

SYLLABUS

WWS 527a
Transportation Policy Analysis and Systems Planning,

v1.0

Fall 2005/2006

Professor Alain L Kornhauser	Class Hours: Mon. & Wed. 10:40-12:10 pm; Location TBA
Office: E-407 EQuad	
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Tel: 609-258-4657	
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 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. 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, "applications", continues the design and analysis of the state-wide transit system as well as investigates other current transportation policy issues. applies the policy perspectives, tools, and technologies elements of the course to current transportation issues. In each lecture 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

Other References: .

Proceedings of the ITS America 2005 Annual Meeting, May, 2005

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

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

Week 1

Mon Sep19

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](#) [National Transport Statistics \(Continuously updated\)](#)

Class Notes: Week 1

Wed Sep20

Historical evolution of National Transportation Policy

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

Week 2

Mon Sep 26

Current National Transportation Policy and the FY06 Budget Proposal for Transportation;
[Highway taxes](#); [Central Jersey Rapid Transit Project](#) BRT Project RFP-04-01

Homework 1: [The Value of a Life](#), Due Wed. Sep 28.

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> ; [FY2006 Federal Budget](#) ; [FY2005 Federal Transportation Budget](#); [2005 surface transportation legislation Reauthorization Bill - \(SAFETEA\)](#)

Wed Sep 28

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. Using Tools of Transportation Demand and Investment to plan, design and analyze a new state-wide mass transportation system for New Jersey

Week 3

Mon Oct 3

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 Oct 5

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 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](#) ,

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

Wed Oct 12

Alternatives Analysis: Demand Forecasts for State-wide transit system

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

Week 5

Mon Oct 17

Alternatives Analysis: Land Use Models

Background reference: M&M , Ch. 6

Wed Oct 19

Modeling Trip Generation for State-wide transit system

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

Assignment: Select traffic assignment zones and find trip generation data sources for the Rt1. corridor. Due: Mon: Oct 18

Week 6

Mon Oct 24

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 26

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 30- Nov 5

Week 7

Mon Nov 7

Interim Workshop on Statewide New Jersey Transit Study; A look at initial designs

Readings:

Wed Nov 9

“Value Pricing” and other pricing policies in transportation.

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

Part 3 The Role of High Technology in Transportation

Week 8

Mon Nov 14

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

Readings: [Class notes](#) (Covered on Exam);)

Assignment: [Final Project Description](#)

Wed Nov 16

Issues in Optimal Real-Time Management & Control of Mobile Assets

Readings:

Week 9**Mon Nov 21**Exam covering weeks 1-9 [Instructions](#)**Wed Nov 23**

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>**Week 10****Mon Nov 28**

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

Wed Nov 30

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

Part 4 Current High Profile Transportation Policy & planning Issues**Week 11****Mon Dec 7**

Special Seminar "Airline Pricing Strategies" by of VP of Pricing at united Airlines

Readings:**Mon Dec 7**

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

Background reference:**Week 12****Mon Dec 14**

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 16**

Second Interim Workshop on Statewide New Jersey Transit Study: Alternative designs

Reading Period 10:00 am - 1:00pm Tuesday Jan 10, Final Workshop on Statewide New Jersey Transit Study; Lunch will be served. [Schedule](#)