ISyE 4111

Advanced Supply Chain Logistics

Fall 2026

Syllabus

Instructor:	Anton J. Kleywegt Office: Groseclose 409 Office hours: Monday, Wednesday 6:15pm–7:15pm e-mail: <Anton.Kleywegt@isye.gatech.edu> WWW URL: `http://www.isye.gatech.edu/faculty/Anton_Kleywegt` Phone: (404) 894-4323
Teaching Assistant:	TBA Office hours: TBA Office hours location: TBA e-mail: TBA
Class Room:	Groseclose 119
Class Times:	Monday, Wednesday 5:00pm–6:15pm

Catalog Description
This course is a follow-up to ISyE3103 that covers optimization models and case studies for logistics network design and logistics operations.

Description:
The course is a continuation of the course ISyE3103 Introduction to Supply Chain Modeling: Logistics. As the name indicates, the course covers both topics in supply chain management, that consider the supply chain as a system with multiple decision makers, as well as topics in logistics, that consider problems from the point of view of a specific decision maker. The decision makers considered include buyers, sellers, market makers, shippers, and carriers, so that the course will prepare you well for a career in consulting, product development (typically software tools), or in-house logistics officer. The course requires intensive use of tools acquired in courses in statistics, optimization, and probability models. In the course we also study various cases in which these tools were used to solve logistics problems in practice. In these case studies it will be shown how complicated, messy logistics problems were addressed in various industries.

Objectives of the course are

1. to develop a deeper understanding of logistics systems, including the design and operation of logistics systems;

2. to develop skill in the use of the tools acquired in other courses such as statistics, optimization, and probability models to address logistics problems;

3. to become familiar with some of the issues often encountered in practical logistics problems, and to learn how these problems can be attacked with industrial engineering tools.

Prerequisites:

1. ISyE3103 Introduction to Supply Chain Modeling: Logistics
2. ISyE3133 Engineering Optimization, including ability to use an optimization solver. The undergraduate computer lab provides access to optimization solver software such as AMPL, GAMS, Gurobi, ILOG Cplex, and XPressMP. Also, other software packages such as Mathematica, Matlab, SAS, R, and Microsoft Excel often include routines for optimization. First check the limitations of a solver (such as maximum number of decision variables and maximum number of constraints) before using it.
3. ISyE3232 Stochastic Manufacturing and Service Systems

Course materials:

The textbooks below introduce some of the logistics topics that are covered in the course. You do not have to buy a textbook — the pdf files of some of these textbooks can be downloaded for free.

1. Ghiani, G., Laporte, G., and Musmanno, R., *Introduction to Logistics Systems Planning and Control*, Wiley, 2004.
2. Ghiani, G., Laporte, G., and Musmanno, R., *Introduction to Logistics Systems Management*, Wiley, 2013.
3. Goetschalckx, M., *Supply Chain Engineering*, 2011.

Topics:

The following core topics will be covered:

1. Less-than-truckload transportation
   (a) Traveling salesman
   (b) Node routing
   (c) Arc routing
   (d) Inventory routing
   (e) Terminal design and operations
2. Truckload transportation
3. Network flow applications
4. Logistics network design

The following topics are optional, and some of these topics will be chosen based on interest expressed by the students. More specifically, we will run a referendum in class. Campaigning and debating are encouraged. Your freedom of speech is guaranteed by the First Amendment of the U.S. Constitution. Our referendum will be more civil than the national election.

1. Water transportation

2. Rail transportation
3. Air transportation
4. Urban transportation and on-demand mobility
5. Self-driving vehicles
6. Forecasting
7. Military logistics
8. Security in logistics
9. Humanitarian logistics
10. Disaster management logistics
11. International logistics
12. Regulation and other legal issues
13. Closed-loop supply chains
14. Outsourcing
15. Procurement and auctions
16. Revenue management

Grading:
Grades will be assigned as follows: First, the course score is a weighted average of scores for homework, case studies, class participation, and assessments with the following weights:

1. Homework, case studies, and class participation: 20%
2. Quizzes/tests: 80%

Second, given the course score out of 100, course grades are assigned as follows: A: 80%–100%, B: 70%–80%, C: 60%–70%, D: 50%–60%, F: 0%–50%.

Homework:
A homework may be due on the Final Instruction Days. Late homework will be accepted only in case of unavoidable occurrences, such as illness or death in the family. You are encouraged to discuss homework and learn from each other, but each person must submit his/her own work, unless the homework specifically indicates that you should work in groups. **Submitting your own work also means that you may not use any AI tools such as ChatGPT in any way for any assignment.** Any queries on homework grades must be submitted in writing to the instructor, together with the homework in question.

Case Studies:
Preparation as well as participation in class are necessary for the case study discussions. Case study preparation must be submitted through Canvas before the lecture in which the case study will be discussed. Grades will be assigned for case study preparation. Grades will also be assigned for participation in class. The instructor will attempt to give each person in class approximately the same opportunity to participate. At the end of the semester the participation grade for each student will be the average of the student's participation grades, thus a smaller number of such grades does not penalize the student. However, absence from class leads to a grade of 0 for the case study. Only unavoidable emergencies such as sickness of the student confirmed in writing by a medical professional, or death in the family qualify as an excuse to miss a case study discussion. No excuses are given for absence from case study discussions and no opportunities are given for make-up work for job interviews, senior design meetings, athletics, or similar activities.

Quizzes/tests/exams:
Quizzes/tests/exams will cover material discussed in class, as well as reading assignments and case study discussions. Quizzes/tests/exams will be comprehensive and closed book. The plan is to give 8 quizzes during the semester. Quizzes may or may not be announced in advance. Absence from a quiz leads to a grade of 0 for the quiz. Only unavoidable emergencies such as sickness of the student confirmed in writing by a medical professional, or death in the family qualify as an excuse to miss a quiz. We only accept notifications from the Dean's office or Institute Approved Absences. The following are links to the online request forms: `https://gatech-advocate.symplicity.com/care_report/index.php/pid167160`
`https://registrar.gatech.edu/info/institute-approved-absence-form-for-students`
Please inform the instructor of your approved absences timely. If the notification from the Dean's office is for the instructor's discretion, then it is your responsibility to reach an agreement regarding accommodations with the instructor as soon as possible. The accommodation may include a separate assessment, such as a separate quiz, or dropping the quiz that you missed and rescaling the grades for your remaining quizzes. If your documentation is fraudulent in any way, or if you falsify in any way your reasons for missing a quiz, you will receive a grade of F in the course. No excuses are given for absence from quizzes for job interviews, senior design meetings, athletics, or similar activities. No make-up quizzes will be given. Your semester grade will be calculated by dropping one and only one quiz with the lowest grade. Any queries regarding quiz grades must be submitted in writing to the instructor, together with the quiz in question, within 1 week of the solution being posted.

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 be asked to leave your bags with all your materials that are not allowed during exams in the front of the class room during exams.
- 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 violate any of these rules, then you will receive an F in the course.

Classroom Rules:

- Class attendance and participation are required, unless Georgia Tech provides you with an excused absence. Participation means that you ask questions during lectures, and when the instructor asks a question then you volunteer your answer.
- You may bring your laptops, tablets, or other electronic devices to class. However, no checking email or surfing the internet during class unless you are explicitly allowed to do so. If you need to check email or surf the internet during class time, then you may leave the class room and do so outside the class room.
- 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 during lectures.

AI Policy:
Unless specifically instructed to use an AI tool, you may not use any AI tools such as ChatGPT, Google Gemini, Grok, etc. in any way in this course. Use of an AI tool without

written acknowledgement that you have used the tool and citation of the tool will be treated as plagiarism.

Academic Honor Code:
Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. All course participants (myself, teaching assistant, and students) are expected and required to act according to the highest ethical standards and to abide by the Georgia Tech Honor Code. The Georgia Tech Academic Honor Code is available at `https://catalog.gatech.edu/policies/honor-code/` and the student Code of Conduct is available at `https://catalog.gatech.edu/rules/18/`. Please familiarize yourself with the code, and use it to guide your conduct. Specifically, you must do your own work in all 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.

Disability Services:
If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) `https://disabilityservices.gatech.edu/` as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations `https://catalog.gatech.edu/rules/22/` articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Planned Schedule:

Week	Dates	Topics	Work Assigned
1	8/24–8/28	Course overview Review of ground transportation Review of networks Symmetric Traveling Salesman Problem	Read *Travels of a T-Shirt* Chapter 1 Read Ghiani, Laporte, Musmanno Sections 7.1–7.2 Do Practice Problem 1.1
2	8/31–9/4	Lagrangian relaxation of optimization problems Lagrangian relaxation of Symmetric TSP	Read *Travels of a T-Shirt* Chapter 2 Read Ghiani, Laporte, Musmanno Section 7.3.2 Do Practice Problems 1.2–1.6
3	9/7–9/11	Asymmetric Traveling Salesman Problem	Read *Travels of a T-Shirt* Chapter 3 Read Ghiani, Laporte, Musmanno Section 7.3.1 Prepare for TSP Case Study Do Practice Problem 2
4	9/14–9/18	Conversion of problems to Symmetric TSP TSP Case Study	Read *Travels of a T-Shirt* Chapter 4 Do Practice Problems 3–12
5	9/21–9/25	Overview of vehicle routing Bin packing problem Vehicle Routing Problem on undirected network	Read *Travels of a T-Shirt* Chapter 5 Read Ghiani, Laporte, Musmanno Section 7.4 Prepare for Vehicle Routing Case Study Do Practice Problem 13
6	9/28–10/2	Vehicle Routing Problem on directed network Vehicle Routing Case Study	Read *Travels of a T-Shirt* Chapter 6
7	10/5–10/9	Vehicle Routing Problem with time windows Vehicle Routing Problem with pickups and deliveries Vehicle Routing Problem with split pick-ups/deliveries	Read *Travels of a T-Shirt* Chapter 7 Read Ghiani, Laporte, Musmanno Section 7.5 Prepare for Inventory Routing Case Study Do Practice Problems 14–18
8	10/12–10/16	Inventory Routing Problem Inventory Routing Case Study	Read *Travels of a T-Shirt* Chapter 8 Read Ghiani, Laporte, Musmanno Section 7.9 Do Practice Problem 19
9	10/19–10/23	Arc Routing Problems Eulerian Walks	Read *Travels of a T-Shirt* Chapter 9 Read Ghiani, Laporte, Musmanno Section 7.6.1 Do Practice Problem 20
10	10/26 10/30	Chinese Postman Problem on an undirected network Chinese Postman Problem on a directed network Rural Postman Problem	Read *Travels of a T-Shirt* Chapter 10 Read Ghiani, Laporte, Musmanno Section 7.6.2 Prepare for Arc Routing Case Study Do Practice Problems 21–22

11	11/2–11/6	Arc Routing Case Study Truckload operations Relationships between carriers, shippers, and brokers Driver/Vehicle Assignment Problem Driver/Vehicle Scheduling Problem	Read *Travels of a T-Shirt* Chapter 11 Read Ghiani, Laporte, Musmanno Sections 6.1–6.4 Prepare for Truckload Operations Case Study Do Practice Problems 23–26
12	11/9–11/13	Review of min-cost network flow problems Dynamic Driver/Vehicle Scheduling Problem Truckload Operations Case Study	Read *Travels of a T-Shirt* Chapter 12 Read Ghiani, Laporte, Musmanno Sections 6.5, 6.9–6.10 Prepare for Elected topic 1 Case Study Do Practice Problem 27
13	11/16–11/20	Network design Elected topic 1	Read *Travels of a T-Shirt* Chapter 13 Read Ghiani, Laporte, Musmanno Sections 6.6–6.8 Prepare for Elected topic 2 Case Study
14	11/23–11/27	Elected topic 2	Read *Travels of a T-Shirt* Chapter 14 Prepare for Urban Transportation Case Study
15	11/30–12/4	Urban transportation and on-demand mobility Self-driving vehicles	Read *Travels of a T-Shirt* Chapter 15
16	12/7–12/11	Course wrap-up	