



**UMASS
AMHERST**

FOMgT 341 - Transportation and Logistics Fall 2011

Class Time: Tuesdays and Thursdays: 9:30-10:45AM
Classroom: ISOM Room 125

Instructor: Dr. Anna Nagurney
John F. Smith Memorial Professor of Operations Management

Office: ISOM Room 316
Phone: 545-5635
E-Mail: nagurney@isenberg.umass.edu
Office Hours: Tuesdays: 11:00AM-12:00PM; Thursdays: 12:00-1:00PM,
and by appointment

Teaching Assistants:	Ms. Dong "Michelle" Li	Mr. Amir Masoumi
E-Mail:	dongl@som.umass.edu	amasoumi@som.umass.edu
Office Hours:	Wednesdays: 1:00-3:00PM	Wednesdays: 3:00-5:00PM
Office:	ISOM Room G28	ISOM Room G28

Course Description:

The growing complexity and scale of problems facing managers in the present world environment has led to the increasing importance of the roles of management science and operations management. A major area in which sophisticated management science and operations management techniques have had wide success and application is transportation and logistics. Indeed, the timely distribution of goods and services, and a well-designed transportation network are essential to the success of any enterprise.

In this course we will focus on the development of models and algorithms for problems in transportation and logistics. The first part of the course will lay down the foundation for the methodologies and will consist of lectures on networks and transportation, focusing on congested urban transportation systems, since they tend to be the most complex. The tools provided will also enable the analysis of many freight and airline network problems as well. The second part of the course will emphasize problems and models in logistics with an emphasis on interregional and international trade issues in the context of spatial price equilibrium problems. Connections to supply chain networks and other network systems such as

the Internet and electric power generation and distribution networks as well as economic and financial networks will also be established.

This course integrates current events in transportation and logistics as they occur throughout the semester to illustrate the direct applicability of the tools covered in class. Additional resources and relevant materials as well as examples of some previous FOMGT 341 class project presentations are available on the Virtual Center for Supernetworks website: see <http://supernet.isenberg.umass.edu/>

Outline of Course Topics

- The transportation planning process
- Representation on networks through nodes, links, origin/destination pairs, demands, costs, path flows, and link flows
- Concepts of optimization, competition, and equilibrium on a network: user-optimization versus system-optimization
- The standard transportation network model (user-optimized and system-optimized versions)
- Exact equilibration algorithms (both user-optimized and system-optimized versions) for the solution of simple network problems with disjoint paths and with linear user cost functions
- Equilibration algorithms for the solution of general transportation network problems, either user-optimized or system-optimized, and with linear user cost functions
- Sensitivity analysis and the Braess paradox
- Policy interventions - toll patterns
- Extensions of user-optimized transportation network equilibrium models:
 - the elastic demand model
 - the extended model
 - the multiclass/multimodal model
- An introduction to logistics on a network
- Spatial price equilibrium problems and supply chains
- Extensions of spatial price equilibrium problems

Copies of the course lecture materials along with additional supporting handouts and articles will be distributed in class. Together these serve as the text for the course.

The class lectures are available online at:

<http://supernet.isenberg.umass.edu/courses/FOMgT341-Fall2011.html>

Each set of lecture notes contains additional references and sources.

Two classic books on transportation, *Studies in the Economics of Transportation* by Beckmann, McGuire, and Winsten and *Urban Transportation Networks* by Sheffi, are available online and can be downloaded. Links to these books can be found at:
<http://supernet.isenberg.umass.edu/classics.htm>

Requirements

There will be regular homework assignments given out in class that will be graded and returned. In addition, there will be two exams and a group class project, consisting of a paper and class presentation, to be discussed further in class. The students are required to attend the classes. If a student cannot attend class, please notify Professor Nagurney via email or by phone.

Grading

Homework:	25%
Exam #1:	25%
Group project and presentation:	25%
Exam #2:	25%

Background: It is required that the student has successfully completed FOMGT 353, Introduction to Management Science, or an equivalent course. If your preparation is in question, please see Professor Nagurney.