

Orf 467
Transportation Systems Planning and Analysis v0

Fall 2012/2013

Course Description

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

Week 1

Mon Sep 17

Introduction and Survey of Course

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

Reading: [Basic background on Transportation in the US](#)

[U.S. Freight on the Move: Highlights from the 2007 Commodity Flow Survey Preliminary Data; Commodity Flow Survey 2007](#)

National Transportation Statistics:

http://www.bts.gov/publications/national_transportation_statistics/2011/pdf/entire.pdf

[Recent Traffic Volume Trends](#); [Travel Monitoring Trends in Personal Income and Travel miles](#)

[Highway Statistics Publication Archive](#)

Energy Flow Diagram: [Total Energy 2010](#)

Energy Outlook: [http://www.eia.doe.gov/oiaf/aeo/pdf/0383\(2010\).pdf](http://www.eia.doe.gov/oiaf/aeo/pdf/0383(2010).pdf)

<http://www.eia.doe.gov/oiaf/aeo/index.html>

World Oil Demand & Reserves: <http://www.vaughns-1-pagers.com/economics/crude-oil-facts.htm>;

<http://www.eia.doe.gov/emeu/aer/txt/ptb1104.html>; <http://www.cnbc.com/id/33550165>

Homework 1: [The Last Drop](#) ; Due Mon Sep 24

Class Notes: Week 1

Tue Sep 18

Evolution of Urban transportation Technology: From the Omnibus to PRT

Wed Sep 19

NO CLASS

Week 2

Mon Sep 24

Evolution of Urban transportation Technology: From the Omnibus to PRT

Historical evolution of National Transportation Policy leading to current National Transportation Policy,

Readings: [History Slides](#) [PRT@LHR](#); & [Aptera Electric car](#)

Tue Sep 25 (Yom Kippur) Precept

Discussion of “Last Drop” and Big Picture view of Transportation in the next 20-25 years ([be prepared to discuss](#) this link!) **Readings:** ; [Highway taxes](#); [Stateline.org Article](#) [Brief History of US DOT](#)

Wed Sep 26 (Yom Kippur)

Personal Rapid Transit, “Transport System of the Future???” History of PRT. A Look at “Radical” Transit Alternatives: Recent Developments in Automated People Movers and Personal Rapid Transit Systems. Study of the Newark Airport and Anderson’s Taxi 2000

Readings: [NJ PRT Legislative Study](#); [NJ PRT Legislative Exec Presentation](#), NJ PRT [Academic](#) Look, [Jerry Schneider's Source Page](#), [Skyweb Express \(aka Taxi2000\)](#), **Reference:** J. E. Anderson **Transit System Theory** Lexington Books, 1978 ISBN: 0-669-01902
More Links on PRT: Uppsala [Conference](#); Daventry [Conference](#), Vectus [PRT](#) , [PRT for Sodertalje](#); [PRT@LHR10Conf](#); [Podcar Stockholm 2011](#); [2GetThere/Masdar](#); Animations: [IndiaPRT](#) ; [Bath Class Notes \(PodcarPaper\)](#)

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

Week 3

Mon Oct 1

Modeling Transportation Systems; Development of a Formal Urban Transportation Planning (UTP) Process & Decision Making: The Central Jersey Transit Study ; Alternatives Analysis: Goals, Objectives, Metropolitan Planning Processes

Ref.: Cascetta, Ch. 1 [Class Notes](#)

Background reference: [NCHRP Synthesis 406 Advanced Practices in Travel Forecasting](#)
Ed Weiner, [Urban Transportation Planning In the United States: An Historical Overview: Fifth Edition](#) especially Ch 3 [3-C Urban Travel Forecasting Process](#), Ch 5 [Continuing Transportation Planning](#) ; Ch 13, especially: [Met and Statewide Planning Regs](#) , [Transportation Management Systems](#), [Planning Charts](#)

Homework #2a,b [My City](#) Examples: [MyCityEx1](#), [MyCityEx2](#), [CityOfEden](#), [CofEReport](#) Due: Tue. Oct 11 & Tue Oct 18.

Tue Oct 2 Precept (102 CS bldg)

Discussion of MyCity homework objectives

Wed Oct 3

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

Ref.: Cascetta, Ch. 4.1- 4.4

Background & Data Reference: [MoreMyCity](#) ;[LincolnTravelDemandModel](#) [SCAG Modelling](#) [TCRP B-15 Characteristics of Urban Travel](#) see especially: [Overall Trip Rates](#); Travel Surveys: <http://www.travelsurveymanual.org/>

Week 4

Mon Oct 8

Relating the Travel Demand with Land Use: Trip generation; Activity-based demand models

Ref.: Cascetta, Ch. 4.5 Lincoln NE Travel Demand Study, SCAG Travel Model, New York Met Area Study, (see Notes for links) Travel Modeling

Class Notes [Notes](#) [LincolnTripGen](#)

Tue Oct 9 Precept (102 CS bldg)

Presentation of MyCity Designs and Trip Generations

Wed Oct 10

Relating the Travel Demand with Land Use: Trip Distribution

Ref.:

Class Notes: [Notes](#) [Trip distribution](#)

Ref.: [The Gravity Model](#), [Example of Trip Distribution Mode Lincoln NEI](#) [SCAG](#) TripDistribution

Week 5

Mon Oct 15

Random Utility Theory and the modeling of Mode Choice

Ref.: **Class Notes** Cascetta, Ch. 3 [Class Notes](#), [ModeChoice](#), [SCAG ModeChoice](#) [LincolnModeChoice](#)

Homework #3 [Final Report for My City](#)

Tuesday Oct 16 Precept 8:00pm 102 CS)

Oral Presentations of Production, Attractions and Work Trip Distribuion of MyCity

Wed Oct 17

Traffic Assignment and paths through networks; Network Analysis: Shortest Paths: Label Setting and Label Correcting, Shortest paths in Real Networks and Essentially Shortest Paths

Readings: Cascetta, Ch.

<http://www.princeton.edu/~alaink/Orf467F10/LincolnTrafficAssignment.pdf> 5.1-5.3, Magnanti, Ch2, Ch4 (to be distributed)

Ref.: [Class Notes](#) [SCAG Networks](#) [SCAG TrafficAssignment](#) [LincolnTrafficAssignment](#)

http://www.scag.ca.gov/modeling/pdf/MVS03/MVS03_Chap04.pdf

Week 6

Mon Oct 22 and Wed Oct 24

More on: Paths through networks; Network Analysis: Shortest Paths: Label Setting and Label Correcting, Shortest paths in Real Networks and Essentially Shortest Paths

Label Setting Dijkstra's Algorithm

Readings: [DykstraApplet](#)

Ref.: Magnanti Ch 4, especially 4.5 through 4.9 [Class Notes c](#) ; [Comparisons of Orf467F10 My Cities](#)

Tuesday Oct 24 Precept 8:00pm 102 CS)

Oral Presentations of Final Report of MyCity

Term Break Oct 25- Nov 4

Week 7

Mon Nov 5

More on Networks: Dial and Radix Heap Implementations of Dijkstra's; Label Correcting; real world networks and stochastic issues

Ref.: Magnanti Ch 4, especially 4.5 through 4.9 [Class Notes c](#) [FlowMapExamples](#)

Additional Readings: [Hunt, Kornhauser, "Assigning Traffic Over Essentially-Least-Cost Paths"](#), [He, Kornhauser & Ran, "Essentially best routes in dynamic and stochastic networks"](#), [Zhan & Noon, "Shortest Path Algorithm : An Evaluation using Real Road Networks"](#)

Assignment: Magnanti: 2.1, 2.2, 2.3, 2.4, 2.5, 2.30, 2.31, 2.43, 2.44, 2.45, 4.1, 4.14, 4.15 (These are straight forward. Do them with your partners; turn in one solution set per two person pair. Both work on all problems), ***Due before precept Tuesday, Nov 13.***

Tue Nov 6

Delayed until end of week

Wed Nov 7

"Value Pricing", other pricing policies in transportation.

Readings: [Fehlig, M, Kornhauser, A. "Marketable Permits for Peak Hour Congestion on Rt 1"](#)

RPA [Congestion Charging & Technology, 2007](#)

Zupan, J and A. Perrotta “[An Exploration of Motor Vehicle Congestion Pricing in NY](#)” [Regional plan Assoc.](#), 2003; [London Congestion Zone](#) New Toll Proposal for East River Bridges: [Ravitch](#) and [NYT](#)
Ref.: [Class Notes](#)

Week 8

Mon, Nov 12

Organization of Term Assignment: New Jersey State-wide PRT Network Design: [Assignment](#) v1, [Teams](#)

Reference: [NJPRT04](#), [NJPRT05](#), [NJPRT07](#), [NJPRT08](#), [NJPRT09](#), [NJPRTF10](#);
[Synthesizing Individual Travel Demand In NJ](#)

Also:

https://blackboard.princeton.edu/@/68A6C449E5C2288BDBEEBEFFFEFB4C86/courses/1/ORF478-J06_F2012/attempt/_1858046_1/s/CBrownell_Prospectus.pdf

Tue Nov 13 (8pm 102 CS)

Work on the Synthesizing of Individual Trips for New Jersey

[Mufti Trip Synthesizer](#)

Wed Nov 14

Toward Real-Time Intelligent Transportation Systems (ITS): Advanced Traveler Information Systems (ATIS): In-vehicle Satellite Navigation: From TravTek to Navigation Based Services; Global Positioning Systems (GPS)

Readings: [Demers, A, et al](#) “Competing With the Ghost of ADVANCE: Experimenting with Real-Time ATIS”,

Fontaine, M.D., et al, “Wireless Location Technology-Based Traffic Monitoring” Transportation Research Record No. 1993, 2007, pp. 51-58

511 Traffic <http://www.trafficland.com/>; [Bay Area](#) [South Florida](#) ; [Virginia Tampa Bay](#) ; [Minnesota Georgia Traffic.com](#) ; [Real-time ATIS](#) <http://www.photoenforced.com/us.html>;

Class Notes

Assignment: [Next Steps in “Advanced Traveler Information Systems”](#) Due Monday Dec 3, 2012 (Work on it over Thanksgiving break!!)

Part 3 The Role of High Technology in Transportation

Week 9

Mon Nov 19

1st 8 weeks in review

Exam: Tuesday Evening Nov 20 7:30- 8:50pm CS 102

Exam covering weeks 1-8 Instructions
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Wed Nov 21

NO CLASS (exam the previous evening)

Part 4 Current High Profile Transportation Policy & Planning Issues

Week 10

Mon Nov 26

Review Term Exam. Discuss NJ_aTaxi12 Systems Analysis process. Analyzing the flow of demand at aTaxiStands

Assignment: [Denamd Flow at NJ_aTaxis Stands](#) Due Wednesday Nov 28, 2012

Tue Nov 27 Precept

[NJ_aTaxi12 RideShare Potential](#)

Wed Nov 28

NJ_aTaxi12 Work Session

Assignment: Assignment on [NJ_aTaxi12 RideShare Potential](#)

Week 11

Mon Dec 3

NJ_aTaxi Work Session : Generating an individual daily trip file for everyone in New Jersey.

Class [Notes](#)

Tue Dec 4

NJ_aTaxi12 Work Session

Group Tasks [NewJerseyTripFile](#):

Wed Dec 5

Current National Transportation Policy, Transportation infrastructure and the FY11Budget Proposal for Transportation; [Central Jersey Rapid Transit Project](#) The Private Sector side of Transportation. Carriers, shippers 3rd party logistics, and other service provides

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

<http://etrucker.com>, <http://www.truckinginfo.com/>, <http://truklink.com/>, <http://www.truckload.org/>

Readings: [FY2009 Federal Transportation Budget](#); The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), governs fiscal years 2004 through 2009. [The legislation](#) For 2005 to 2009, highway spending limits total \$189.48 billion, and public transportation funding totals \$45.31 billion. Public transportation spending equals 18.5 percent of the bill's overall funding. [Summary of Highway provisions](#) 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.pcmiller.com/news/industry/default.html>

Week 12

Mon Dec 10 & Wed Dec 12

Individual presentations of Interim Report of NJ_aTaxi design

Readings: [aTaxiFinalProject Analysis of Demand](#)

Reading Period 10:00 am - 1:00pm Friday Jan 11, Final Workshop on Term Project; Lunch will be served. [Schedule](#)