Course Information

Course Number: DS677

Course Title: Deep Learning

Class Time: 10:00 AM - 12:50 PM on Wednesdays

Location: KUPF 204

Faculty Contact Information

Professor: Dr. Grace Guiling Wang

Email: gwang@njit.edu

Office: GITC 5718

Office Hour: 8:30 AM-9:30 AM on Wednesdays and 8:00 AM-9:00 AM on Thursdays

TA: Jingyi Gu

Email: jg95@njit.edu

Office: GITC 4325

Office Hour: 12:00 PM-1:00 PM, 2:00 PM - 3:00 PM on Thursdays

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Office Hour

To avoid overcrowding during the pandemic, students are required to book the time slots to stop by. Before you come, please check the sheet below and mark your name in the selected time slots. Please do not remove others' name. You can also email the TA or professor to set up a separate time to meet.

https://docs.google.com/spreadsheets/d/1_0yoko7Fh66dbdY92Zgu3lsCxSXLXFHfJQCRTs-oX6A/edit#gid=0

Course Description

This course studies the architecture and algorithms of deep learning. Topics to be covered include: deep feedforward networks, deep model training optimizations, convolutional networks, recurrent and recursive nets, and deep reinforcement learning. Upon successful completion of the course, students will have gained a deep understanding of the fundamental concepts and principles of designing and implementing deep learning networks.

Prerequisite

• Decent programming skills.
• Adequate mathematical background.
• CS675 Machine Learning or equivalent courses.

Course Outcomes

• Deep understanding of deep learning networks
• Hands-on experience in designing and coding deep learning-related applications
• Broad knowledge on start-of-art deep learning concepts
• Improved presentation skill

Grading Categories

Categories	Percentage
Presentation	10%
Midterm	20%
Programming assignments	65%
Attendance and class participation	5%

The overall score must be higher than 60 to pass the class.

Presentation

There will be one research project. Students will study a hot AI technology or story and present it in class. Through the presentation and feedback from peers and the instructor, presenters are expected to improve their public speaking capability and learn how to present technical topics clearly. Other students are expected to learn a wide range of hot AI topics.

Programming assignments

There will be multiple programming assignments that each student needs to finish independently and in group.

Exam

The exam is closed book.

Honor Code

The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students. Note in particular that copying programming assignments or exam papers, in full or in part is forbidden.

Attendance and class participation

Discussion and questions are highly encouraged. Cell phones must be turned off or set silent during the class hours. Attendance is required.

Modular Topics

Module	Topic
Module 1	Introduction and ML Basics
Module 2	DL Basics
Module 3	CNN
Module 4	Attention and Self-Attention
Module 5	Transformer and Bert
Module 6	ChatGPT, GAN, AutoEncoder
Module 7	Reinforcement Learning
Module 8	Adversarial Attack
Module 9	Meta Learning
Module 10	Explainable AI, Self unsupervised learning, Domain Adaptation, Parallel ML (optional)

Disclaimer
The module may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in the class of any changes to the modules.

Policies about Emails and Questions

- All the academic questions can be posted through Moodle on the corresponding discussion forums and the professor and the TA answer there. Students are also encouraged to comment. In this way, students can learn from each other's questions. Before posting a question, firstly check whether a similar question has been posted already and answered. **Such questions emailed to the professor will not be answered.** For example, if you have a question about how CNN works, post on the forum; asking by email will not be replied. If you have a question about course administrative details, e.g., the TA's office, check corresponding documents (in this case, the syllabus) first. If no answer, post online.
- Only if you have some special issues, contact the professor by email. For example, if all your group members drop the class and you need help. You will have an interview and need my input.
- If you have comments and suggestions about how to improve the class, please email the professor, instead of posting on Moodle. For example, you believe that one programming

topic is too hard and the professor should change a topic. The professor appreciates the comments and will consider adjusting the course material for the coming semesters, but the requirement clearly stated from the beginning will be strictly followed.

- Questions posted online will be answered by the next one business day. For example, if you post a question on Friday at 10 P.M., the question will be answered by Monday at 11:59 P.M. If you post a question on Monday at 10 P.M., the question will be answered by Tuesday at 11:59 P.M. The only exception is when the professor is out of town for academic conferences/meetings and has no Canvas access, and the TA cannot answer the question. In this case, the Professor will answer the question within one business day after she comes back.

Policy of Missed Exams

A make-up exam may be taken only after providing written documentation from the Dean of Students.

Student Conduct

The NJIT University code on academic integrity, found at http://www.njit.edu/academics/integrity.php, will be followed in all courses.

Students with Disabilities Codes

NJIT adheres to section 504 of the Rehabilitation Act (ADA) of 1990. Appropriate accommodations are provided at no cost to the student. If you have any questions or would like additional information, please contact Dr. Phyllis Bolling, Center for Counseling and Psychological Services (C-CAPS), Campbell Hall, (entry-level), room 205, (973) 596-3420. For further information, visit the Disability Support Services website.

Technical Support

For assistance with the following items, please contact NJIT IST Service Desk at:
1-973-596-2900 or https://ist.njit.edu/servicedesk/

*NJIT passwords may be changed using the Global Password Change mechanism. You will need to know your current UCID and UCID password. Questions can be referred to as 1-973-596-2900.

Periodic changing of passwords and strategies for managing them is best practice for anyone using a computer. All members of the university community are encouraged to review tips for password management and to change passwords regularly.