

ISyE 4031 Regression and Forecasting

Fall 2026, Syllabus

Course Information

- **Instructor:** Sen Na (senna@gatech.edu)
- **Course Prefix and Number:** ISYE 4031 M11 (CRN 94169)
- **Term:** Fall 2026

Course Description

A practical and theoretical introduction to regression analysis, statistical learning methods related to regression, time-series analysis, and forecasting. Topics include a review of statistical inference and linear regression; model diagnostics, residual analysis, outliers, and influence; variable selection and model building; logistic regression, ridge regression, and the LASSO; time-series regression; exponential smoothing; and ARMA/ARIMA models, with optional seasonal extensions. Emphasis is placed on fitting and evaluating models using R or Python, interpreting results, and communicating data-driven conclusions. The course includes a team project based on a real-world problem.

Course Learning Outcomes

By the end of this course, students will be able to:

1. Formulate real-world problems using regression, statistical learning, and forecasting models.
2. Identify and collect appropriate data for model estimation and assess which data are most relevant to the problem.
3. Use statistical software to fit and evaluate models using real-world data.
4. Interpret model results and draw data-driven conclusions to address real-world problems.

Required Course Materials

No single textbook purchase is required. Assigned readings and examples may be drawn from the following references:

- [1] Bowerman, B. L., O'Connell, R. T., and Koehler, A. B. **Forecasting, Time Series, and Regression**, 4th ed.
- [2] Faraway, J. J. **Linear Models with R**, 2nd or 3rd ed. <https://julianfaraway.github.io/faraway/LMR/>.

- [3] James, G., Witten, D., Hastie, T., and Tibshirani, R. **An Introduction to Statistical Learning with Applications in R**, 2nd ed. <https://www.statlearning.com/>. A Python edition is also available.
- [4] Hyndman, R. J., and Athanasopoulos, G. **Forecasting: Principles and Practice**, 2nd or 3rd ed. <https://otexts.com/fpp3/>.

Software: R or Python will be used for assignments and data analysis. Both are freely available.

Grading Policy

Grades will be based on the following components:

Component	Weight
Participation	5%
Homework	25%
Midterm 1	20%
Midterm 2	20%
Group project	30%

Letter grades are assigned according to the following scale:

Grade	Score
A	≥ 90
B	80–89
C	70–79
D	60–69
F	< 60

Homework. Homework will be assigned periodically and submitted electronically through Canvas. Late homework will not be accepted except in connection with approved accommodations or documented circumstances. Students may collaborate, but each student must prepare and submit an individual solution.

Exams. The course includes two in-class midterm examinations. Exams are open notes and open book. There is no final examination during the Institute's final examination period.

Group project. Students will work in teams on an applied regression or forecasting project using real data. Project requirements, milestones, and deliverables will be provided on Canvas.

Attendance Policy

Regular attendance and constructive participation are expected. Students are responsible for material and announcements missed during an absence. Documented accommodations and approved absences will be honored in accordance with Georgia Tech policy.

Academic and Research Honesty/Integrity Statement

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 the [Student Code of Conduct](#) and the [Academic Honor Code](#). Suspected violations will be referred to the Office of Student Integrity.

All submitted work must reflect the student's own understanding and effort and must properly acknowledge outside sources. AI tools may be used for brainstorming, grammar checking, and other supportive tasks, but their use must be disclosed. Students remain responsible for the validity of submitted work, and AI-generated content may not be presented as original work.

Core IMPACTS

Not applicable. ISyE 4031 is not designated as a Core IMPACTS course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the [Office of Disability Services](#) as soon as possible to discuss your needs and obtain an accommodations letter. Please also contact the instructor to arrange implementation of approved accommodations.

Expectations of Advisors and Advisees

At Georgia Tech, we believe that it is important to foster an atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and students. The [Student-Faculty Expectations Agreement](#) articulates the basic expectations that students and faculty may have of one another. Respect for knowledge, hard work, and cordial interactions will help build the environment we seek.