

CSC 461: Machine Learning

Fall 2024

Course logistics

Prof. Marco Alvarez, Computer Science
University of Rhode Island

Should I take this class?

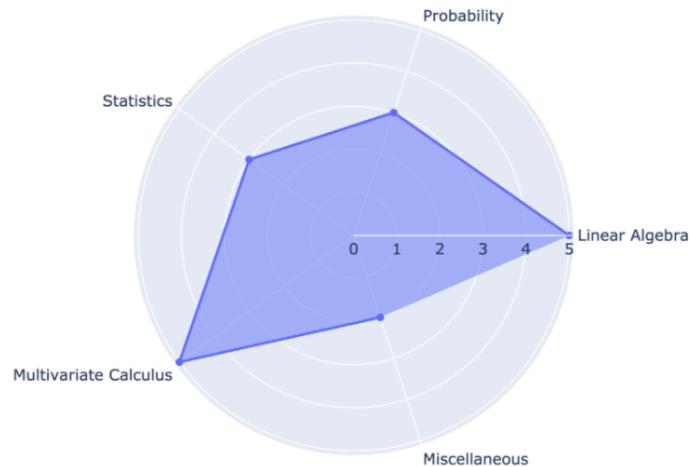
- ▶ Requires more **math** than traditional CS courses
 - **programming** experience is required
- ▶ Less emphasis on “how to use this library”
 - more focus on understanding major algorithms
- ▶ High grades require high effort
 - long and challenging assignments/exams

consider taking this course a later time if necessary

What is this course about?

- ▶ Understand how ML algorithms work
 - the **learning problem** and limitations
 - theoretical foundations of major techniques
- ▶ Be able to develop ML applications
 - problem design, algorithm/platform choice
- ▶ Be able to read current papers

Math for ML



Python tools



Course organization

Tentative topics (order NOT relevant)

Introduction, Supervised Learning	Neural Networks
Linear Regression, Linear Classifiers, Loss Functions	Convolutional Networks
Generalization, Regularization, Overfitting/Underfitting, Model Selection	Recurrent Neural Networks
K-NN, Curse of Dimensionality	Transformer Architectures
Decision Trees, Bagging, Boosting	k-Means, Hierarchical Clustering
Gradient Descent, Backpropagation	Reinforcement Learning

Course website

‣ URL

- <https://homepage.cs.uri.edu/~malvarez/teaching/csc-461>

‣ Sections

- Syllabus
- Schedule
- Resources
- Projects/Workshop

Course information

► Lectures

- MWF 2-2:50p

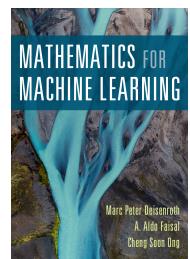
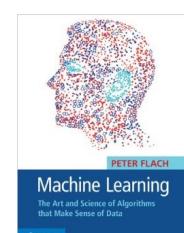
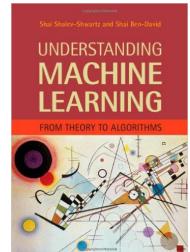
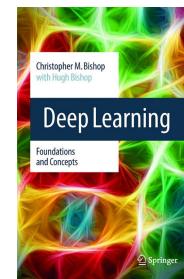
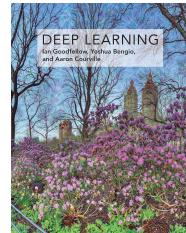
► Team

- Marco Alvarez, instructor
- Jacob Dauphinais, TA
- Calvin Higgins, TA
- Maedeh Hosseinpur, TA

► Office Hours

- TBA

Recommend textbooks



Support tools



Academic discussion, polls, quizzes



Assignment submission and grading



Virtual office hours and remote collaboration

Grading

Homework assignments	15%
----------------------	-----

Midterm exam	30%
--------------	-----

Final exam	30%
------------	-----

Final project	25%
---------------	-----

Homework assignments

- ▶ Problem sets and programming tasks
 - Python is the preferred language
- ▶ Individual work, however discussions and collaboration are allowed
 - you **must write your own** code and solutions
- ▶ Late submissions **NOT accepted**
 - ample time given to complete (6-9 days)
 - start early and use office hours for guidance and feedback

Final project

- ▶ Team work (2-3 members)
 - focusing on applying machine learning to real-world problems
- ▶ Deliverables
 - progress report (mid October)
 - final report (end of semester)
 - live presentation (ML Workshop — end of semester)

outstanding projects will receive extra credit

Exams

- ▶ In-person and open-book (printed materials only)
- ▶ No electronic devices allowed
- ▶ Mix of multiple-choice, short answer, and problem-solving questions
- ▶ Designed to test understanding, not just memorization

Academic integrity

- ▶ Assignments and project
 - collaboration is encouraged for discussing ideas
 - however, each student/team must submit their own unique solutions
- ▶ Sharing/copying solutions from peers is prohibited
- ▶ Using uncredited AI-generated content prohibited

AI and LLMs

► AI tools

- e.g., ChatGPT, Gemini, Claude, GitHub Copilot
- can be used to enhance learning through brainstorming, concept exploration, and strategy development
- students must critically evaluate and fully understand any AI-generated content used in their work
- all AI-assisted work **must be cited in submissions**

► AI tools are designed to support students' learning

- NOT to replace independent problem-solving and critical thinking

► Seek instructor guidance if uncertain about appropriate AI tool usage

How to succeed?

► Class attendance

- students are expected to **attend all lectures**, which are held **synchronously** and will not be recorded
- regular attendance is linked to higher grades and better comprehension of course material

► Active participation

- students should engage critically by asking questions, participating in discussions, and thinking deeply about the material
 - during online meetings, cameras should be turned on
- **laptops and cellphones are NOT permitted**, unless being used for note-taking
- students are advised to utilize **Ed** and attend office hours for additional support

Aim for excellence in your work, rather than simply chasing a good grade