# ISyE 6333: Operations Research for Supply Chains I

Fall 2026

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**Prerequisites:** ISyE 6331 and 6332, or equivalent

## Overview

One of the important prescriptive analytics tools used by successful supply chain engineers is mathematical optimization modeling. Optimization models are used to make the best set of decisions, subject to constraints on the feasibility of those decisions. Optimization models have been successfully developed to help determine answers to the following supply chain decision questions, for example:

- Where should I locate facilities?
- Which customers should be assigned to which distribution regions?
- How should I schedule work shifts in facilities or for vehicle operators?
- Which delivery vehicles should serve which customers, and in what order?

The optimization models most frequently used in supply chain analytics are so-called linear, network, and integer linear models. We will focus our studies on these approaches. Much of the emphasis will be on building effective models of these types. We will also examine algorithms for finding solutions to these models, and gain experience using software packages that implement such algorithms.

## Objectives

- To develop understanding of linear, network, and integer linear optimization modeling and solution approaches.
- To become an expert in applying optimization modeling to various supply chain problems.
- To develop skills in using optimization software packages.

Throughout the semester, we will utilize case studies written especially for engineering classes and/or case studies from actual industry practice.

## Delivery Mode

This course will be delivered in person. All homework assignments and projects will be submitted electronically. The quizzes and midterms will be taken in person. Although live attendance is not mandatory, we highly recommend to participate in class lectures while they are being delivered, for a better learning experience. You are expected to participate by asking and answering questions. Recordings will be available after each lecture.

## Grading

Students are responsible for all announcements made in class and for all changes in the schedule that are posted on the class website. Grades will be assigned using the following formula:

1. Homework assignments ($\simeq 4$): 15%
2. Class quizzes: 10%
3. Midterm exams (2): 25% each
4. Project: 25%

Grades will be calculated using the weighted average of all components. A grade of "A" corresponds to a percentage grade of 90% or above on graded assignments, a grade of "B" corresponds to a percentage grade of 80%-89.99%, a grade of "C" corresponds to a percentage grade of 65%-79.99%, a grade of "D" corresponds to a percentage grade of 50%-64.99%, and a grade of "F" corresponds to a percentage grade of 49.99% and below. The instructor reserves the right to lower any of these grade thresholds at their discretion. Students will receive rubrics or expectations for each assignment, and timely feedback will be provided through Canvas.

**No additional assignment will be given for extra credit. Regrading requests must be made within 1 week after the graded assignments are returned.**

## Homework Assignments

- Homework accounts for 15% of your course grade. Late homework will not be accepted under any circumstance.
- Students can discuss the assignments, but **every student must turn in their own written solutions in their own words**. For programming assignments, it is fine to help another student debug code or discuss ideas. However, modifying another student's code for your own use is not acceptable.
- The use of AI tools, including large language models, is permitted. However, we warn students against excessively relying on them, as the purpose of homework assignments is for students to practice and increase the likelihood of performing highly on in-person quizzes and midterm exams.

– Any queries on homework grades must be submitted in writing to the teaching assistant, together with the homework report in question.

## Quizzes

There will be six in-class quizzes (see below for the schedule). They will account for 10% of your course grade, and will last 10 minutes each (unless stated otherwise). The lowest two scores will be dropped. **Any missed quiz will count as one of the dropped ones.**

## Midterm Exams

There will be two midterm exams, and will each account for 25% of your course grade. They will take place during lecture times. Midterms will be **in person** and will last 75 minutes.

## Class Project

There will be a group project, which will account for 25% of your course grade. Each group will contain up to four students. Each group will submit their written solutions and code (similarly to the problem sets) as well as their presentation slides. Only one submission per group is needed. The projects will be unveiled later in the semester.

## Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code (`https://catalog.gatech.edu/policies/honor-code/`) and the student Code of Conduct ( `http://www.catalog.gatech.edu/rules/18/`).

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

## Special Accommodation

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404) 894-2563 or `http://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 the instructor 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.

## Resources

**Official class book:** *Operations Research: Applications and Algorithms* by Wayne Winston, Fourth Edition, 2003.

**Canvas:** This course will be hosted on Canvas. The class material will be posted there.

**Contacting the instructors:** If you have a general question about the content, homework or logistics of the course, you are encouraged to post it on Piazza. That will help clear up issues for all students. Feel free to also respond to the questions from your friends on Piazza. If you want to email the instructor and/or TA, please start your subject with [ISyE 6333]. We also hold regular office hours you are encouraged to attend.
**Additional (optional) resources:**

1. Guenin, Bertrand, Jochen Könemann, and Levent Tuncel. *A gentle introduction to optimization.* Cambridge University Press, 2014.

2. Bertsimas, Dimitris, and John N. Tsitsiklis. *Introduction to linear optimization. Vol. 6.* Belmont, MA: Athena Scientific, 1997.

3. Ronald Rardin. *Optimization in Operations Research, 2nd Edition.* Pearson, 2017.

## Tentative Schedule (Subject to Change)

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| Lecture 1: Introduction |
| Lecture 2: LP Formulations |
| Lecture 3: LP Formulations + Simplex Algorithm |
| Lecture 4: LP Problems – **Quiz 1** |
| Lecture 5: LP Problems |
| Lecture 6: Duality |
| Lecture 7: Duality |
| Lecture 8: LP Sensitivity – **Quiz 2** |
| Lecture 9: Network Optimization |
| Lecture 10: Network Optimization |
| Lecture 11: Practice Problems – **Quiz 3** |
| Lecture 12: Practice Problems |
| Midterm 1 |
| Lecture 13: Network Optimization |
| Lecture 14: Network Optimization |
| Lecture 15: Network Optimization |
| Lecture 16: Network Optimization – **Quiz 4** |
| Lecture 17: MIP Formulations |
| Lecture 18: MIP Formulations |
| Lecture 19: Traveling Salesman Problem |
| Lecture 20: Branch and Bound Algorithm – **Quiz 5** |
| Lecture 21: Branch and Bound Algorithm |
| Lecture 22: Practice Problems – **Quiz 6** |
| Lecture 23: Practice Problems |
| Lecture 24: Practice Problems |
| Midterm 2 |
| Project Presentations |