

ISyE 3103
Introduction to Supply Chain Modeling: Logistics
Summer 2011
Syllabus

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Class Room: IC213
Class Times: Monday, Wednesday, Friday 2:40-3:50pm

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 information and 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
- Modeling and Optimization: ISyE3133
- Probability: ISyE2027 (not required, but helpful)
- Solving Optimization Problems: you learned optimization in ISyE3133, and in this class you will be asked to solve problems using optimization software of your choice. One example optimization software available in the ISyE computer labs is XPRESSMP.

Reading Material:

- Class handouts
- (Optional) Murphy, Paul R. and Wood, Donald F., *Contemporary Logistics*, 8th edition, Pearson Prentice Hall, Upper Saddle River, NJ, 2003.

Topics Covered:

- Supply chain management
 - The coordination of supply chain activities involving multiple participants in the supply chain.*
 - Supply chain game
 - Bullwhip effect
 - Vendor managed inventory
- Data and Forecasting
 - Introduction to methods for data collection, data management, and forecasting future uncertain data.*
 - Data collection technology
 - Database design for supply chain management
 - 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

- Truckload trucking

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

- Time-space networks
- Assignment problems for scheduling

- LTL Trucking and Vehicle Routing

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

- Traveling salesman problem
- Bin packing problem
- Vehicle routing problem

- 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

- Pricing and Revenue Management

Introduction to pricing of transportation services for profit maximization.

Grading:

Grades will be assigned as follows:

- Homework/Cases: 15%
- Quizzes: 20%

- Midterm exam: 30%
- Final exam: 35%

Homework and Cases:

Homework will be assigned approximately once a week. 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.

Quizzes:

Quizzes will cover material discussed in class, as well as reading assignments, homework and cases. Any queries on quiz grades must be submitted in writing to the instructor, together with the quiz in question.

Exams:

Exams will cover material discussed in class, as well as reading assignments, homework and quizzes. 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. Make-up exams will be scheduled only in case of unavoidable occurrences. It is your responsibility to take the exams at the designated times. The midterm exam is scheduled for Wednesday June 29, 2011, in class. Travel arrangements are not sufficient reason to warrant a make-up exam or an incomplete grade.

The final examination will be cumulative. If a student has completed all work (homework, quizzes 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 homework (unless the homework is specifically designated as a group homework), quizzes and exams.