SYLLABUS

Course title and number	CSCE 636: Deep Learning
Term	Fall 2021
Meeting times and location	T&Th 11:10 am-12:25 pm, ZACH 244
Credit hours	3

Course Description and Prerequisites

An introduction to the field of deep learning, including basic machine learning, supervised learning, logistic regression, loss functions, neural networks, optimization, error back-propagation, regularization and generalization, unsupervised learning and auto-encoders, convolutional neural networks, recurrent neural networks, visualization and interpretability, graph neural networks, attention models, applications to natural language processing and computer vision.

Prerequisites include basic machine learning (e.g., supervised learning, linear regression, logistic regression, support vector machines), linear algebra (e.g., matrix computations, eigenvalues and eigenvectors, singular value decomposition), multivariate calculus, access to GPU, proficiency in Python programming

Learning Outcomes or Course Objectives

Student learning outcomes include (1) understanding the foundation, major techniques, applications, and challenges of deep learning; (2) the ability to apply basic deep learning algorithms for solving real-world problems. The learning outcomes will be assessed based on a combination of homework assignments, exams, projects and presentations.

Instructor Information

Name	Shuiwang Ji
Telephone number	(979) 458-1547
Email address	sji@tamu.edu (This is the ONLY email used for this course)
Office hours	T&Th 2:30 pm - 3:30 pm
Office location	Zoom Only (link on Canvas)

TA Information

Name	Haoran Liu
Email address:	liuhr99@tamu.edu
Office Hours:	TBD
Office Location	Zoom Only (link on Canvas)

Grader Information

Name	Shaista Ambreen
Email address:	sambreen@tamu.edu

Textbook and/or Resource Material

Main text:
Charu C. Aggarwal: Neural Networks and Deep Learning, Springer, September 2018
https://www.amazon.com/dp/3319944622
http://www.charuaggarwal.net/neural.htm
https://rd.springer.com/book/10.1007/978-3-319-94463-0

Additional materials:
YS Abu-Mostafa, M Magdon-Ismail, HT Lin: Learning from Data, only Chapters 3 and 7
http://amlbook.com/
https://www.amazon.com/Learning-Data-Yaser-S-Abu-Mostafa/dp/1600490069

Aston Zhang, Zack C. Lipton, Mu Li, Alex J. Smola
Dive into Deep Learning
https://www.d2l.ai/

Course Delivery and Management

This course will be managed via Canvas (https://canvas.tamu.edu/). All hand-outs will be distributed via Canvas, including assignments, lecture materials, etc.

Grading Policies

Homework (4): 40%: There will be four homework assignments containing both written and programming components. The total number of points for each assignment may be different.

Exam (2): 35%: There will be two exams covering the foundations of neural networks and deep learning. Exam 1 will be 15% and final exam will be 20%.
Final exam schedule: 3:00 – 5:00 p.m. on Friday, December 10, 2021

Project (1): 25%: There will be one semester-long project. The project is for individual student, not for group. Details of project will be presented during the first class. This will be a structured project in which each student is given the same task, but you can explore different solutions to this task. In the end, each student needs to submit their results (code and prediction results) and a report summarizing the methods and results. Students are required to use LaTex for typesetting the report and the NeurIPS LaTex template (https://nips.cc/) is recommended.

All homework assignments are individual and collaboration among students is strictly prohibited. Project reports should be treated as scientific publications, and all rules governing paper-writing apply.

Grading Disputes

Questions on assignment grading should be discussed with the TA. Questions on exam grading should be discussed with the instructor. Grading dispute period for the final exam will be determined and announced at the time of grade posting based on university deadline for submitting letter grades. Grading disputes for all other graded materials (other than the final exam) must be presented to the respective party within ONE week upon receiving grading results (timed as email notification for electronic ones or returning of graded materials for hard-copies). All grades after the dispute time windows are considered final.

Late Policies

For homework assignment, 25% is deducted for each late day for up to three days (including weekends) after which submissions are not accepted. Late project submissions will not be accepted.

Excused absence will not be counted towards late days. If an exam overlaps with an excused absence, the instructor will provide the student an opportunity to make up an exam by a date agreed upon by the student and instructor. If the instructor has a regularly scheduled make up exam, students are expected to attend unless they have a university approved excuse.

Unexpected excused absences: In cases where prior notification of excused absence is not feasible (e.g., accident or emergency) the student must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class.

Student Rule 7 explains attendance policies and excused absences. https://student-rules.tamu.edu/rule07/

Grading Scale

Final letter grades will be based on absolute percentage as follows*:*

A = [90, 100]
B = [80, 90)
C = [70, 80)
D = [60, 70)
F = <60

[] denotes inclusive; () denotes exclusive;

Course Topics, Calendar of Activities, Major Assignment Dates

Week	**Topic**	**Major assignment dates**
1	Introduction to machine/deep learning	
2	Linear and logistic regression	
3	Softmax regression	
4	Fully connected neural networks	
5	Convolutional neural networks	
6	Convolutional neural networks	
7	Training and optimization	
8	Backpropagation	Exam 1 on 10/12
9	Regularization and loss functions	
10	Neural network and kernel methods	
11	PCA and autoencoders	
12	Recurrent neural networks	
13	Attention mechanism	
14	Graph neural networks	
15	Visualization and interpretability	Project submission due 11/19

Americans with Disabilities Act (ADA)

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Academic Integrity

An Aggie does not lie, cheat or steal, or tolerate those who do.

Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.

Statement on COVID-19

To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students to be vaccinated and to wear masks in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death.