ISyE 6664 Syllabus

Stochastic Optimization, A, 3 Credits

Fall 2026

Instructor Information

Instructor: Hayriye Ayhan

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General Course Information

Description

An introduction to sequential decision making under uncertainty. Much of the course is devoted to the theoretical, modeling, and computational aspects of Markov decision processes.

Course Learning Outcomes

The goal of this course is to provide students with a comprehensive and in-depth understanding of Markov Decision Processes, a widely used framework for making sequential decisions in stochastic systems. We will cover

- Finite Horizon Markov Decision Problems
- Infinite Horizon Markov Decision Problems under Discounted Optimality Criterion
- Infinite Horizon Markov Decision Problems under Long-run Average Reward Optimality Criterion
- Continuous Time Models
- Applications of Markov Decision Processes

Required Course Materials

There is no required textbook, but I will closely follow “Markov Decision Processes: Discrete Stochastic Dynamic Programming”, by Martin L. Puterman. This is an excellent reference book is you are interested in the topic.

Grading Policy:

Graded Component	*Weight*
Midterm Exam 1	25%
Midterm Exam 2	25%
Final Exam	30%
Homeworks	10%
Project	10

Description of Graded Components

All exams are in class. Exams are closed notes and books. Calculators will be allowed.

Course Policies

Attendance and/or Participation

Attendance is not mandatory but strongly encouraged. The students who attend the class regularly perform much better than their peers.

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 and the student Code of Conduct.

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

Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource

developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) 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 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.

Pre- &/or Co-Requisites

Knowledge of discrete and continuous time Markov chains.

Collaboration, Group Work, and Use of Generative AI

You are allowed to work in groups on all homework and out-of-class assignments, but any work you turn in must be written in your own hand. In-class tests and exams are to be your own work. All in-class tests and exams will be closed book and notes.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Late homework will be penalized accordingly. There are no make up exams. The percentage of your final exam will be increased accordingly.