STOR 565: MACHINE LEARNING, SPRING 2025

Course Information

Machine learning has become one of the most exciting research areas in recent years. In this Python-based course, we will explore fundamental algorithms, delve into supervised and unsupervised learning methods, and examine practical applications. Along the way, you'll build hands-on projects, develop a deep understanding of model training and evaluation, and learn how to handle real-world data challenges.

Lecture:	TTH 3:30pm - 4:45pm, Hanes 120
Optional Textbook:	*An Introduction to Statistical Learning*, by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani.
Course Website:	`https://liyao880.github.io/stor565/`

Instructor

Instructor:	Yao Li
Office:	Hanes 334
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Office Hours:	W 2:00 pm - 3:00pm.
Website:	`https://liyao880.github.io/yaoli/`

Teaching Assistant

Name:	Shaleni Kovach
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Office Hours:	M 2:00 pm - 3:00pm, Hanes B5; F 10:00 am - 11:00 am on Zoom

Grader

Name:	
Email:	

Prerequisites

Basic knowledge in numerical linear algebra, probability, and calculus.

Programming language: Python.

Topics

Topics covered by this course include but are not limited to:

- Machine Learning Overview
- Linear Models (Linear Regression; Logistic Regression; SVM)
- Non-linear Models (Tree-based Methods; Kernel SVM; Neural Networks)
- Clustering Methods
- Advanced topics

Grading

Homework	Final Project	Quiz & Participation	Total
40%	40%	20%	100%

Homework

- Around 4 to 5 homeworks will be assigned and will be collected via Canvas.
- Late homework will receive a grade of 0.
- You are allowed to work with other students but identical solutions will receive 0.
- Questions regarding HW grade should be addressed to the grader.

Final Project

This course includes a final project in lieu of a final exam. Projects will be completed in groups of **four** and consist of:

- Project proposal (10%)
- Project presentation (30%)
- Project paper (50%)
- Peer review score (10%)

I will meet with each group to discuss the final project topic. Project topics can be:

- Solve an interesting/new problem with existing method
- Develop a new algorithm/model
- Compare state-of-the-art algorithms on some problems
- . . .

Project proposal: The project proposal is limited to 2-page (excluding reference) and contains:

- Problem to solve
- Review of existing studies in this field
- Your proposed method/Methods you would like to compare
- Evaluation metric
- Reference

Please use the latex template at link for the proposal.

Project presentation: All groups will present their final projects during the last two/three lectures. Every group member is expected to join the presentation. The length of the presentation depends on the number of groups (10–20min) and will be announced later.

Project paper: Each team must submit a written project report. It is recommended to include a discussion of how your research work can be further extended. It is required to use the NeurIPS Latex style files and submit the report in PDF format. The report should be less than 8 pages without references (no minimum requirement).

Peer Score: Ten points of the final project is based on an average score measuring overall contribution as seen by you and the other members of your group. Each group member should score every person in their group on a continuous scale from 0 (Bad) to 10 (Good). The due date is the same as the due date of the final paper. Your name and this information will remain private between me and

you. If you fail to submit this group scoring before the deadline, 2 points penalty will be applied and I will give the other members a score of 10.

Quiz and Participation

There will be approximately 5–6 in-class quizzes throughout the semester. The final participation score will be calculated using the formula: $20 \times \frac{m}{n}$, where n is the total number of quiz questions given across all quizzes, and m is the total score you earned from these quiz questions.

You can also earn participation/quiz credit by answering questions during class. For every question you attempt, regardless of whether your response is correct, it will count as one additional correctly answered quiz question. These participation credits will be added to your quiz score at the end of the semester.

The final Quiz and Participation score will be determined as: $\max\left(20, 20 \times \frac{m+k}{n}\right)$, where k is the total number of questions you answered during class.

Academic Integrity and AI tools

All homework and analysis assignments must be completed individually. Assistance from other students, AI tools (e.g., ChatGPT), or using previously uploaded work from other sources (e.g., CourseHero) is strictly prohibited. This policy also applies to project work; AI tools are not allowed to aid in the completion of any projects. Violations of this policy will result in a grade of 0 for the assignment or project. Additionally, any alleged violations will be reported to the University of North Carolina (UNC) for further review and potential disciplinary action.

Notes

The Instructor reserves the right to make any changes she considers academically advisable.

Attendance

Regular class attendance is a student obligation, and a student is responsible for all the work, including tests and written work, of all class meetings. No right or privilege exists that permits a student to be absent from any class meetings except for excused absences for authorized University activities or religious observances required by the student's faith. If a student misses three consecutive class meetings, or misses more classes than the course instructor deems advisable, the course instructor may report the facts to the student's academic dean. (See details at https://catalog.unc.edu/policies-procedures/attendance-grading-examination/#text)

Honor Code

http://instrument.unc.edu/

Accessibility

https://ars.unc.edu/

Counseling

https://caps.unc.edu/

Title IX

Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Please contact the Director of Title IX Compliance (Adrienne Allison – Adrienne.allison@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvsc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu.