

Course Syllabus

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CS722/822 Machine Learning - Spring 2026

Schedule: Thursday 6:00 pm-8:40 pm

Location: DRGS 1117

Instructor Information

- **Instructor:** Pratip Rana, Ph.D., Assistant Professor, CS Department
- **Office:** ECSB 3206
- **Email:** prana@odu.edu
- **Phone:** (757)683-7745
- **Office Hours:** Wednesday 1:30 pm – 2:30 pm (other times by appointment)

Teaching Assistant: N/A

Course Delivery & Overview

This is a In-person. All classes will take place in DRGS 1117. Required to attend all classes physically in the classroom.

Course Description

This course presents both the foundational and the practical aspects of modeling, analyzing, and mining of computerized data sets, including classification, regression, clustering, semi-supervised learning, structured sparsity learning, etc. The course assignments are designed to contain both theoretical and programming components in order to train students to gain hands-on-experience.

This course also includes advanced topics such as deep learning, transformers, and multi-task learning. Emerging topics will be identified by reviewing latest publications in top venues (ICML, NeurIPS, SIGKDD, etc.). Because of the diversity in machine learning topics, the materials covered in this course may vary among semesters.

Prerequisites

Knowledge of linear algebra, probability theory, calculus, and optimization is required. Students should have basic computer skills and programming experience with Python (preferred), MATLAB, R, Java, or C++.

Assignments & Grading

Component	Weight	Details
Quizzes	40%	Close-book; 2 in-class quizzes (10%) and 1 final quiz (20%).
Term Project	30%	Teams of up to 2 students; implementing algorithms from a recent publication.
Paper Review	10%	Presentation included.
Homework	20%	4 Assignments.

Late Policy

Everyone gets **ONE** time free 3-day extension. Any submission more than **THREE** days past due will **NOT** be graded.

After the free extension, past-due submissions are graded with the formula: $0.5^N \times g$, where N is the number of days delayed and g is the grade if submitted on time.

Textbooks

Note: None of the textbooks are required, but they may complement lecture materials.

- **Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow** by Aurélien Géron
- **An Introduction to Statistical Learning** by Gareth James, Daniela Witten, Trevor Hastie, Rob Tibshirani, Jonathan Taylor
- **Pattern Recognition and Machine Learning** by Christopher M. Bishop
- **Deep Learning** by Ian Goodfellow, Yoshua Bengio, and Aaron Courville

Tentative Schedule

Week	Topics	Notes
Week 1 (Jan 22)	Introduction: Supervised/Unsupervised learning. Review of Linear Algebra and Python.	
Week 2 (Jan 29)	Review of probability, Supervised learning - Regression, Linear model	
Week 3 (Feb 5)	Supervised learning - Classification, Logistic regression, KNN	HW 1 Due
Week 4 (Feb 12)	Model evaluation	
Week 5 (Feb 19)	Regularization	
Week 6 (Feb 26)	In-class quiz (90 minutes)	HW 2 Due
Week 7 (Mar 5)	Tree-based methods	
Week 8 (Mar 12)	Neural networks	
Week 9 (Mar 19)	No Class	Spring Holiday
Week 10 (Mar 26)	In-class quiz (90 minutes)	HW 3 Due
Week 11 (Apr 2)	Paper review: Paper Presentation	
Week 12 (Apr)	Paper review: Paper Presentation	

Week	Topics	Notes
9)		
Week 13 (Apr 16)	Unsupervised learning clustering: K-means, hierarchical, DBSCAN, spectral clustering	
Week 14 (Apr 23)	Advance Topics: Deep learning, transformers, and multi-task learning	
Week 15 (Apr 30)	Project presentations: Student teams present final term projects	
Final Week (May 7th)	Final Quiz (180 minutes)	HW 4 Due, Extended class: 6:00pm - 9:00pm

* schedule may be subject to change

Institutional Policies

Drop Policy:

As per University guidelines. See the University Calendar for drop dates.

Disabilities & Accessibility

Old Dominion University is committed to ensuring equal access to all qualified students with disabilities in accordance with the Americans with Disabilities Act. The Office of Educational Accessibility (OEA) is the campus office that works with students who have disabilities to provide and/or arrange reasonable accommodations.

- If you experience a disability which will impact your ability to access any aspect of my class, please present me with an accommodation letter from OEA so that we can work together to ensure that appropriate accommodations are available to you.
- If you feel that you will experience barriers to your ability to learn and/or testing in my class but do not have an accommodation letter, please consider scheduling an appointment with OEA to determine if academic accommodations are necessary

The Office of Educational Accessibility is located at 1021 Student Success Center and their phone number is (757)683-4655. Additional information is available at the OEA website: <http://www.odu.edu/educationalaccessibility/> (<https://canvas.odu.edu/http://%20http://www.odu.edu/educationalaccessibility/>)

Honor Code & Academic Integrity

Students are expected to follow the ODU Honor Code for all assignments and exams. Any violations will be dealt with strictly according to university policy. Despite that this course requires a lot of interaction, and thus discussions of ideas are encouraged, the work that you turn in must be your own. Similar wise, ChatGPT and such tools may be used to get some ideas, but again, the work submitted must be students' own.

Academic Dishonesty:

Old Dominion University is committed to students' personal and academic success. In order to achieve this vision, students, faculty, and staff work together to create an environment that provides the best opportunity for academic inquiry and learning. All students must be honest and forthright in their academic studies. Your work in this course and classroom behavior must align with the expectations outlined in the Code of Student Conduct, which can be found at www.odu.edu/oscai. The following behaviors along with classroom disruptions violate this policy, corrupt the educational process, and will not be tolerated.

Cheating: Using unauthorized assistance, materials, study aids, or other information in any academic exercise.

Plagiarism: Using someone else's language, ideas, or other original material without acknowledging its source in any academic exercise.

Fabrication: Inventing, altering or falsifying any data, citation or information in any academic exercise.

Facilitation: Helping another student commit, or attempt to commit, any Academic Integrity violation, or failure to report suspected Academic Integrity violations to a faculty member.

Academic dishonesty will be reported to the Office of Student Conduct & Academic Integrity and may result in sanctions up to and including expulsion from the University.