Course title and number	CSCE 636: Deep Learning
Term	Fall 2020
Meeting times and location	T&Th 09:45 am-11:00 am, Online via Zoom (link at eCampus)
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., 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 TAMU email that I use)
Office hours	T&Th 11:00 am - 12:00 pm
Office location	Online via Zoom (link at eCampus)

TA Information

Name	Qing Wan
Email address:	frankwan@email.tamu.edu
Office Hours:	MWF 4pm-5:30pm
Office Location	Online via Zoom (link at eCampus)

Grader Information

Name	Zirui Wang
Email address:	ziruiwang@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 eCampus (https://ecampus.tamu.edu/). All hand-outs will be distributed via eCampus, 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): 30%: There will be two exams covering the foundations of neural networks and deep learning. Exam 1 will be 15% and final exam will be 15%.
Final exam schedule: 8:00 – 10:30 a.m. Monday, December 7, 2020

Project (1): 30%: 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 disputes must be presented to the respective party within ONE week upon receiving grading results. Grading disputes on final exam must be presented to the instructor within THREE days after the posting of final exam grades. Time period of grading disputes for any other graded materials is ONE week from the date of grade posting (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.

Attendance and Late Policies

Attendance is required and mandatory for this course. 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 results and report 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	Training and optimization	
6	Regularization and generalization	
7	Convolutional neural networks	
8	Convolutional neural networks	Exam 1 on 10/6
9	PCA and autoencoders	
10	Recurrent neural networks	
11	Visualization and interpretability	
12	Graph neural networks	
13	Attention mechanism	
14	Advanced topics	
15	Advanced topics	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.

Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, Texas A&M University has adopted policies and practices for the Fall 2020 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- Self-monitoring—Students should follow CDC recommendations for self-monitoring. **Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.**
- Face Coverings—Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Description of face coverings and additional guidance are provided in the Face Covering policy

and [Frequently Asked Questions (FAQ)](#) available on the [Provost website](#).

- Physical Distancing—Physical distancing must be maintained between students, instructors, and others in course and course-related activities.
- Classroom Ingress/Egress—Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Leave classrooms promptly after course activities have concluded. Do not congregate in hallways and maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- To attend a face-to-face class, students must wear a face covering (or a face shield if they have an exemption letter). If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the [Student Conduct office](#) for sanctions. Additionally, the faculty member may choose to teach that day's class remotely for all students.

Personal Illness and Quarantine

Students required to quarantine must participate in courses and course-related activities remotely and **must not attend face-to-face course activities**. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities.

Students experiencing personal injury or Illness that is too severe for the student to attend class qualify for an excused absence (See [Student Rule 7, Section 7.2.2](#).) To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7. While Student Rule 7, Section 7.3.2.1, indicates a medical confirmation note from the student's medical provider is preferred, **for Fall 2020 only, students may use the Explanatory Statement for Absence from Class form in lieu of a medical confirmation. Students must submit the Explanatory Statement for Absence from Class within two business days after the last date of absence.**