

Machine Learning Syllabus

CSCE 4205.001 and CSCE 5215.001/600: Machine Learning, Fall 2025

Time: Tuesday & Thursday 10:00 am - 11:20 am

Location: NTDP B155

Credits: 3

Dates: Aug. 18 - Dec. 12, 2025

Instructor & TA

Name: Xinrui Cui

Office Location: Discovery Park F264

Student Hours: Thursday 1:00-2:00 pm

Email: xinrui.cui@unt.edu

[I reserve the right to modify course policies, the course calendar, assignment or project point values, and due dates.]

TA Name: Mingchen Li

TA Email: MingchenLi@my.unt.edu

TA Student Hours: Thursday 4:00-5:00 pm at F221

Communication Expectations: Students should regularly check for Canvas notifications and maintain consistent class attendance. If you miss a class, please check Canvas afterward to access lecture slides, assignments, or other course materials. Simple questions can be addressed before or after each class or through Canvas Inbox. For detailed assistance with course content, please consult the Teaching Assistant before scheduling a meeting with the instructor. Canvas Inbox inquiries will receive responses within 24 hours during weekdays (Monday through Friday). For matters beyond the TA's scope, students are encouraged to utilize the instructor's office hours.

Course Description

The theory and process to create systems that learn directly from data to make predictions and decisions. Topics include a wide variety of supervised learning methods, both regression and classification, with an emphasis on those that perform well on large feature sets. Ensemble methods are used to combine independent approaches efficiently. Unsupervised and semi-supervised methods demonstrate the power of learning from data without an explicit training target or goal. Reinforcement learning enables effective reward-seeking behaviors in complex environments. The goal is to create models that can make automated decisions from new data or make inferences on unlabeled data to aid in understanding and future prediction models.

Learning outcomes

By the end of the course, you will:

- Understand the theoretical foundations of learning, including bias–variance tradeoff, generalization, and overfitting.
- Know standard machine learning models: linear and logistic regression, decision trees, ensemble methods, clustering, dimensionality reduction, and neural networks etc.
- Recognize the role of optimization techniques (e.g., gradient descent, stochastic optimization) in training models.
- Identify and justify appropriate evaluation measures (accuracy, precision/recall, ROC, etc.) for different tasks.
- Understand the distinctions between classical machine learning methods and modern deep learning paradigms.

Learning objectives

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

- Implement fundamental machine learning algorithms with modern frameworks.
- Apply supervised, unsupervised, and reinforcement learning techniques to real-world datasets.
- Evaluate model performance using proper validation and statistical metrics.
- Analyze the mathematical and statistical principles that underlie machine learning methods.

- Compare different algorithms and select appropriate models for specific problems.

Course Requirements

Textbook: A textbook does not need to be purchased for this course. However, you are strongly encouraged to refer to the following textbooks, all of which are available in electronic form.

- - Pattern Recognition and Machine Learning, by Christopher Bishop.
 - Machine Learning with PyTorch and Scikit-Learn: Develop machine learning and deep learning models with Python, by Sebastian Raschka and Vahid Mirjalili
 - Elements of Statistical Learning, by Jerome H. Friedman, Robert Tibshirani, and Trevor Hastie

Coding: Experience with Python/Google Colab/Pytorch is required.

Laptops: Laptops are **required for in-class midterm and final exams**. You need to use your laptop to take exams online. Exams are on the Canvas quiz system.

- - Students are expected to download and install Anaconda Python version 3 and be able to run experiments on the Jupyter Notebook/Google Colab.

Course evaluation

In this course, you will be evaluated by attendance, assignments, group project, and exams.

Attendance: Attendance is mandatory. There will be a **roll call in four classes** randomly distributed throughout the semester. Please note that each absence will result in a **one-point deduction** from your overall grade.

Assignments are designed to engage you in your learning, so you can begin to apply these principles in practice. They are generally **due at the end of the day one week after they are assigned** unless otherwise specified. Assignments should be **submitted in PDF format**. Codes and outputs should be **submitted in both code notebook** (e.g. Jupyter notebook, vscode, etc.) **and PDF format**. Coding results should be reproducible.

Group Project (topic will be released after midterm): The project proposal, presentation, and final report will be used for evaluation. You are required to work in groups (**4 per group at maximum**). All people in the group are expected to contribute. This is your opportunity to demonstrate what you have learned in a way that reaches beyond the selection of tools, datasets, and approaches demonstrated in the course.

Exams: Exam days are posted and considered fixed. **The midterm is on Oct. 7th, and the Final is on Dec. 11th.** Exams cannot be missed without prior arrangements or documented proof of extenuating circumstances.

Grading

Grades are determined by a simple points system, with a total of **100 pts**. The expected distribution of points is given below, with the exact scale determined by point values given for each roll call, assignment, project, or exam - this is subject to minor modification based on actual points given. Note, due to the nature of the course, exams and assignments are a significant means of establishing your final grade, so please complete the assignments in a timely way and be prepared prior to each exam.

- Assignments: 40%
 - Four assignments in total, 10 pts each.
- Attendance: 4%
 - four random roll calls in total.
- Presentation and Project: 6%
 - 1-page Proposal: 1 pt
 - Presentation: 2 pts
 - Report: 3 pts
- Exams: 50%
 - Mid-Term Exam: 20%
 - Final Exam: 30%

Student Evaluation

Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students to confidentially provide constructive feedback to their instructor and department to improve the quality of student experiences in the course.

Course Policies

Examination Policy

Exams will be on the computer using the **Canvas quiz system**. You need to bring a laptop on the exam days. **Exams are “closed book” - no use of materials outside the canvas exam system except for one US-letter page of notes.** Exams must be taken in the classroom unless special accommodations have been made through the Office of Disability Accommodation (ODA). Other accommodations must be given by prior arrangement with the instructor, otherwise documentation proving an extenuating circumstance will have to be provided after the missed exam. Time will be limited, and all work will be individual. You are strongly encouraged to attempt to solve the tasks iteratively and incrementally - write code that works first, but works poorly, and improve from there, rather than write perfect code top to bottom. Exams will focus on the most recent material but are expected to be cumulative in scope.

Technical errors during exams

In the event of technical difficulties during an online exam, immediately notify the exam proctor. The instructor will then determine appropriate accommodations to allow test completion without compromising fairness. If server outages or other technical issues prevent students from completing time-sensitive assessments, the instructor will extend submission windows and provide suitable accommodations based on the circumstances. All technical problems must be reported to the instructor without delay.

Late Policy

When assignments and project work are turned in after the due date, this places an undue burden on the instructor and TA, especially when this policy is abused. As a compromise, if the assignment or project work is turned in *prior to grading* there will be no reduction in points, however, grading can occur any time after the due date (including the following morning!). A request for late submissions may be sent at the discretion of the IA or instructor, but is not guaranteed.

Assignments and project work will still be accepted **up to two days late after the deadline**. Each day late (irrespective of how late it was received) will incur **a penalty of 10%.** **No work will be accepted two days after the stated deadline.**

Attendance Policy

You are expected to attend the course regularly. **One-point penalty will be imposed for each unexcused absence.** If a class is missed, you are expected to proactively reach out to classmates, the TA, or the instructor if there are any questions. In the past, there has been a strong correlation between engagement and accomplishment in courses - especially for those who are struggling with the material. Feel free to prioritize your time, but prioritize wisely.

Eagle alert notice

Students will be notified by Eagle Alert if there is a campus closing that will impact a class. [Campus Closures Policy \(https://policy.unt.edu/policy/15-006\)](https://policy.unt.edu/policy/15-006).

UNT Policies

Academic Integrity Policy

Academic Integrity Standards and Consequences. According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

ODA Policy

UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the [ODA website \(https://disability.unt.edu/\)](https://disability.unt.edu/).

Emergency Notification & Procedures

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public

safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Retention of Student Records

Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Blackboard online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their individual record; however, information about student's records will not be divulged to other individuals without proper written consent. Students are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University's policy. See UNT Policy 10.10, Records Management and Retention for additional information.

Acceptable Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT's [Code of Student Conduct](https://deanofstudents.unt.edu/conduct) (<https://deanofstudents.unt.edu/conduct>) to learn more.

Access to Information - Eagle Connect

Students' access point for business and academic services at UNT is located at: my.unt.edu. All official communication from the University will be delivered to a student's Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward e-mail [Eagle Connect](https://it.unt.edu/eagleconnect) (<https://it.unt.edu/eagleconnect>).

Student Evaluation Administration Dates

Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during weeks 13, 14 and 15 of the long semesters to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no-reply@iasystem.org) with the survey link. Students should look for the email in their UNT

email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the [SPOT website](http://spot.unt.edu/) (<http://spot.unt.edu/>) or email spot@unt.edu.

Getting Help

Technical Assistance

UNT Help Desk (<http://www.unt.edu/helpdesk/index.htm>)

Email: helpdesk@unt.edu

Phone: 940-565-2324

In Person: Sage Hall, Room 130

Walk-In Availability: 8am-9pm

Telephone Availability:

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

Laptop Checkout: 8am-7pm

Student Support Services

- Registrar (<https://registrar.unt.edu/registration>)
- [Financial Aid](https://financialaid.unt.edu/) (<https://financialaid.unt.edu/>)
- [Student Legal Services](https://studentaffairs.unt.edu/student-legal-services) (<https://studentaffairs.unt.edu/student-legal-services>)
- [Career Center](https://studentaffairs.unt.edu/career-center) (<https://studentaffairs.unt.edu/career-center>)
- [Multicultural Center](https://edo.unt.edu/multicultural-center) (<https://edo.unt.edu/multicultural-center>)
- [Counseling and Testing Services](https://studentaffairs.unt.edu/counseling-and-testing-services) (<https://studentaffairs.unt.edu/counseling-and-testing-services>)

- [Student Affairs Care Team](https://studentaffairs.unt.edu/care) (https://studentaffairs.unt.edu/care)
- [Student Health and Wellness Center](https://studentaffairs.unt.edu/student-health-and-wellness-center) (https://studentaffairs.unt.edu/student-health-and-wellness-center)
- [Pride Alliance](https://edo.unt.edu/pridealliance) (https://edo.unt.edu/pridealliance)

Academic Support Services

- [Academic Resource Center](https://clear.unt.edu/canvas/student-resources) (https://clear.unt.edu/canvas/student-resources)
- [Academic Success Center](https://success.unt.edu/asc) (https://success.unt.edu/asc)
- [UNT Libraries](https://library.unt.edu/) (https://library.unt.edu/)
- [Writing Lab](http://writingcenter.unt.edu/) (http://writingcenter.unt.edu/)
- [MathLab](https://math.unt.edu/mathlab) (https://math.unt.edu/mathlab)