ISyE 3103
Introduction to Supply Chain Modeling: Logistics
Spring 2007
Syllabus

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Class Room: IC213
Class Times: Tuesday, Thursday 1:35 – 2:55 pm

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

- the components of logistics systems, such as supplies, storage, materials handling, production, inventory, orders, and transportation systems;
- the interactions between these components;
- models and techniques for the analysis of logistics systems and the development of decision support systems.

Objectives:

- to develop a familiarity with supply chain logistics concepts;
- to understand the issues in logistics system design and operation;
- to develop the ability to formulate quantitative decision models for logistics system design and management.
Prerequisites:

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

Reading Material:

- Course material on ISyE3103 ITWeb site (http://itweb.isye.gatech.edu/)

Topics Covered:

- Supply chain management
  
  *The coordination of supply chain activities involving multiple participants in the supply chain.*
  
  - Supply chain inventory management
  - Supply chain (Beer) game
  - 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 regression

- 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 paths?*
• Transportation costs and rates
• Models for mode/carrier selection
• Minimum-cost path models

• LTL Trucking and Vehicle Routing

*Introduction to routing and scheduling problems for a local consolidation terminal.*

• Traveling salesperson problem
• Bin packing problem
• Vehicle routing problem

• Truckload trucking

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

• Time-space networks
• Assignment problems for scheduling

• Consolidation transportation

*How does a shipper or a consolidation carrier decide how to structure a terminal network, and then move freight through the terminal network?*

• Role of consolidation
• Network design
• Minimum-cost network flow models
• Facility location models

• An Integrative Example: E-commerce Home Delivery

*Providers of e-commerce home delivery services design and operate complex logistics systems that integrate and extend concepts from the earlier portion of the course.*

• Vehicle routing problems with time windows and/or deadlines
• Dynamic decision-making in logistics
• Integrated decision-making: location, assignment, routing

**Lectures:**

Attendance is not required in lecture. **However, it is recommended since a good deal of the material we will cover does not appear in reference texts.** The lectures will be essential for learning the material.

A portion of your course grade will be from class participation. I strongly believe in interactive learning. Don’t forget that participation includes asking questions. If there’s anything you don’t understand in class please ask right away. I’m always happy to answer
any of your questions. It’s important that you understand each point; otherwise, you’ll be lost when we go on.

During lectures in which we cover cases you should familiarize yourself with the case before coming to class. These lectures will be highly interactive and I might call on random names for discussing 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 10 homeworks 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 in class before the homework is due. Late homework will not be accepted. Some cases will be discussed in class, and students must prepare for class discussions. You are encouraged to discuss homework and cases and learn from each other, but each person must submit his/her own work, unless the assignment specifically indicates that you should work in groups. Any queries on homework grades must be submitted in writing to the instructor, together with the homework report in question.

**Exams:**
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 Tuesday March 6, 2007, in class. Travel arrangements are not sufficient reason to warrant a make-up exam or an incomplete grade.

**Makeups:** In general, there will be no makeup exams given. If you must miss an exam for any Institute-approved reason, please let me know as far in advance as possible.

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

- Homework/Cases: 15%
- Class Participation: 10%
- Midterm exam: 30%
- Final exam: 45%

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

**Academic Honor Code:**
All course participants (myself, teaching assistant, 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.