension of transportation planning history and theory, travel behavior, demand modeling, and project evaluation.

Homework assignments will be evaluated as check minus, check, and check plus. Assignments may be completed in pairs and are due in hard copy at the beginning of class. Incomplete or late assignments will receive a check minus. The assignments are designed to help you synthesize the material of each section, develop the ability to work with

transportation data, and evaluate what you have learned. If you are struggling to complete any of the course material or need an extension for any assignments, please do not hesitate to contact me. I am generally happy to grant extensions when asked in advance.

**Approximate grading weights**

Midterm (25%), Homework (25%), final exam (50%).

**Final paper (in lieu of final exam)**

Instead of the final exam, you may opt to produce a final paper to explore a transportation area or dataset in depth. I recommend choosing one of the following options:

- 1) Describing and answering a simple research question using an existing dataset (e.g., summarizing and discussing the relative costs and ridership of light rail or heavy rail transit in the United States); or
- 2) Summarizing the state of academic knowledge about a specific research topic, such as whether and by how much bike lanes increase traffic safety or whether and by how much BRT increases transit use.

In both cases, your paper will need: (1) an introduction that defines the question and why it is important, (2) a methods section that explains what you did (if a lit review, how did you choose the literature you reviewed?), (3) a findings section that summarizes the findings, (4) a discussion section that explains what the findings mean, and (5) a conclusion that summarizes your paper.

If you would like to write a final paper instead of taking the exam, please submit a one-to-three paragraph paper proposal to Canvas by November 9.

**Assignment and exam dates**

<b>Assignments/Exams</b>	<b>Due Date</b>
HW 1 Traffic counts	Thursday 9/15
HW 2 Census analysis	Tuesday 9/27
HW 3 Household travel survey	Thursday 10/13
<i>Midterm exam</i>	<i>Thursday 10/20</i>
HW 4 Demand modeling	Tuesday 11/15
HW 5 Describing transit	Tuesday 12/06
<i>Final exam</i>	<i>Not yet available</i>
<i>Final paper (in lieu of exam)</i>	<i>Monday 12/19</i>

## **Readings**

There is one required textbook for the course:

Hanson, S., & Giuliano, G. (Eds.) (2017). *The Geography of Urban Transportation* (Fourth Edition), New York: The Guilford Press.

It is available through on-line book retailers like Amazon.com. The remaining required readings are available online through Canvas. Where possible, I also provide hyperlinks to articles in the reading list. You will only be able to access them through a Penn-connected computer or through [a library proxy](#).

If for some reason a link is broken, you are still required to access the reading. I recommend using the Penn library or Google Scholar.

## **Participation**

Come prepared to participate in class discussions. To be prepared, you must complete all required readings and be ready to discuss them with the class. This is an important component of the course and your learning experience.

## **Software**

Please install R and R-Studio onto your personal computer. You will need these programs for the lab sessions. If you are familiar with R, you may use any text editor that you prefer. If not, please use R-Studio. Both programs are fully functional with Windows, Macs, and Linux machines.

<http://cran.r-project.org/>  
<http://www.rstudio.com/>

If you would like to use a point-and-click GUI, several are available. I will not, however, be supporting these in class, if you have a technical issue. I will provide you with sufficient code to complete all course assignments. While you will certainly learn some coding during the class, you will be able to accomplish assignments by cutting and pasting from text files that I provide. No prior coding experience is needed.

I will also be providing additional labs throughout the semester.

## **Plagiarism and academic integrity**

Do not plagiarize. If you have any questions about what constitutes plagiarism, please consult the [University's official policy for academic integrity](#). If you continue to have any questions, please come talk to me or send me an email. Plagiarism can lead to failure and even expulsion. Plagiarism harms you, your colleagues, the University, the department, and your professors. Don't do it. If you are having trouble completing any assignment, please arrange a time to speak with me in person.

## READING LIST AND CLASS SCHEDULE

An asterisk indicates that the reading is available in the required textbook.

### PART I: HISTORIES AND THEORIES

#### 1.1 (8/30): Introduction and Overview

Welcome to class! No readings.

#### 1.2 (9/1): Trends in urban transportation

\*Chapter 1. (Hanson, S.): Introducing Urban Transportation

[McDonald, N. \(2015\) Are Millennials Really the 'Go-Nowhere' Generation? \*Journal of the American Planning Association\*, 81\(2\), 90–103.](#)

(Optional readings)

Cervero, Robert, Erick Guerra, and Stefan Al (2017). *Beyond mobility: Planning cities for people and places*. Washington, D.C.: Island Press. Chapter 1 Introduction.

Vasconcellos, E. (2001). *Urban transport, environment, and equity: the case for developing countries*. London: Earthscan. Chapter 2: Current Transport and Traffic Conditions in Developing Countries.

#### 2.1 (9/6): Transportation and the evolution of urban form

\*Chapter 3. (Muller, P.): Transportation and urban form: Stages in the spatial evolution of the American metropolis.

[Foster, M. \(1979\). City Planners and Urban Transportation: The American Response, 1900–1940. \*Journal of Urban History\*, 5\(3\), 365–396.](#)

(Optional readings)

Jackson, K. T. (1987). *Crabgrass Frontier: The Suburbanization of the United States*. Oxford University Press, USA. Chapters 2 and 6.

Hall, P. (1996). *Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century* (2nd ed.). Oxford: Blackwell. Chapter 9.

[Brown, J. R., Morris, E. A., & Taylor, B. D. \(2009\). Planning for Cars in Cities: Planners, Engineers, and Freeways in the 20th Century. \*Journal of the American Planning Association\*, 75\(2\), 161–177.](#)

#### 2.2 (9/8): The transportation and land use connection

[Giuliano, G. \(1995\). The weakening transportation-land use connection. \*Access, Spring\*, 6, pp. 3- 11.](#)

[Cervero, R., & Landis, J. \(1995\). The transportation-land use connection still matters. \*Access, Fall\*, 7, pp. 2–10.](#)

[Cervero, R. B. \(2013\). Linking urban transport and land use in developing countries. \*Journal of Transport and Land Use\*, 6\(1\), 7–24.](#)

(Optional readings)

Cervero, Robert, Erick Guerra, and Stefan Al (2017). *Beyond mobility: Planning cities for people and places*. Washington, D.C.: Island Press. Chapter 7 Transit-Oriented Development.

#### 3.1 (9/13): Lab: supply, demand, price, and elasticities

This is the first lab session. Please be sure to download and install R and R-Studio prior to class. Spend 30 minutes walking through this tutorial (it has installation instructions too):

<http://web.cs.ucla.edu/~gulzar/rstudio/basic-tutorial.html>

- Gomez-Ibanez, J. (1999). Pricing. Chapter 4 in J. Gomez-Ibanez, W. B. Tye, & C. Winston (Eds.), *Essays in Transportation Economics and Policy: A Handbook in Honor of John R Meyer* (pp. 99–136). Washington, D.C.: Brookings Institution Press.
- Ingram, G. K., & Liu, Z. (1999). Determinants of motorization and road provision. Chapter 10 in J. Gomez-Ibanez, W. B. Tye, & C. Winston (Eds.), *Transportation Economics and Policy Handbook* (pp. 325–356). Washington, D.C.: Brookings Institution Press.

### **3.2 (9/15) The transportation planning process**

\*Chapter 6. (Sciara, G. and Handy, S.): Regional Transportation Planning

[Dittmar, H. 1995. A Broader Context for Transportation Planning. \*Journal of the American Planning Association\* 61 no. 1:7-13](#)

### **4.1 (9/20) Finance and equity**

\*Chapter 10. (Taylor, B.): The Geography of Urban Transportation Finance.

\*Chapter 13. (Blumenberg, E.): Social Equity and Urban Transportation.

*(Optional readings)*

[Blumenberg, E. \(2008\). Immigrants and transport barriers to employment: The case of Southeast Asian welfare recipients in California. \*Transport Policy\*, 15\(1\), 33–42.](#)

### **4.2 (9/22) Transportation data and the transportation plan**

\*Chapter 7. (Boarnet, M.): Land Use, Travel Behavior, and Disaggregate Travel Data

Download DVRPC's 2012 household travel survey (spend a little time reviewing the data dictionary and be sure to carefully read the README:

[https://www.dvrpc.org/Transportation/Modeling/Data/zip/PublicDB\\_RELEASE.zip](https://www.dvrpc.org/Transportation/Modeling/Data/zip/PublicDB_RELEASE.zip)

Quick lab: set working directory and open files

### **5.1 (9/27) Lab session: summarizing transportation data**

No reading: Walk through Philadelphia Household Travel Survey lab 1. If you do not complete this first lab, you may struggle with the second in class lab.

## **PART II: POLICY AND PROJECT EVALUATION**

### **5.2 (9/28) Introduction to projection evaluation and cost-benefit analysis**

Small, Kenneth, and Erik Verhoef. 2007. *The Economics of Urban Transportation*. 2<sup>nd</sup> ed. New York: Routledge, pp. 181-190, Cost-benefit analysis.

Metz, David. 2008. "The Myth of Travel Time Saving." *Transport Reviews: A Transnational Transdisciplinary Journal* 28 (3): 321.

*(Optional readings)*

Cervero, Robert, and Erick Guerra (2011). "To T or Not to T: A Ballpark Assessment of the Costs and Benefits of Urban Rail Transportation." *Public Works Management & Policy* 16: 2.

Meyer, M. D., & Eric J. Miller. (2001). *Urban transportation planning: a decision-oriented approach* (2nd ed.). New York: McGraw-Hill. Chapter 3.2: pp. 112-149.

## **6.1 (10/4) Social costs and benefits**

\*Chapter 9. Giuliano, G. and A. Agarwal (2017). Land use impacts of transportation investments: Highway and transit.

Aeron-Thomas, A., & Jacobs, G. (2011). Road crashes and low-income cities: impacts and options. In H. T. Dimitriou & R. A. Gakenheimer (Eds.), *Urban transport in the developing world: a handbook of policy and practice*. Cheltenham: Edward Elgar.

(Optional readings)

Vanderbilt, T. (2009). *Traffic: why we drive the way we do (and what it says about us)*. New York: Vintage Books. Chapter 7: When Dangerous Roads are Safer.

Vasconcellos, E. (2001). *Urban transport, environment, and equity: the case for developing countries*. London: Earthscan. Chapter 15: Traffic Accidents.

## **6.2 (10/6) Fall break**

No class

## **7.1 (10/12) Assessing environmental impacts (ASIF)**

Schipper, Lee, Calanit Saenger, and Anant Sudardshan. 2011. "Transport and Carbon Emissions in the United States: The Long View." *Energies* 4 (4): 563–81.

Cervero, Robert, Erick Guerra, and Stefan Al (2017). *Beyond mobility: Planning cities for people and places*. Washington, D.C.: Island Press. Chapter 3 Better Environments.

(Optional readings)

Banister, D., & Berechman, J. (2000). *Transport investment and economic development*. London: University College London Press. Chapter 5: Social, Spatial and Environmental Effects.

\*Chapter 12. (Greene, L.): Transportation and Energy

## **7.2 (10/13) Level of service, mobility, and accessibility**

[Dumbaugh, Eric, Jeffrey Tumlin, and Wesley E. Marshall. 2014. "Decisions, Values, and Data: Understanding Bias in Transportation Performance Measures." \*Institute of Transportation Engineers. ITE Journal\* 84 \(8\): 20.](#)

[Schneider, R., K. Shafizadeh, and S. Handy. \(2015\) Method to Adjust Institute of Transportation Engineers Vehicle Trip- Generation Estimates in Smart-Growth Areas." \*Journal of Transport and Land Use\* 8\(1\): 69-83.](#)

<http://www.citylab.com/commute/2014/07/transit-projects-are-about-to-get-much-much-easier-in-california/374049/>

## **8.1 (10/18) My ongoing research**

No readings for today. Focus on preparing for exam.

## **8.2 (10/20) Midterm exam**

# **PART III: PREDICTING TRANSPORTATION DEMAND**

## **9.1 (10/25) The demand for transportation**

Small, Kenneth, and Erik Verhoef. 2007. *The Economics of Urban Transportation*. 2<sup>nd</sup> ed. New York: Routledge, pp. 4-55 (skim 23-43), Travel Demand.

## 9.2 (10/27) The 4-step model

\*Chapter 5. (Miller, H.): Theories and Models in Transportation Planning

[Bills, T. S., & Walker, J. L. \(2017\). \*Looking beyond the mean for equity analysis: Examining distributional impacts of transportation improvements\*. \*Transport Policy\*, 54, 61–69.](#)

(Optional readings)

Xinhao Wang and Rainer vom Hofe. 2007. *Research Methods in Urban and Regional Planning*. Chapter 7: Transportation Analysis.

Meyer, M. D., & Eric J. Miller. (2001). *Urban transportation planning: a decision-oriented approach* (2nd ed.). New York: McGraw-Hill. Chapter 5: pp. 247-331.

## 10.1 (11/1) Class lab: Linear regression and direct demand modeling

*Bring your computer with dataset loaded.*

[Cervero, R. \(2006\). \*Alternative approaches to modeling the travel-demand impacts of smart growth\*. \*Journal of the American Planning Association\*, 72\(3\), 285–295.](#)

James, Gareth, Daniela Witten, Trevor Hastie, and Robert Tibshirani. *An Introduction to Statistical Learning*. Springer, 2013. Chapter 3: Linear Regression. <http://www-bcf.usc.edu/~gareth/ISL/ISLR%20Fourth%20Printing.pdf>

## 10.2 (11/3) Choice and count models for transportation planning (ACSP)

James, Gareth, Daniela Witten, Trevor Hastie, and Robert Tibshirani. *An Introduction to Statistical Learning*. Springer, 2013. Chapter 4: Classification. 4.1 to 4.3, pp. 127 – 138. <http://www-bcf.usc.edu/~gareth/ISL/ISLR%20Fourth%20Printing.pdf>

# PART IV: MULTIMODAL TRANSPORTATION PLANNING POLICIES

## 11.1 (11/8) Dealing with congestion

\*Chapter 14. (Giuliano, G. with Hanson, S.): Looking to the Future

[Downs, A. \(2004\). \*Why Traffic Congestion is Here to Stay...and Will Get Worse\*. \*Access\*, \(25\): 19-25.](#)

[Taylor, B. D. \(2002\). \*Rethinking Traffic Congestion\*. \*Access\*, \(21\), 8–16.](#)

## 11.2 (11/10) Multimodal urban planning

Guest lecture: Chris Puchalsky on Philadelphia's Strategic Transportation Plan

## 12.1 (11/15) Urban Freight

\*Chapter 2. (Lablanc, L. and Rodrigue, J.P.) The Geography of Urban Freight

## 12.2 (11/17) The high cost of free parking

Shoup, Donald. 1999. "The Trouble with Minimum Parking Requirements." *Transportation Research Part A: Policy and Practice* 33 (7-8): 549–574.

[Manville, M., & Shoup, D. \(2004\). \*People, Parking and Cities\*. \*Access\*, \(25\), 3–8.](#)

(Optional Readings)

Website: <http://sfpark.org/about-the-project/pilot-evaluation/>



### **13.1 (11/22) Public transportation: an overview**

\*Chapter 8. (Schweitzer, L.): Mass Transit.

[Cervero, R. \(2001\). \*Informal Transit: Learning from the Developing World\*. \*Access\*, 18, 12–16.](#)

*(Optional Readings)*

Vuchic, V. (1999). *Transportation for livable cities*. New Brunswick, N.J.: Center for Urban Policy Research (Chapters 2 and 7).

### **13.2 (11/24) Thanksgiving**

No class.

### **14.1 (11/29) Air transportation planning**

Guest lecture: Megan Ryerson

[Ryerson, Megan S. “Planners Take Flight: Integrating Air Transportation into Planning Education.” \*Journal of Planning Education and Research\* 36, no. 4 \(2016\): 427–39.](#)

Ryerson, Megan. 2020. [America's aviation sector might collapse due to COVID — it might be a good thing](#). Op-Ed in The Hill.

*(Optional Readings)*

[Ryerson, M.S., Woodburn, A. \(2014\). Build Capacity or Manage Demand: Can regional planners lead American aviation into a new frontier of demand management? \*Journal of the American Planning Association\*, 80\(2\), 138-152.](#)

### **14.2 (12/1) Bicycle and pedestrian planning**

[Pucher, J., Buehler, R., & Seinen, M. \(2011\). Bicycling renaissance in North America? An update and re-appraisal of cycling trends and policies. \*Transportation Research Part A: Policy and Practice\*, 45\(6\), 451–475.](#)

[Norton, P. D. \(2007\). Street Rivals: Jaywalking and the Invention of the Motor Age Street. \*Technology and Culture\*, 48\(2\), 331–359.](#)

### **15.1 (12/6) Doctoral research into transportation planning at Penn**

No readings for today. Guest panel.

### **15.2 (12/8) The future of urban transportation**

Cervero, Robert, Erick Guerra, and Stefan Al. *Beyond Mobility: Planning Cities for People and Places*. Washington, DC: Island Press, 2017, Chapter 10: Emerging Technologies.

\*Chapter 4. (Circella, G. and Mokhtarian, P.) Impacts of Information and Communication Technology.