

CSC 461

Machine Learning (Fall 2024)
Lecture 01: Course Logistics

Prof. Marco Alvarez, University of Rhode Island

What is this course about?

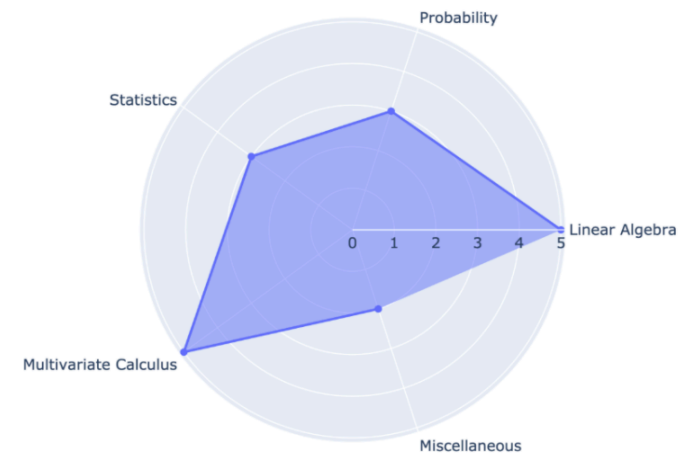
- Understand how ML algorithms work
 - the **learning problem** and limitations
 - theoretical foundations of major techniques
- Be able to develop ML applications
 - problem design, algorithm/platform choice
- Be able to read current papers

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

Math for ML



<https://www.analyticsvidhya.com/blog/2019/10/mathematics-behind-machine-learning/>

Python tools



Tentative topics (order NOT relevant)

Introduction, Supervised Learning

Neural Networks

Linear Regression, Linear Classifiers, Loss Functions

Convolutional Networks

Generalization, Bias/Variance, Overfitting/Underfitting, Model Selection, Regularization

Recurrent Neural Networks

K-NN, Curse of Dimensionality

Transformer Architectures

Decision Trees, Bagging, Boosting

k-Means, Hierarchical Clustering

Gradient Descent, Backpropagation

Reinforcement Learning

Course Organization

Course website

► URL

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

- Syllabus
- Schedule
- Resources
- Projects/Workshop

Course information

▸ Lectures

- MWF 2-2:50p

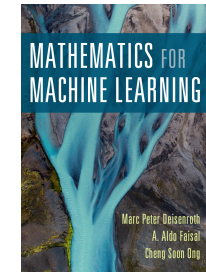
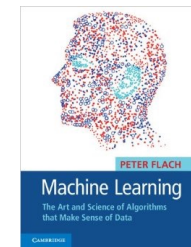
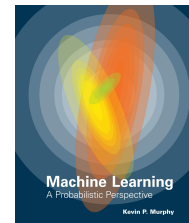
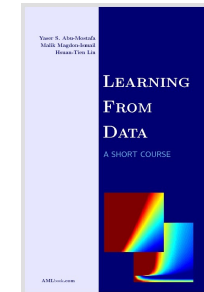
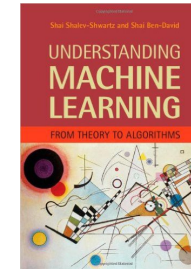
▸ Team

- Marco Alvarez, Instructor
- Jacob Dauphinais
- Calvin Higgins

▸ Office Hours

- TBA

Recommended textbooks



Support tools



Ed Discussion: Academic discussion, polls, quizzes.



Gradescope: Assignment submission and grading.



Zoom: Virtual office hours and remote collaboration.

Grading

- Homework assignments (15%)
- Midterm exam (30%)
- Final exam (30%)
- Final project (25%)

Coursework

▸ Homework assignments

- problem sets and programming tasks (primarily Python)
- 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

▸ 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

Coursework

▸ 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

Academic integrity

▸ Assignments and project

- collaboration is encouraged for discussing ideas, but 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 the Ed and attend office hours for additional support

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