ISyE 3103
Introduction to Supply Chain Modeling: Logistics
Spring 2010
Syllabus

Instructor: Alan L. Erera
Office: Groseclose 220A
Office hours: Thursday 10:00-11:00, Friday 10:00-11:00
e-mail: Alan.Erera@isye.gatech.edu
web: http://www.isye.gatech.edu/faculty/Alan_Erera
Phone: (404) 385-0358
Fax: (404) 894-2301

Teaching Assistant:
Office: TBA
Office hours: TBA
e-mail: TBA

Class Room: Boggs E6A
Class Times: Tuesday, Thursday 3:05 – 4:25 pm

Description:
An introduction to industrial supply chain logistics systems, including

- the components of logistics systems, such as suppliers, production facilities, storage and distribution facilities, freight transportation systems, and associated information and decision technologies;

- the interactions between logistics systems components; and

- quantitative models and techniques for the analysis of logistics systems and the development of decision support technologies.

Objectives:

- To develop an understanding of supply chain logistics concepts;

- To understand key issues and tradeoffs in logistics system design and operation; and

- To develop the ability to formulate quantitative decision models for logistics system planning and control.
Prerequisites:

- Statistics: ISyE2028
- Optimization: ISyE3133 (or 4231)
- Probability: ISyE2027 (not required, but very helpful)

Reading Material:

- Course Modules on ISyE3103 T-square site (http://t-square.gatech.edu/)
- *Logistics and OR* blog (on t-square, or follow via tumblr: logistics-prof.tumblr.com)

Topics Covered:

- Supply chain flow management
  
  *The coordination of supply chain flows, often involving multiple firms/organizations*
  
  - Supply chain configurations
  - Supply chain inventory management
  - Bullwhip effect
  - Vendor managed inventory

- Data and forecasting
  
  *Introduction to methods for data collection, data management, and forecasting future uncertain data.*
  
  - Extrapolation forecasting
  - Multivariate forecasting via linear regression models

- Freight transportation modes
  
  *Overview of motor freight, sea cargo, railroad, air cargo, and package express transport providers.*

- Transportation mode and route selection
  
  *The transportation market: transportation costs, freight rates, contracts, spot market. How do shippers decide which modes/carriers to use for moving freight? How do shippers and carriers both decide on best paths?*
- Transportation costs and rates
- Models for mode/carrier selection
- Minimum-cost path models

• Local transportation management

  *Introduction to routing and scheduling problems for a local transportation between customers and consolidation terminals.*

  - Traveling salesperson problem
  - Bin packing problem
  - Vehicle routing problems

• Long-haul transportation management

  *Models for managing a freight transport fleet serving origin-destination direct movements.*

  - Time-space networks
  - Minimum cost network flow models
  - Assignment problems for scheduling

• Consolidation transportation planning

  *How does a shipper (or a consolidation carrier) decide how to move freight through a terminal network?*

  - Role of consolidation
  - Minimum-cost network flow models for freight routing
  - Multi-commodity network models for freight routing

Lectures:

Lectures will be the primary source for information in this course, and are essential for learning the material. Lecture notes and supplementary material will be provided throughout the semester via t-square.

We will have a large group of students this semester, but I still highly encourage you to ask questions during lecture. We will cover a good deal of material, and many techniques will build upon those presented in prior lectures, so it is important that you ask questions if you don’t understand.

During one or two lectures, we may cover case studies in class. You should familiarize yourself with the case before coming to class. These lectures will be interactive and I might call on random names to discuss the case. If you will be unavailable to attend these lectures, please contact me beforehand with a reasonable excuse so that you will not be penalized.

Homework and Cases:

There will be about 9 homework assignments during the course of the semester. You should start working on each homework early, that way you will have time to ask (and understand)
questions before the homework is due. Late homework will not be accepted. You are encouraged to discuss homework with your classmates and learn from each other, but each person must submit his/her own assignment, unless the assignment specifically indicates that you should submit one assignment per group. Note that an assignment submitted as your own work cannot by definition be a copy (or near copy) of someone else’s assignment.

**Exams:**
There will be one midterm exam, and one final exam in this course. Exams will cover material discussed in class, as well as reading assignments, homeworks and cases. The exams will be comprehensive and closed book. Any queries on exam grades must be submitted in writing to the instructor, together with the exam in question.

The midterm exam is scheduled for Thursday March 11, 2010, in class.

**Makeups:** In general, there will be no makeup exams given. Travel arrangements are not sufficient reason to warrant a make-up exam or an incomplete grade. If you must miss an exam for any Institute-approved reason, please be considerate and let me know as far in advance as possible.

**Grading:**
Grades will be assigned as follows:

- Homework/Cases: 20%
- Midterm exam: 35%
- Final exam: 45%

The final examination will be comprehensive and based on the cumulative material for the semester. If a student has completed all work (homework and midterm) for the course and received a passing grade on each (50% and above), the final course grade will be determined by the maximum of the grade calculated by the above formula and the final examination grade.

**Academic Honor Code:**
All course participants (myself, teaching assistants, and students) are expected and required to abide by the Georgia Tech Honor Code. Please familiarize yourself with the code, and use it to guide your conduct. Specifically, you must do your own work in all homeworks and exams.