

*Orf 467*  
*Transportation Systems Planning and Analysis* v1.1

Fall 2007/2008

Professor Alain L Kornhauser	Class Hours: Mon. & Wed. 1:30- 2:50 pm Location: 109 Friend
Office: E-407 EQuad	
E-mail: alaink@princeton.edu	
Tel: 609-258-4657	
<b>Course Requirements:</b>	<b>% of final grade</b>
bi-weekly assignments	30%
"tenth - week" exams	30%
Term project due at end of Reading Period	30%
Class participation	10%

**Course Description**

Studied is the transportation sector of the economy from a systems technology and planning perspective. The focus is on the modeling and analytical methodologies that support

- regional and national, long and short-range capital and operations planning initiatives,
- real-time operational decision making by transportation companies, and
- the formulation and analysis of long-range public policy initiatives focused on the transportation sector of the economy.

The transportation sector of the economy is one in which a continuing “tug-of-war” exists between the private sector and the public sector that continually seeks a balance between private sector market forces and broad based public policy initiatives. With shifting national priorities, the Federal role in transportation is changing significantly. The move away from strict economic regulation towards privatization while trying to continually improve a common shared transportation infrastructure creates special challenges and opportunities for this sector of the economy. The heightened sensitivity of security creates new challenges. Radical concepts such as "value" pricing, private toll roads and for-profit mass transportation are beginning to be seriously considered as elements of a broad transportation policy. Meanwhile, local issues of traffic congestion, road construction and transportation-related environmental issues are dominant themes of grass roots planning and policy analysis. Finally, global warming, profiteering from Katrina, CAFE standards on SUVs and \$80 a barrel oil may be big enough straw to “finally break our back”. We may now be prepared to change our view on oil as we’ve changed our views on tobacco (which took forty years). Investigated will be ways that we can begin to finally wean ourselves from our addiction to oil.

The first part of the course, "policy, planning and decision making", surveys the transportation sector of the economy by studying and evaluating the current change in the balance between Federal, regional and local transportation agencies, private transportation providers, consumers of transportation and those impacted by transportation. Studied are the roles played by each of the participants in the transportation sector of the economy. The historical evolution of transportation policy will provide a perspective for evaluating current proposals for a reorientation of transportation priorities.

The second part of the course, "tools and technology", focuses on the quantitative aspects of transportation design, planning and analysis. Studied are the methodologies used in the transportation planning process: its objective, its models and its data requirements. Focus will be on methodologies of the planning process that are appropriate for addressing broad national policy issues as well as detailed and specific local circulation and traffic issues. These methodologies will be applied to the design of a new State-wide mass transit system for New Jersey. Each student will be responsible for the design and analysis of the mass transit system for at least one county. The class will work together to create a unified synergistic system for the entire state. Work on the system will evolve throughout the semester. Interim results and findings will be presented at two interim workshops. A Final workshop, presenting final recommendations, will take place at the end of Reading Period.

The third part of the course, "technologies", focuses on the users of transportation and how emerging technologies may improve the way that we use transportation. Studied are the various elements of intelligent transportation systems (ITS) that apply advanced communications, computation and control systems. The introduction of many of these systems is in response to improved service demanded by the shippers and travelers. Studied will be advanced traveler information systems and advanced transportation management.

The final part of the course, "current transportation policy issues", investigates three policy issues having significant local, regional and national transportation policy implications:

- a) "Paying for Access" (the Manhattan Congestion Zone),
- b) "The Arts versus Mass Transit" (Moving the Dinky to make room for the new University Arts Center), and
- c) "Privatizing the Cash Cow (aka New Jersey Turnpike) "
- d) "Taxing gasoline as a sin"

Course requirements include weekly readings, bi-weekly assignments, one "tenth week" exam, a term project and class participation. Two (2) 80 minute classes. We'll also visit some transportation facilities in the metropolitan area and have several distinguished practitioners come speak with us.

### **Textbook:**

#### ***Reference Textbooks:***

Ahuja, R. K, T. L. Magnanti & J. T. Orlin ,(Magnanti) *Network Flows, Theory, Algorithms and Applications*, Prentice Hall 1992, ISBN 0-13-617549 (excellent reference text on networks)  
Meyer, M. D., & Miller, E. J. (M&M) *Urban Transportation Planning, A Decision-Oriented Approach*, 2<sup>nd</sup> ed. McGraw-Hill, 2001, ISBN 0-07-242332-3

### **Other References: .**

Ran, B., Boyce, D. *Dynamic Urban Transportation Network Models*, Lecture Notes in Economics & Mathematical Systems, #417, Springer-Verlag  
Oppenheim, N. *Urban Travel Demand Modeling*, Wiley, 1995, ISBN 0-471-55723-4  
<http://www.bts.gov/> US Transportation Statistics <http://www.fhwa.dot.gov/tea21/index.htm> Current Federal Transportation Legislation <http://www.fhwa.dot.gov/trafficinfo/index.htm#TRFF> National traffic & road closure  
Gomez-Ibañez, et al (Eds.). (1999) *Essays in Transportation Economics and Policy –A Handbook in honor of John R. Meyer*. Washington DC: Brookings Institution Press. Available on a page by page basis at: <http://brookings.nap.edu/books/0815731817/html/>  
Proceedings of the ITS America 2007 Annual Meeting, June, 2007