

SYLLABUS

WWS 527a

Transportation Policy Analysis and Systems Planning

Fall 2004

Professor Alain L Kornhauser	Class Hours: Mon.& Wed. 1:30-2:50 pm; 012 Robertson Hall (WWS)
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Course Requirements:	% of final grade
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 broad public policy perspective with a an emphasis on technology. The focus is on the modeling and methodologies that underpin the policy formulation, capital and operations planning, and real-time operational decision making within the transportation industry. With shifting national priorities, the Federal role in transportation is changing significantly. The heightened sensitivity of security creates new challenges. Social and market forces play a much bigger role in the transportation sector. 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 politics.

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", 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.

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, "applications", applies the policy perspectives, tools, and technologies elements of the course to current transportation issues. In each of the final week, a current transportation topic is studied. Students are assembled into groups, each of which is responsible for addressing the issue from one of the three elements. Group responsibilities are rotated so that each group has the opportunity to address a current issue from each of the three perspectives. Issues are assigned during the previous week's precept. Group presentations and discussions occur during normal class periods.

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:

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/>
Meyer, M. D., & Miller, E. J. (M&M) *Urban Transportation Planning, A Decision-Oriented Approach, 2nd ed.* McGraw-Hill, 2001, ISBN 0-07-242332-3
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

Other References: .

Proceedings of the ITS America 2003 Annual Meeting, May, 2003
USDOT, FHWA, Conference Proceedings: Automated Highway Systems, Precursor Systems Analysis, Interim Results Workshop, FHWA-RD-94-101, August, 1994
U. of Minnesota, PRT I, PRT II, PRT III, 1972,1973, 1975
Transportation Research Board, Special Report 232, Advanced Vehicle and Highway Technologies, 1991

USDOT, FHWA Proceedings of the Dynamic Traffic Assignment Workshop, August, 1994

<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

Part 1. Perspective on the Transportation Sector of the Economy: Its Function, Its Players, Its Technologies, Its Policies, Its Information Sources

Week 1

Mon Sep13

Introduction and Survey of Course

Elements of the transportation sector of the economy, the player, the technologies, the information sources

Reading: http://www.bts.gov/publications/pocket_guide_to_transportation/2003/pdf/entire.pdf, *The Changing Face of Transportation* USDOT [Highway Statistics 2002](#)

Class Notes: Week 1

Wed Sep15

Historical evolution of National Transportation Policy

Readings: Coyle Ch. 1-4, pp. 2-129 (passed out); [National Transportation Statistics BTS Brief History of US DOT](#) <http://isweb.tasc.dot.gov/Historian/history.htm>

Week 2

Mon Sep 20

Current National Transportation Policy and the FY05 Budget Proposal for Transportation; [Highway taxes](#); [Central Jersey Rapid Transit Project](#)

Homework 1: [The Value of a Life](#), Due Mon Sep 29.

Reading: Transportation for the 21st Century for Transportation. PL105-178, Transportation Equity Act for the 21st Century (T21)

<http://www.fhwa.dot.gov/tea21/index.htm> ; [FY2004 Federal Budget](#) ; [Tea21 apportionment Tables](#) ; [Reauthorization Bill - \(SAFETEA\)](#)

Wed Sep 22

Big Picture view of Transportation in the next 20-25 years ([be prepared to discuss!](#))

The Private Sector side of Transportation. Carriers, shippers 3rd party logistics, and other service providers

Background reference: links to trucking industry: Trucking/Carriers:

<http://www.truckline.com/>, <http://etrucker.com>, <http://www.truckinginfo.com/>,

<http://truklink.com/>, <http://www.truckload.org/> Logistics/Shipper:

<http://www.logisticsmgmt.com>, <http://www.totalsupplychain.com>,

<http://www.trafficworld.com/>, <http://inboundlogistics.com/index.shtml>,

<http://logistar2.com/> (For software vendor research),
<http://www.pcmiler.com/news/industry/default.html>

Homework #2 & #3 [Alternatives Analysis](#) [Student Teams](#)

Part 2. Planning and Analysis Tools of Transportation Demand and Investment

Week 3

Mon Sep 27

Development of a Formal Urban Transportation Planning (UTP) Process & Decision Making: The Central Jersey Transit Study

Ref.: [Class Notes](#) also: [Millstone Bypass](#)

Background reference: M&M, Ch 2 Planning & Decision Making

Wed Sep 29

Urban Travel & Transportation System Characteristics: Planning Studies and Methods: Travel Demand Surveys, Data Sources, Intro to Sequential Demand Forecasting Modeling Approaches

Background reference: M&M, Ch 3

Week 4

Mon Oct 4

Special Lecture by Frank Lorenzo, Former CEO of Continental Airlines, “Intense Competition in the Airline Industry”

Background reference: M&M, Ch 4 Data Management & Use in Decision Making

Wed Oct 6

Alternatives Analysis: Demand Forecasts

Background reference: M&M , Ch. 5.0 – 5.3

Week 5

Mon Oct 11

Alternatives Analysis: Land Use Models

Background reference: M&M , Ch. 6

Wed Oct 13

Modeling Trip Generation,

Assignment: Layout, generate trips for the Central Jersey Transit Study

Background reference: M&M , **Ref.:** Handout of ITE Trip Generation chapter, Ch. 5.4.1

Week 6

Mon Oct 18

Models of Trip Distribution; Transport behavior of individuals and households Models of demand elasticities,

Assignment: [Homework #3](#): Distribute trips for Central Jersey Transit Study,

Ref.: [Class Notes](#), [Handout](#), [reference on matrix manipulations in Excel](#), M&M , Ch. 5.4.2

Wed Oct 20

Models of Mode Choice behavior of individuals; [Traffic](#) Assignment ; [Paths](#) through networks; Network Analysis: Shortest Paths: Label Setting and Label Correcting, Shortest paths in Real Networks and Essentially Shortest Paths

Ref.: [Class Notes](#) M&M , Ch. 5.4.3-6, Magnanti, Ch4, Ch5 Zhan & Noon, “Shortest Path Algorithm : An Evaluation using Real Road Networks”; Kornhauser & Hunt, “Essentially Shortest Paths”; White & Kornhauser “Princeton Dynamic traffic Assignment Model”

Term Break Oct 25- Nov 2

Week 7

Mon Nov 1

Pricing policies in transportation; various approaches to “Value Pricing”

Ref.: Fehlig, M, Kornhauser, A. “Value Pricing on Rt 1” TRB 2003

Wed Nov 3

Special Seminar “Airline Pricing Strategies” by of VP of Pricing at USAir

Readings:

Week 8

Mon Nov 8

Workshop on the Central Jersey Transit Study; A Look at Conventional Transit Alternatives

Readings:

Assignment: [Final Project Description](#)

Wed Nov 10

Workshop on the Central Jersey Transit Study; A Look at “Radical” Transit Alternatives: Supply Role of Automation in Public Transportation Systems; Recent Developments in Automated People Movers and Personal Rapid Transit Systems. Study of the Newark Airport and Anderson’s Taxi 2000

Readings: [History of PRT](#), [Jerry Schneider’s Source Page](#), [Taxi2000](#)

Part 3 The Role of High Technology in Transportation

Week 9**Mon Nov 15**

Special Seminar: Dr. Venkatesh Prasad , Program Director Informatics, Ford Motor Co.

Wed Nov 17

In-vehicle Navigation: From TravTek to nRouteCommerce; Global Positioning Systems

Readings: [Class notes](#) (Covered on Exam);)**Week 10****Mon Nov 24**Exam covering weeks 1-9 [Instructions](#)**Wed Nov 26**

Dual-use Technology that addresses Homeland Security and Improved Efficiency of Transportation: Moving on from “Just-in-Time”

Week 11**Mon Nov 29**

Supply Role of Automation in Public Transportation Systems; Recent Developments in Automated People Movers and Personal Rapid Transit Systems. Study of the Newark Airport and Raytheon's PRT 2000

Readings: [History of PRT](#), [Jerry Schneider's Source Page](#), [Taxi2000](#)**Mon Dec 1**

Issues of real-time transportation decisions & Dynamic Traffic Assignment, Problem formulation, data sources

Readings: Kornhauser, White, "The Princeton Dynamic Route Guidance Analysis System" Proceedings of the Dynamic Traffic Assignment Conference, Chantilly VA, May, 1994. <http://www.fhwa.dot.gov/trafficinfo/index.htm#TRFF>**Part 4 Current High Profile Princeton Area Transportation Policy & planning Issues:****Week 12****Mon Dec Dec 8**

Focus on Princeton Area Transportation Policy & Planning Challenges: Case study of the Princeton Area: S-92, The Millstone Bypass, Alleviating truck traffic on US 206 and local traffic congestion, Value pricing on the NJ Turnpike, Hudson River Bridges and Rt 1.

Readings:**Wed Dec 8**

Focus on Local Transportation Policy & Planning Challenges: Case study of Value pricing on the NJ Turnpike, Hudson River Bridges and Rt 1.

Readings:

Reading Period 10:00 am - 1:00pm Tuesday Jan 11, Oral presentation of term projects.
Lunch will be served. [Schedule](#)