

CS5043:Advanced Machine Learning

Spring 2026

Time: Tu/Th 3pm-4:15pm

Location: DEH 130

Instructor: Chao Lan (clan@ou.edu)

Office Hour: W 1pm-4pm at DEH 210

1. Course Description

This course introduces deep learning techniques and theories. Representative DL architectures will be covered, including but not limited to CNN, RNN, transformer, GAN and autoencoder. Experiment design and model evaluation will also be briefly covered.

2. Reference

There is no required reference book. Some lecture materials will be from “Deep Learning: Foundations & Concept” by Christopher Bishop & Hugh Bishop and “Dive into Deep Learning” at <https://d2l.ai/index.html>.

3. Assignment

Written assignments must be done using Overleaf and programming assignments must be done using Python.

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

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

4. Final Project and Presentation

This course has no exam, but a research project.

The project is to write a research paper that improves either a deep learning technique or theory. It should follow standard paper structure, including introduction, related work, proposed method/theory, experiment, conclusion and reference. The proposed method/theory must be compared with a reasonable baseline. The paper should contain at least 4 pages, not including reference.

Below is the project timeline.

03/23: Submit a project proposal, which includes problem statement, a brief literature review and proposed idea. Proposed contents may be modified later.

04/27-05/08: give a 15-min presentation of the preliminary/final results.

05/08: submit the final paper.

05/15: submit responses to questions.

5. Final Grade

50%: assignments

50%: final project, including

- 10%: clarity of problem statement
- 10%: comprehensiveness of literature review
- 5%: novelty of the proposed idea

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- 5%: mathematical depth of the proposed idea
 - 10%: experiment/theoretical performance, as compared to the baseline
 - 5%: comprehensiveness of experimental evaluation
 - 5%: quality of paper writing

Note: We do not use Canvas to calculate final scores. The score will be calculated manually.

6. Learning Outcomes

Students are expected to learn basic techniques and theories of deep learning in this course.

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 be 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 [Timely Care](#). 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

Generative AI Policy

We learn best when we are actively engaged in the process of completing all aspects of an assignment. Even the brainstorming and initial draft phase is a time of discovery that is an integral part of your learning. To empower you to fully engage in the learning process, the use of Generative AI, including, but not limited to, ChatGPT, CoPilot, ClaudeAI, Gemini, and Grammarly AI, is not encouraged for this course.

As the use of Generative AI to assist in completing any aspect of work for this course includes using Generative AI to derive mathematical solutions, implement algorithms and address exam questions. If using an e-book or search engine that has integrated Generative AI, then you should not rely on the Generative AI output and engage instead with the source material.

Resources are available to help you where you might otherwise want to use Generative AI, including: [Academic Success Center](#), the [Writing Center](#), [Bibliographic, Citation, and Reference Management Software](#), [subject specific research support](#) (see resources by subject), and simple grammar or spell check tools.

If you have any questions about this policy, please talk with me.

My Usage of Generative AI: Just as I'm encouraging you not to use Generative AI, I will not use Generative AI to aid in my teaching, grading, or in my communication with you.