COSC 4315 Applied Deep Learning
Fall 2025 M/W 2:30 PM – 3:55 PM
Dr. Sagnik Dakshit| Email: sdakshit@uttyler.edu

Office Hours: M/W 10:30PM-02:30PM and M/W 5:30-6:30 pm @ COB 315.06

Prior Emails are preferred to avoid Office Hour Rush and to ensure I do not have another meeting.

General Course Information

Required Texts	None
Course Description	This course offers a comprehensive introduction to deep learning, focusing on the foundational concepts, architectures, and practical applications. Students will explore neural networks, convolutional and recurrent networks, and learn to implement and train models using popular frameworks like TensorFlow and PyTorch. The course emphasizes hands-on experience, preparing students to tackle real-world challenges and interviews in fields such as computer vision, natural language processing, and data science. By the end of the course, it is expected that students will have significant familiarity with the subject, and be able to apply Deep Learning to a variety of tasks.
Learning Outcome	● Understand the fundamental deep learning learning methodologies namely Supervised, Unsupervised, and Reinforcement Learning. ● Understand the fundamental deep learning concepts and architectures, including neural networks, convolutional networks, recurrent networks and Transformers. ● Implement and Develop hands-on experience in designing, training, and evaluating deep learning models using frameworks such as TensorFlow or PyTorch. ● Apply standard hyperparameters optimization and improve model performance, using techniques such as grid search and cross-validation. ● Remember SOTA models and their purpose ● Understand the challenges of AI and ML ● Develop skills to read AI Research Papers to stay updated and current in this rapidly developing field. ● Analyze the appropriateness of Deep Learning models for a variety of tasks
Course Objectives	● Knowledge Acquisition: ○ Gain a solid foundation in the theoretical underpinnings of deep learning and its various architectures. ○ Learn to use popular deep learning frameworks effectively. ● Skill Development: ○ Develop hands-on experience in designing, training, and evaluating deep learning models. ● Practical Application: ○ Apply deep learning techniques to real-world problems through projects. ○ Build practical solutions and demonstrate their effectiveness in diverse domains. ● Critical Thinking: ○ Make informed decisions about model selection, hyperparameter tuning, and evaluation strategies. ● Develop skills and knowledge required for Deep Learning Jobs

Grading Policy

Weightage Scheme	Assignments: 30% Project: 45%, Exams: 20% Active Participation: 5% Each unexcused absence: -3	90.0 - 100% A 80.0 - 89.99% B 70.0 - 79.99% C 60.0 - 69.99% D Below 60% F
Rules	There are three necessary conditions for passing this class: 1) Submission of all Assignments and Projects 2) Delivering a functioning product 3) Active Participation	

Project

- There will be one, semester-long project, to be completed in teams.
- Each team will give presentations demonstrating the project progress.
- All code and files required for the projects must be submitted to Github.
- Peer evaluation will be conducted to track each team member's performance.
- Team members who do not contribute appropriately to an assignment will receive a significantly lower grade for that assignment than the rest of that team, possibly "zero", at the discretion of the instructor.
- On Project workdays, I will rotate with each group to answer your questions and provide guidance on your project.

Assignments

- 3 Assignments
- 2 Exams (Midterm and Finals)
- Semester Long Project (Final Exam)

Course Policies

- Assignments should be turned in no later than the deadline. Turn in what is completed by the deadline for partial credit. No late submissions will be accepted.
- You are expected to do your own work. You may assist each other with general concepts, but direct assistance with a particular assignment or any attempts to gain an unfair academic advantage will not be tolerated. Any indication of cheating and/or plagiarism on an exam/assignment/project will be an automatic 0 (zero) for the exam/assignment/project for all students involved. Solutions copied from the internet, instructor's manual, etc. will also be given zero credit. If you have questions about the line between assistance and cheating, discuss it with the instructor. For examples of Scholastic Dishonesty, please visit Section 8-802 of the Manual of Policy and Procedures.
- I am not against the use of the latest technology such as GPT or Dall-E for developing presentations. However, you are responsible for your submitted work and will bear the penalty for errors and cannot blame the technology.

Attendance and Participation

- Attendance and participation will be considered in a portion of the student's grade.
- Each student is expected to participate by making regular forum posts on the discussion board under Canvas, either asking a question or responding to an existing topic.
- Regular course attendance is mandatory. If attendance is low, the instructor reserves the right to administer pop quizzes for credit, to be determined.

Information for Classrooms and Laboratories

- Students are expected to wear face masks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its Honor Code and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.
- Students who are feeling ill or experiencing symptoms such as sneezing, coughing, digestive issues (e.g. nausea, diarrhea), or a higher than normal temperature should stay at home and are encouraged to use the UT Tyler COVID-19 Information and Procedures website to review protocols, check symptoms, and report possible exposure. Students

needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

University Policies and Additional Information that Must Appear in Each Course Syllabus (5/19)

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do. Students Rights and Responsibilities To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: http://www.uttyler.edu/wellness/rightsresponsibilities.php

Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including non-visible disabilities such as learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079.
I would encourage you to meet me individually (Only if you are okay with it) for me to better understand your requirements and cater to your needs.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second-class meeting of the semester.

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Student Standards of Academic Conduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

1. "Cheating" includes, but is not limited to:
    - copying from another student's test paper

- using, during a test, materials not authorized by the person giving the test.
- failure to comply with instructions given by the person administering the test.
- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test.
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program.
- collaborating with or seeking aid from another student during a test or other assignment without authority.
- discussing the contents of an examination with another student who will take the examination.
- divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors have designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student.
- substituting for another person or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment.
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program.
- falsifying research data, laboratory reports, and/or other academic work offered for credit.
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct.
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

2. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.
3. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.
4. All written work that is submitted will be subject to review by plagiarism software

UT Tyler Resources for Students

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254)

Important Covid-19 Information for Classrooms and Laboratories

- Students are required to wear face masks covering their nose and mouth, and follow social distancing guidelines, always in public settings (including classrooms and laboratories), as specified by Procedures for Fall 2020 Return to Normal Operations. The UT Tyler community of Patriots views adoption of these practices consistent with its Honor Code and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.
- Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher-than-normal temperature will be excused from class and should stay at home and may join the class remotely. Students who have difficulty adhering to the Covid-19 safety policies for health reasons are also encouraged to join the class remotely. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

Recording of Class Sessions

- Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

*This syllabus is subject to change at any time at the discretion of the instructors.

Tentative Schedule

- All Assignments are due on Sunday by 12:00am

*Note that the schedule is subject to change as the course progresses depending on skill requirement for successful Project Completion.
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Week	Dates	Lecture Topics
1		Introduction & Foundations
2		Neural Network Basics
3		Convolution Neural Networks
4		Advanced Computer Vision
5		Sequence Models & RNNs
6		Training Deep Models
7		Midterm Review & Exam
8		Transformers & Modern NLP
9		Generative Models
10		Deep Learning for Audio & Multimodal Data
11		Explainability & Ethics
12		Special Topics
13		Reinforcement Learning
14		Final Project Presentations
15		Finals