

CS4033/5033: Machine Learning

Fall 2025

Title	Name	Email	Office Hour	Location
Instructor	Chao Lan	clan@ou.edu	M 11am-12pm, 1:30-3:30pm	DEH 210
TA	Shayan Shafaei	shayan.shafaei@ou.edu	Th 3pm-4:30pm	Zoom:4551860899
TA	Luyuan Yang	luyuan.yang@ou.edu	F 3pm-4:30pm	DEH 210

1. Course Description

This course introduces the fundamentals of machine learning. Topics include linear/kernel regression, classification, dimensionality reduction, clustering, ensemble methods and others. A tentative schedule is below.

Week 1: Introduction and Math Review

Week 2-3: Linear Regression (hw1)

Week 4: Kernel Regression (hw2)

Week 5: Exam 1

Week 6-7: Classification (hw3)

Week 8: PCA and Clustering

Week 9: Ensemble Methods (hw4)

Week 10: Exam 2

Week 11-14: Other Topics (hw5, hw6)

Week 15: Thanksgiving.

Week 16: Presentation

2. Main Reference

[ELS] T. Hastie, R. Tibshirani and J. Friedman. The Elements of Statistical Learning. Springer, 2009.

[PRML] C. Bishop. Pattern Recognition and Machine Learning. Springer, 2006.

[COV] S. Boyd and L. Vandenberghe. Convex Optimization. Cambridge University Press, 2004.

[ALS] L. Wasserman. All of Statistics. Springer, 2004.

3. Assignment

Assignments have written and programming tasks. Written tasks must be done using Overleaf (Latex) and programming tasks must be done using Python.

Students can collaborate to complete assignments but need to clarify collaborators in submission and be ready to independently defend submitted answers upon request. AI tools can be used (not encouraged).

All assignment deadlines are hard deadlines. Late submissions will not be graded.

4. Exams, Paper Review and Bonus Presentation

There are two closed-book exams during the semester. Use of AI tools is not allowed.

There is no final exam. Instead, each student needs to select and review a research paper published between 2020-2025 at the main conference (not workshops) of ICML, NeurIPS, UAI or AISTATS.

A two-page review report needs be submitted by Dec 12, 2025. The report should include a summary of the paper, its main contribution or novelty, its main technical idea and specifics, its main experimental or theoretical results and your critical thinking on the strengthens and weaknesses of the paper. Any structure or format of the report is acceptable, as long as it contains a non-trivial review.

Bonus-Point Presentation

Each student can propose to give a 15-minute in-class presentation of the reviewed paper during Dec 1 - 5.

Students who want to present must email a formal request to the instructor and attach a completed version of the presentation slides (which could be modified later) before Nov 26, 2025. Late request will not be considered. All requests will be reviewed by the instructor and at most 9 students will be selected to present. Below are some policies.

- Any student who submits the request with a completed version of the presentation slides by the deadline will receive 1 point bonus even if he/she is not selected for presentation.
- A selected student can earn up to 5 bonus points depending on the quality of presentation. However, if a student is selected but does not present, he/she gets a -5 bonus points.
- Selection criterion depends on the topic of the paper, the quality of the attached slides and the student's overall performance in the course e.g., an application paper with little math is unlikely to be selected, and a student who misses half of the assignments is unlikely to be selected.

5. Final Grade

Final score is an aggregated score in $[0, 100]$ with the following distribution:

60%: assignments

15%: each exam

10%: paper review

Bonus points are directly added to the final score.

A student gets A if the final score is in $[90, 100)$, B if $[80, 90)$, C if $[70, 80)$, D if $[60, 70)$ and F otherwise.

Note: We do not use Canvas to calculate the aggregated score. The score needs be calculated manually.

6. Learning Outcomes

Students are expected to learn the fundamentals of machine learning in this course. By the end of the course, they should be able to describe the mathematical designs of prediction models, objectives to optimize models, optimization techniques and basic properties of learning. They will also be able to implement basic learning techniques in Python and evaluate these techniques on real-world data sets.

7. University Policies

Mental Health Support Services

Support is available for any student experiencing mental health issues that are impacting their academic success. Students can either been seen at the University Counseling Center (UCC) located on the second floor of Goddard Health Center or receive 24/7/365 crisis support from a licensed mental health provider through [TELUS Health](#). To schedule an appointment or receive more information about mental health resources at OU please call the UCC at 405- 325-2911 or visit [University Counseling Center](#). The UCC is located at 620 Elm Ave., Room 201, Norman, OK 73019.

Title IX Resources and Reporting Requirement

The University of Oklahoma faculty are committed to creating a safe learning environment for all members of our community, free from gender and sex-based discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking, in accordance with Title IX. There are resources available to those impacted, including: speaking with someone confidentially about your options, medical attention, counseling, reporting, academic support, and safety plans. If you have (or someone you know has) experienced any form of sex or gender-based discrimination or violence and wish to speak with someone confidentially, please contact [OU Advocates](#) (available 24/7 at 405-615-0013) or [University Counseling Center](#) (M-F 8 a.m. to 5 p.m. at 405-325-2911).

Because the University of Oklahoma is committed to the safety of you and other students, and because of our Title IX obligations, I, as well as other faculty, Graduate Assistants, and Teaching Assistants, are mandatory reporters. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This includes disclosures that occur in: class discussion, writing assignments, discussion boards, emails and during Student/Office Hours. You may also choose to report directly to the Institutional Equity Office. After a report is filed, the Title IX Coordinator will reach out to provide resources, support, and information and the reported information will remain private. For more information regarding the University's Title IX Grievance procedures, reporting, or support measures, please visit [Institutional Equity Office](#) at 405-325-3546.

Reasonable Accommodation Policy

The University of Oklahoma (OU) is committed to the goal of achieving equal educational opportunity and full educational participation for students with disabilities. If you have already established reasonable accommodations with the Accessibility and Disability Resource Center (ADRC), please [submit your semester accommodation request through the ADRC](#) as soon as possible and contact me privately, so that we have adequate time to arrange your approved academic accommodations.

If you have not yet established services through ADRC, but have a documented disability and require accommodations, please complete ADRC's pre-registration form to begin the 2 registration process. ADRC facilitates the interactive process that establishes reasonable accommodations for students at OU. For more information on ADRC registration procedures, please review their [Register with the ADRC web page](#). You may also contact them at (405)325-3852 or adrc@ou.edu, or visit www.ou.edu/adrc for more information.

Note: disabilities may include, but are not limited to, mental health, chronic health, physical, vision, hearing, learning and attention disabilities, pregnancy-related. ADRC can also support students experiencing temporary medical conditions.

Religious Observance

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty. [See [Faculty Handbook 3.15.2](#)]

Adjustments for Pregnancy/Childbirth Related Issues

Should you need modifications or adjustments to your course requirements because of pregnancy or a pregnancy-related condition, please request modifications via the [Institutional Equity Office](#) website or call the Institutional Equity Office at 405/325-3546 as soon as possible. Also, see the Institutional Equity Office [FAQ on Pregnant and Parenting Students' Rights](#) for answers to commonly asked questions.

Final Exam Preparation Period

Pre-finals week will be defined as the seven calendar days before the first day of finals. Faculty may cover new course material throughout this week. For specific provisions of the policy please refer to OU's [Final Exam Preparation Period policy](#).

Emergency Protocol

During an emergency, there are official university [procedures](#) that will maximize your safety.

Severe Weather

If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather.

- Look for severe weather refuge location maps located inside most OU buildings near the entrances.
- Seek refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building.
- Go to the building's severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows.
- Get in, Get Down, Cover Up
- Wait for official notice to resume normal activities.

Additional [Weather Safety Information](#) is available through the Department of Campus Safety.

The University of Oklahoma Active Threat Guidance

The University of Oklahoma embraces a Run, Hide, Fight strategy for active threats on campus. This strategy is well known, widely accepted, and proven to save lives. To receive emergency campus alerts, be sure to update your contact information and preferences in the account settings section at one.ou.edu.

RUN: Running away from the threat is usually the best option. If it is safe to run, run as far away from the threat as possible. Call 911 when you are in a safe location and let them know from which OU campus you're calling from and location of active threat.

HIDE: If running is not practical, the next best option is to hide. Lock and barricade all doors; turn off all lights; turn down your phone's volume; search for improvised weapons; hide behind solid objects and walls; and hide yourself completely and stay quiet. Remain in place until law enforcement arrives. Be patient and remain hidden.

FIGHT: If you are unable to run or hide, the last best option is to fight. Have one or more improvised weapons with you and be prepared to attack. Attack them when they are least expecting it and hit them where it hurts most: the face (specifically eyes, nose, and ears), the throat, the diaphragm (solar plexus), and the groin.

Please save OUPD's contact information in your phone.

NORMAN campus: For non-emergencies call (405) 325-1717. For emergencies call (405) 325-1911 or 911.

TULSA campus: For non-emergencies call (918) 660-3900. For emergencies call (918) 660-3333 or 911.

Fire Alarm/General Emergency

If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates:

- LEAVE the building. Do not use the elevators.
- KNOW at least two building exits
- ASSIST those that may need help
- PROCEED to the emergency assembly area
- ONCE safely outside, NOTIFY first responders of anyone that may still be inside the building due to mobility issues.
- WAIT for official notice before attempting to re-enter the building.

[OU Fire Safety on Campus](#)