CP 6331 / CEE 6624: LAND USE AND TRANSPORTATION INTERACTIONS

Georgia Institute of Technology, Spring 2014
M/W 12:35 – 1:55pm
Rm. 204, Cherry Emerson
Instructor: Tim Welch
Office Hours: Wednesdays 2:00-4:00
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OVERVIEW This course is about the contemporary American metropolis and the forces that shape it. The objectives of the course are to develop an understanding of the complex interaction between land use and transportation systems and, building on this foundation, to assess the implications of future transportation and land use decisions for urban growth and environmental quality. In the first component of the course, readings and group discussions will examine the historical and contemporary relationship between transportation investment and land use; including the basic theories of spatial organization and travel behavior.

The second and third components of the course will examine the social and environmental costs of decentralized land use and the principal economic, regulatory, and design-based strategies that have been employed to mitigate the undesirable effects of metropolitan growth. As air quality and climate change hold significant implications for future urban development, a particular emphasis will be placed on the linkages between land use, energy consumption, and air pollution. In the final component of the course, students will be introduced to the emerging integrated transport modeling framework and the major federal statutes governing the state and regional level transportation planning process. Through two lab projects, students will have the opportunity to perform their own analysis of land use and travel behavior with census demographic and travel survey data obtained from a major metropolitan area. The course will conclude with an overview of an integrated approach to land use and transportation planning.

EVALUATION The course will be structured as a combined lecture-seminar course. You are expected to have read all assigned readings ahead of time, and be prepared to actively participate and on selected days, lead the in class discussions. Students will be evaluated on three sets of tasks: (1) class participation and a student led lecture; (2) two lab projects; and (3) two exams corresponding to the last two divisions of the course. The formal requirements of the class are as follows:

Discussion Participation and Topic Presentation (30%):

Class sessions will consist of lecture material, discussion, and student led lectures. Students are expected to come to each class well prepared to discuss and evaluate the assigned reading material. Students will work in groups to develop a formal lecture on an identified class topic to be covered during a class session. For each lecture, students will be allotted 40 to 45 minutes in which to deliver a well-structured PowerPoint-based lecture covering a selected set of readings or project outlined in the syllabus. Student presentations will be evaluated on content, organization, visual quality, creativity, and delivery. Each group is expected to schedule a meeting with me to discuss the presentation at least one week in advance of the assigned date.

***Land Use – Travel Behavior Project* (30%):**
Through the completion of two lab assignments, students will create and analyze their own integrated land use and travel behavior dataset. The objective of these assignments will be to construct a land use and travel behavior dataset with information acquired from the U.S. Census Bureau and a metropolitan travel survey; perform a statistical analysis; and write a technical report detailing the research question, methods, findings, and recommendations. Two lab sessions during the course of the semester will equip students with the necessary database management and analytical skills needed to perform these tasks.

***Examinations* (40%)**
Material addressed in the second and third components of the syllabus will be covered through two in-class exams. Each exam will adopt a short answer format and will be administered during the class period noted in the syllabus.

Please note that all written assignments (unless otherwise noted) are to be submitted through the "Assignments" tab in T-Square. Late submissions will be discounted a letter grade a day. It is the student's responsibility to ensure that assignments submitted through T-Square are successfully uploaded into the system. Also note that the grading percentages presented above may be adjusted by the instructor in response to an insufficient effort on any assignment.

The Institute policy regarding student plagiarism will be strictly enforced. It is expected that all students have a thorough understanding of the various forms of plagiarism and that questions pertaining to this policy will be resolved before the submission of any assignment. For a description of proper attribution, please see the "Academic and Professional Writing Guide," available through the resources tab in T-Square. Any student found to violate the policy on plagiarism will receive a failing grade for the assignment and will be subject to disciplinary action as outlined within the Institute's Honor Code.

Students with disabilities needing academic accommodation should provide documentation to the Access Disabled Assistance Program for Tech Students (http://www.adapts.gatech.edu/) and bring an ADAPTS accommodation letter to the instructor indicating the nature of accommodations required. This should be done within the first week of class or as soon as possible after a new disability condition arises. All effort will be made to provide reasonable accommodation.

TEXTS All readings will be available as PDF files on T-Square. No textbook purchase is required.
Optional Textbook: Moore, T., & Thorsnes, P. (1994). *The transportation/land use connection* (No. PAS 448/449). ['Moore et al' in the syllabus]

I. THE BASICS OF THE TRANSPORTATION – LAND USE CONNECTION

Week 1: Course Overview; An introduction to Transport and Land use Interaction

Giuliano, Genevieve. 1995. The weakening transportation-land use connection. Access, 6:3-11.

Cervero, Robert, and John D. Landis. 1995. The transportation-land use connection still matters. Access, 7:2-10.

Deakin, Elizabeth. 1991. "Jobs, Housing, and Transportation: Theory and Evidence on Interactions Between Land Use and Transportation," in *Transportation, Urban Form, and the Environment*. TRB Special Report 231.

Week 2: No Class: TRB

No Readings

Week 3: Urban Form and Location Theory

Moore et al: Chapters 1 & 2

Heilbrun, James and Patrick A. McGuire. 1987. "Site Rent, Land Use Patterns, and the Form of the City," in Urban Economics and Public Policy, Third Edition. Saint Martin's Press.

Muller, P. O. (2004) "Transportation and urban form: Stages in the spatial evolution of the American metropolis," In The Geography of Urban Transportation, edited by S. Hanson and G. Giuliano, New York: Guilford, pp. 59-85.

Noland, Robert B. and Christopher S. Hanson, How does induced travel affect sustainable transportation policy? *Transport Beyond Oil*

Weeks 4 and 5: How land use affects transportation

Student Led Lecture #1: *How has transportation shaped our cities?*

Lee, Y., Washington, S., & Frank, L. D. (2009). Examination of relationships between urban form, household activities, and time allocation in the Atlanta Metropolitan Region. *Transportation Research Part A: Policy and Practice*, *43*(4), 360-373.

Mothorpe, C., Hanson, A., & Schnier, K. (2013). The impact of interstate highways on land use conversion. *The Annals of Regional Science*, 1-38.

Overview and Density:

Cervero, Robert and Kara Kockelman, 1997, "Travel Demand and the 3D's: Density, Diversity, and Design", Transportation Research D (Transport and Environment), 2(3): 199-217.

Ewing, Reid and Robert Cervero, 2010, "Travel and the Built Environment", Journal of the American Planning Association, 76(3), 265-294.

Transit Cooperative Research Program (TCRP). 2003. Land Use and Site Design. Report 95. Chapter 15. "Density." Pages 15-13 to 15-38.

Diversity and Design

TCRP Report 95. Chapter 15. "Diversity." Pages 15-39 to 15-58.

Ewing, Reid, Eric Dumbaugh, and Mike Brown. 2002. "Internalizing Travel by Mixing Uses: A Study of Master-Planned Communities in South Florida," in Transportation Research Record 1780: 115-120.

TCRP Report 95. Chapter 15. "Design." Pages 15-58 to 15-90.

Lynch, Kevin. 1960. Chapter Three (The City Image and Its Elements) from The Image of the City. MIT Press.

Jacobs, Allan. 1995. Chapter One (Requirements for Great Streets) and Chapter Two (Qualities that Contribute) from Great Streets. MIT Press.

Beatley, T. 2000. *Green Urbanism: Learning from European Cities*. Washington, DC: Island Press: 166-193

Effects on Travel Behavior

Crane, Randall, 2000, The influence of urban form on travel: An interpretive review, Journal of Planning Literature, 15 (1): 3-23.

Cao, X., Mokhtarian, P. L., and Handy, S. L. (2009). Examining the impacts of residential self-selection on travel behavior: A focus on empirical findings. Transport Reviews, 29 (3), 359-395.

(skim) National Research Council, 2009, Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions, Transportation Research Board Special Report 298.

Week 6: Accessibility and Mobility

Levine, Jonathan, Joe Grengs, Qingyun Shen and Qing Shen, 2012, Does Accessibility Require Density or Speed, Journal of the American Planning Association, 78(2): 157-172.

Handy, Susan. 2002. Accessibility vs Mobility: Enhancing Strategies for Addressing Automotive Dependence in the US. ITS-Davis Publication No. UCD-ITS-RR-02-15.

Litman, Todd. 2003. "Measuring Transportation: Traffic, Mobility, and Accessibility." Victoria Transportation Policy Institute.

Geurs, Kerst and Bert van Wee. 2004. "Accessibility Evaluation of Land Use and Transport Strategies: Review and Research Directions," in Journal of Transport Geography 12: 127-140.

Student Led Lecture #2: Regional Accessibility – The Atlanta Example

Helling, A. (1998). Changing intra-metropolitan accessibility in the US: Evidence from Atlanta. *Progress in Planning*, *49*(2), iii-107.

Sanchez, T. W. (1999). The connection between public transit and employment: the cases of Portland and Atlanta. Journal of the American Planning Association, 65(3), 284-296.

II. SOCIAL AND ENVIRONMENTAL IMPACTS OF DECENTRALIZATION

Weeks 7 & 8: Social Impacts –

Public Transit, Traffic Congestion, Induced Demand, Excess Parking

Taken For a Ride Video

Student Led Lecture #3: Congestion and Its Causes

Downs, A. 2004. *Still Stuck in Traffic: Coping with Peak Hour Traffic Congestion*. Washington, DC: Brookings Institution, 37-60

Shoup, D. 2004. *The High Cost of Free Parking*. Washington: Planners Press, 127-175

Transportation Equity and the Loss of Social Capital

Deka, D. (2004). Social and environmental justice issues in urban transportation. In Hanson, Susan (Ed). 2004. *The Geography of Urban Transportation*. New York: Guilford Press, 332-355

Kunstler, J. 1993. *The Geography of Nowhere*. New York: Touchstone, 113-131

Putnam, R. 2001. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster, 204-215

Student Led Lecture #4: Race, Income, and Transit Dependency in Atlanta

Keating, L. (2001). *Atlanta: Race, class and urban expansion*. Temple University Press, Chapter 6 (113-141).

Paget-Seekins, L. (2013). Competing mobility needs: The users, actors, and discourses in Atlanta, Georgia. *Transport Policy*, *27*, 142-149.

Kirkman, R., Noonan, D. S., & Dunn, S. K. (2012). Urban transformation and individual responsibility: The Atlanta BeltLine. *Planning Theory*, *11*(4), 418-434.

Lab 1 – Building an Integrated Land Use and Travel Behavior Database

Meet in Room 358 Arch West, 1:00pm-2:30pm

No reading assigned.

Week 9 and 10: Environmental Impacts

Energy Consumption and Peak Oil

Goodstein, David. 2004. *Out of Gas*. New York: Norton & Co., 15-40

Rubin, Jeff. 2010. *Your World is about to get a Whole Lot Smaller*. New York: Random House, 1-24

Orszag, Peter. 2012. Fracking Boom Could Finally Cap Myth of Peak Oil. Bloomberg News, January 31

Air Pollution & Climate Change

Nebel, B. & Wright, R. 1998. *Environmental Science*. New Jersey: Prentice Hall, 371-397

U.S. Environmental Protection Agency. 1993. The Plain English Guide to the Clean Air Act. **Access on-line: www.epa.gov/air/caa/peg**

Stone, B. 2012. The City and the Coming Climate: Climate Change in the Places We Live. New York: Cambridge University Press, Chapter 1

National Research Council. 2008. Potential Impacts of Climate Change on US Transportation, Special Report 290, 79-92

Student Led Lecture #5: Climate Action Plans

Pollak, M., Meyer, B., & Wilson, E. (2011). "Reducing Greenhouse Gas Emissions: Lessons from State Climate Action Plans." Energy Policy, 39(9), 5429–5439. doi:10.1016/j.enpol.2011.05.020.

Lutsey, N., & Sperling, D. (2008). "America's Bottom-up Climate Change Mitigation Policy." Energy Policy, 36(2), 673–685. doi:10.1016/j.enpol.2007.10.018.

Preston, B. L., Westaway, R. M., & Yuen, E. J. (2011). Climate adaptation planning in practice: an evaluation of adaptation plans from three developed nations. *Mitigation and Adaptation Strategies for Global Change*, *16*(4), 407-438.

Exam 1: Social and Environmental Impacts of Decentralization

III. STRATEGIES FOR INTEGRATING LAND USE AND TRANSPORTATION PLANNING

Week 11: Spring Break

No Class

Week 12: Market-Oriented Approaches

Pricing Roads & Parking

Moore et al: Chapter 4

Shoup, D. 2004. *The High Cost of Free Parking*. Washington: Planners Press, 185-204

Shoup, D. 2004. *The High Cost of Free Parking*: 379-395

Shoup, Donald. 2004. "Unnatural Selection," "The Pseudo-science of Planning for Parking," and "A Great Planning Disaster" from The High Cost of Free Parking. American Planning Association.

Student Led Lecture #6: Toll Roads and Parking Cost in Atlanta

Fields, G., Hartgen, D., Moore, A., & Poole Jr, R. W. (2009). Relieving congestion by adding road capacity and tolling. *International Journal of Sustainable Transportation*, *3*(5-6), 360-372.

Rountree, R., Miller, J. M., Vu, P., Slack, T., & Guensler, R. (2008, February). Georgia's approach to congestion with four T's: tolling, transit, telework, and technology. In *DVD: Transportation Research Board 87th Annual Meeting*.

Nelson, A. C., Meyer, M. D., & Ross, C. B. (1997). Parking supply policy and transit use: Case study of Atlanta, Georgia. *Transportation Research Record: Journal of the Transportation Research Board*, *1604*(1), 60-66.

Lab 2 – Measuring the Influence of Land Use on Vehicle Travel

Meet in Room 358 Arch West, 1:00pm-2:30pm

No reading assigned.

Weeks 13 & 14: Regulatory Approaches

Supply and Demand Side Strategies

Moore et al: Chapters 5 & 6

Integrating Land Use into the UTMS

Moore et al: Appendix E

Planning and Funding Major Infrastructure

Johnston, R. A. (2004). The Urban Transportation Planning Process. In Hanson, S. (Ed). 2004. The Urban Transportation Planning Process. The Geography of Urban Transportation. New York: Guilford Press, 115 - 140

USDOT Federal Highway Administration. 2012. A Summary of Highway Provisions in MAP-21, Office of Legislative and Intergovernmental Affairs, August

Levinson, D. & Krizek, K. 2008. Planning for Place and Plexus, Routledge: 251-277

Integrating Land Use into the Air Quality Planning Framework

EPA Guidance: Improving Air Quality through Land Use Activities. 2001. Office of Transportation and Air Quality, EPA 420-R-01-001, January, 5-26

Stone, B. 2003. Air Quality by Design: Harnessing the Clean Air Act to Manage Metropolitan Growth. Journal of Planning Education and Research. 23(2): 177-190

Discussion Topic

Building a Bridge: Project XL and Atlantic Station

Week 15: Design-Based Approaches

Transit Oriented Development

Rubin, et al. 1999. Ten Myths about US Urban Rail Systems. *Transport Policy*, 6: 57-73

Stanger, R. 2000. Ten Myths about US Urban Rail Systems – A Rejoinder. *Transport Policy*, 7: 303-305

Cervero, R. 1998. The Transit Metropolis. Washington DC: Island Press, Chapter 1

TOD Case Studies

Cervero, R. 1998. The Transit Metropolis. Washington DC: Island Press, Chapters 16 & 17

Week 16: Modeling the Transportation-Land Use Relationship

Overview of Land Use Interaction Models

Waddell, Paul and Gudmundur Freyr Ulfarsson. 2003. "Introduction to Urban Simulation: Design and Development of Operational Models," from Handbook in Transport, Volume 5: Transport Geography and Spatial Systems. Pergamon Press.

US Environmental Protection Agency. 2000. Projecting Land-Use Change: A Summary of Models for Assessing the Effects of Community Growth and Change on Land Use Patterns. Office of Research and Development.

Integrated Transportation and Land Use Models – Guest Speaker: Dr. David Lee

Readings TBD

Finals Week: Exam 2: Strategies for Integrating Land Use and Transportation Planning, Wednesday April 30, 11:30am - 1:30pm