EE628WS- Introduction to Deep Learning for Engineering
School of Engineering and Science
Spring 2026

Office Location: Virtual Online
Instructor: Rensheng Wang
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Office Hours: Friday 9AM ~ 5PM or Online Session by Appointment
Course Web Address: https://sit.instructure.com/courses/83670
Online Session URL: https://stevens.zoom.us/j/8971227209

Prerequisite(s):   None
Corequisite(s):   EE603

COURSE DESCRIPTION

This course covers the comprehensive introductions about deep learning techniques used by practitioners in industry and programming exercises with related deep learning software packages. It consists of three sections. The first part reviews the applied math and machine learning basics.   The second part studies the industry practices with deep networks in convolutional networks, recurrent & recursive nets, regularization for deep learning, auto-encoders etc. The last one is to train the students with real industry data for deep learning tasks at the big-data platform. By the end of the course, students will have a thorough knowledge about the state-of-the-art approaches used in deep learning.

STUDENT LEARNING OUTCOME

Formulate a problem that can be solved with deep learning
Design the neural network architecture
Select the proper model to fit various data resources

COURSE MATERIALS

Reference Textbook(s):

Deep Learning, *Ian Goodfellow, Yoshua Bengio, and Aaron Courville*, The MIT Press,

ISBN-10: 0262035618;**ISBN-13:** 978-0262035613
Deep Learning with Python, Francois Chollet

ISBN: 9781617294433

Materials: Lecture notes are posted weekly.

TENTATIVE COURSE SCHEDULE

	Topics(s)	Reading/HW/Exam
Week1	Introduction of machine learning, deep learning and big data platform. Introduction of natural language processing (NLP)	Download and install required software.
Week 2	Neural network basics	Train/test sets, bias/variance
Week 3	Regularizing your neural network	Overfitting, dropout regularization/normalization/Gradient checking
Week 4	Optimization for deep learning	Mini-batch gradient descent, Exponentially weighted averages, RMSprop, Adam Optimization
Week 5	Hyperparameter tuning for deep learning	Hyperparameter tuning/Batch normalization/multi-class classification
Week 6	Convolutional Networks	Convolution, pooling, and structured outputs
Week 7	NLP: language modeling	n-gram language models/sequence tagging with probabilistic models
Week 8	NLP: word and sentence embeddings	Matrix factorization/word2vec
Week 9	Midterm	
Week 10	Autoencoders & Variational autoencoder	Autoencoder for clustering & anomaly detection/data augmentation
Week 11	Sequence: Modeling recurrent & recursive nets	Deep recurrent networks & recursive neural networks
Week 12	Autoencoders & Variational autoencoder	Autoencoder for clustering & anomaly detection
Week 13	Sequence: Modeling recurrent & recursive nets	Transformer/Attention
Week 14	Stable Diffusion Model	Denoising/generative AI
Week 15	GenAI /Large Language Models	ChaGPT and prompt engineering

ACADEMIC INTEGRITY

Graduate Student Code of Academic Integrity

All Stevens graduate students promise to be fully truthful and avoid dishonesty, fraud, misrepresentation, and deceit of any type in relation to their academic work. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance must be acknowledged. Any student who violates this code or who knowingly assists another student in violating this code shall be subject to discipline.

All graduate students are bound to the Graduate Student Code of Academic Integrity by enrollment in graduate coursework at Stevens. It is the responsibility of each graduate student to understand and adhere to the Graduate Student Code of Academic Integrity. More information including types of violations, the process for handling perceived violations, and types of sanctions can be found at www.stevens.edu/provost/graduate-academics.

EXAM ROOM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Room Conditions on the quiz or exam.

1. Students may use the following devices during quizzes and/or exams. Any electronic devices that are not mentioned in the list below are <u>not</u> permitted.

Device	Permitted?	
	Yes	No
Laptops		X
Cell Phones		X
Tablets		X
Smart Watches		X
Google Glass		X
Other (calculator)	X	

2. Students are not allowed to work with or talk to other students during quizzes and/or exams.

LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. Student Counseling and Disability Services works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, and psychiatric disorders in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from SCDS staff.   The SCDS staff will facilitate the provision of accommodations on a case-by-case basis. These academic accommodations are provided at no cost to the student.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the office of Student Counseling, Psychological & Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability

documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/sit/counseling/disability-services. If you have any questions please contact:
> Lauren Poleyeff, Psy.M., LCSW - Diability Services Coordinator and Staff Clinician in Student Counseling and Disability Services at Stevens Institute of Technology at lpoleyef@stevens.edu or by phone (201) 216-8728.

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- be open to the perspectives of others
- appreciate the uniqueness their colleagues
- take advantage of the opportunity to learn from each other
- exchange experiences, values and beliefs
- communicate in a respectful manner
- be aware of individuals who are marginalized and involve them
- keep confidential discussions private