

ISYE 4600 Methods and Applications of Machine Learning - Fall 2026

Instructor information

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Course information

Machine learning is a field of computer science that gives computers the ability to learn without being explicitly programmed. The course is designed to answer the most fundamental questions about machine learning: What are the most important methods to know about, and why? How can we answer the question 'is this method better than that one' for a specific dataset of interest? What can we say about the errors our method will make on future data? What's the "right" objective function? How to tune parameters?

This course is designed to give senior undergraduate students a thorough grounding in the methods, theory, mathematics and algorithms needed to understand and use machine learning. Students entering the class with a pre-existing working knowledge of probability, statistics and algorithms will be at an advantage, but the class has been designed so that anyone with a strong numerate background can catch up and fully participate. Some experience with coding is expected (in Python).

Prerequisites ISYE 3030 BASIC STATISTICAL METHODS and ISYE 3133 ENGINEERING OPTIMIZATION.

Course Outcomes Upon successful completion of this course, students should be able to:

1. Have thorough understanding of the methods, theory, mathematics and algorithms needed to do research and applications in machine learning.
2. Implement and use machine learning algorithms.
3. Analyze real data.

Required Course Materials

Python will be used for assignments and projects. No formal textbook is required.

Grading Policy

The weights used for grade assignment will be

Assignment type	Weight
Attendance and participation:	10%
In-class quizzes:	20%
Homework:	20%
Midterm exam:	20%
Project	30%

Thresholds for letter grade assignment are as follows.

Letter grade	Percentage range
A:	$89.5\% \leq \text{total grade} \leq 100\%$
B:	$79.5\% \leq \text{total grade} < 89.5\%$
C	$69.5\% \leq \text{total grade} < 79.5\%$
D	$59.5\% \leq \text{total grade} < 69.5\%$
F	$0\% \leq \text{total grade} < 59.5\%$

Participation/Attendance In-person attendance is required, and taken based on participation in in-class activities. In general, participation is evaluated on effort, not correctness. In some circumstances where unlimited submissions are available, participation is evaluated on correctness.

Quizzes Three to five quizzes will be given during the semester in class. Quizzes are graded for correctness, with partial credit awarded for partial answers (e.g. work shown) or to account for minor errors.

Homework Five to eight homework assignments will be given during the semester. Assignments will include both exercises and programming problems. Homework is graded for correctness, with partial credit awarded for partial answers (e.g. work shown) or to account for minor errors.

Midterm exam One midterm exam will be given during the semester. Exams are graded for correctness, with partial credit awarded for partial answers (e.g. work shown) or to account for minor errors.

Project Projects will be done in groups of 2-3 students. Please plan for the project early; you need to form your own team. In the middle of the semester, each team will need to submit a project proposal, worth 5% of the total grade. By the end of the semester, each group needs to submit one project report, worth 25% of the total grade. At the end of the semester, each group will give a short presentation on their project to the class, worth 5% of the total grade. See Course Schedule for due dates.

Course policies

Attendance In-person attendance and participation is required. Three unexcused absences are dropped. Excused absences can be made up by completing participation within two days of the absence.

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 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.

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.

Collaboration, Group Work, and Use of Generative AI You are allowed to talk to other students in class about homework assignments, but any work you turn in must be written yourself. Quizzes and the exam are to be your own work.

Generative AI In general, use of Generative AI and of any previous semester course materials, such as homework, projects, and any other coursework, are prohibited in this course. Using these materials will be considered a direct violation of academic policy and will be dealt with in accordance with the GT Academic Honor Code. **When in doubt regarding what constitutes a violation, do not guess the answer and post on Piazza for clarifications.**

Extensions, late assignments, and re-scheduled/missed exams Once per semester, a student can use a 24-hour extension on a homework assignment. Any homework assignments turned in past 24 hours (or a second time during the semester) will not be accepted. Makeup quizzes and midterms are only offered for institute-approved reasons. Contact the instructor within the first two weeks of the semester if dates of quizzes/exam/presentation conflict with a religious observance.