

ISyE 3103

Introduction to Supply Chain Modeling: Logistics

Summer 2012

Syllabus

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- Class Room:** IC205
Class Times: Monday, Wednesday, Friday 2:40-3:50pm

Description:

An introduction to 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:

- Goetschalckx, Marc, *Supply Chain Engineering*, 2011.
- Class handouts
- (Recommended) Ghiani, G., Laporte, G., and Musmanno, R., *Introduction to Logistics Systems Planning and Control*, Wiley, 2004.
- (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.

Office Hours:

- Mondays and Wednesdays after class.
- You are encouraged to come to office hours. Note that you have to start assignments well before the due date to allow yourself the opportunity to ask questions when you need help.
- Come to office hours with specific questions. No private lectures.

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 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. Quiz dates may or may not be announced in advance. No make-up quizzes will be given for any reason. If you have a good reason for missing a quiz, then bring the instructor a letter from the dean of students stating that the reason for missing the quiz is legitimate and has been verified, and the quiz will be dropped from your grading (the other quizzes will be given proportionally more weight in the grading). 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. It is your responsibility to take the exams at the designated times. The midterm exam is scheduled for Wednesday June 20, 2012, in class. Make-up exams will be scheduled only in case of unavoidable emergencies. Personal business, such as interviews and travel arrangements are not sufficient reason to warrant a make-up exam or an incomplete grade. All unexcused absences will result in an exam grade of zero. If you have a good reason (unavoidable emergency) for missing an exam, then bring the instructor a letter from the dean of students stating that the reason for missing the exam is legitimate and has been verified, and a make-up exam will be scheduled. If your documentation is fraudulent in any way, or if you falsify in any way your reasons for missing an exam, you will receive a grade of F in the course. Any queries on exam grades must be submitted in writing to the instructor, together with the exam in question.

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.

Quiz and Exam Rules:

- All exams and quizzes are closed-book and closed-notes.
- Unless you are explicitly told that a calculator is allowed on a quiz or exam, there should not be any calculator within your reach during a quiz or exam. If you are explicitly told that a calculator is allowed on a quiz or exam, then you may use a calculator that can only function as a calculator, and nothing else. No communication device, such as a mobile phone or device that facilitates access to the internet, may be within your reach during a quiz or an exam, not even if you use it as a calculator. In most quizzes and exams no calculator will be allowed.
- You may bring a wristwatch that can function as a watch and nothing else. You may not use any other electronic equipment (unless you are explicitly told that a calculator is allowed). In particular, no electronic equipment that allows you to communicate with others, either inside or outside the exam room, or make web queries, or store notes, may be within your reach during a quiz or an exam, not even if you use it to check the time.
- You will not be permitted to go to the restroom during a quiz or exam. No exceptions, so be sure to go before class. If you have a medical reason why this rule is a problem for you, then you have to arrange in advance with the dean of students to take the exam proctored by their personnel.
- Cheating on quizzes and exams will not be tolerated in this course. You may not:
 - Attempt to look at someone else's exam (even for a second).

- Copy from someone else's exam,
- Let someone else copy from your exam. (Cover your exam!)
- Bring or look at any information during the exam (e.g. on your person).
- Wear caps or headphones/earbuds of any kind.
- Use unacceptable electronic equipment.
- Undertake any other activity that can be construed as giving/receiving or attempting to give/receive help during the exam.

If you cheat, then you will receive an F in the course.

Classroom Rules:

- No mobile phone use in the class. That means no talking, texting, checking email, surfing the internet, or any other mobile phone use in the class.
- No newspaper reading in the class.
- You may bring your laptops to class. However, no checking email or surfing the internet during class unless you are explicitly allowed to do so.

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. Any form of academic dishonesty, such as plagiarism, can result in a serious deduction from your final grade or even a grade of F in the course.