

CMPS 460 – Machine Learning

Syllabus and Course Admin



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Outline

- Course introduction
- Grading
- Policies

About the Instructor

- **Dr. Abdelkarim Erradi**
 - **Office:** H07 - C309, College of Engineering
 - **Phone:** 4403 4254

Office hours:

- **Tuesday 1pm to 2pm at H07-C309**
- You can talk to me **after** class if you have quick issues/questions
- Best way to contact me is via **MS Teams chat**

Course Learning Outcomes

1. Understand the basic theoretical concepts and fundamental principles of machine learning
2. Compare and contrast various approaches to machine learning.
3. Gain **hands-on experience** with solving a real-world problem with appropriate machine learning techniques.
4. **Design, implement, and analyze** machine learning solutions

Prerequisites

- **Proficiency in Python.** All class assignments will be in Python. See that your level of knowledge is sufficient by going over the following tutorials
 - <https://docs.python.org/3/tutorial/>
 - <https://docs.scipy.org/doc/numpy/user/quickstart.html>
- **College Level Calculus, Linear Algebra.** You should be comfortable taking derivatives and understanding matrix/vector operations and notation
 - See <https://people.engr.tamu.edu/guni/csce689/files/linalg.pdf>
- **Basic Probability and Statistics.** You should be familiar with basics of probabilities, Gaussian distributions, mean, standard deviation, etc.
 - See <https://people.engr.tamu.edu/guni/csce689/files/prob.pdf>

Schedule

Topics	Weeks	Chapters
Introduction to Machine Learning	1	
Working with Data	2	
Clustering	2	
Classification	2	
Regression and Logistic Regression	3	
Neural Networks	4	
Project Presentations & Exams	1	

Your Grade is Based on

Theory:

Assignments: 15% - 3 assignments

Quizzes: 15% - 4 take 3

(no makeup for missed quizzes)

Project & Presentation: 15%

Midterm Exam: 20% - Week 8

Final Exam: 35%

Teaching Style

- **Conceptual Foundations:** Explains the "why" behind algorithms to **build intuition** and enable students to **select the correct model** for specific real-world problems
- **Mathematical Foundations:** Breaks down the linear algebra, calculus, and probability underlying models, supporting **effective debugging** and **result interpretation**
- **Implementation from Scratch:** Builds algorithms using only Python and NumPy before using libraries, eliminating “black-box” thinking through **hands-on understanding**
- **Real-World Application using Scikit-Learn & PyTorch:** Bridges theory and industry practice, preparing students for production-level ML

Quizzes & Assignments

- **Quizzes:**
 - Short (~10 minutes) quizzes on BB
 - Quizzes will mostly include multiple-choice questions covering main concepts that were discussed in class
 - These quizzes will give you a good idea of your level of understanding
- **Assignments:**
 - You will implement common ML algorithms in Python
 - You will be graded separately on each algorithm

Exams and Project

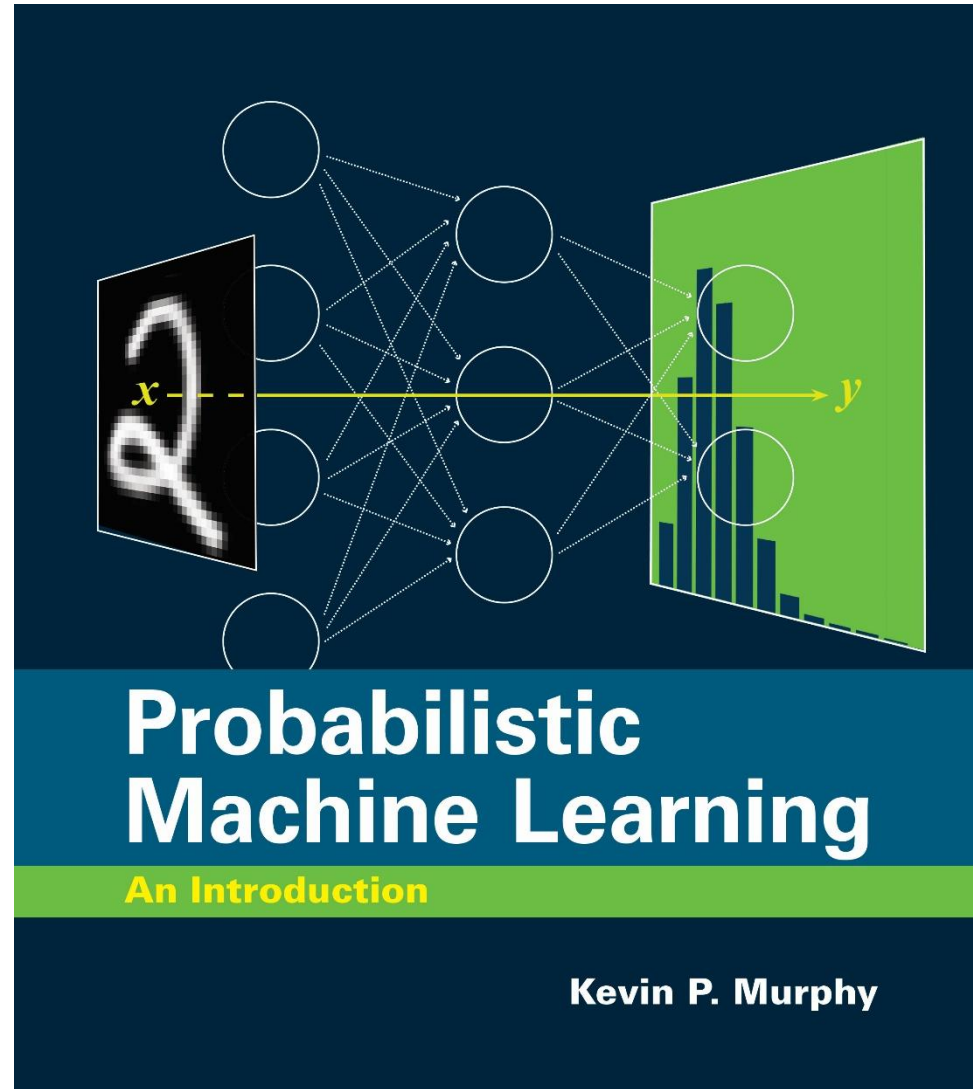
- Exams assess understanding and basic application of concepts
- Project apply ML to real problem (you select the desired problem, design, implement, test and present).

Recommended Textbook

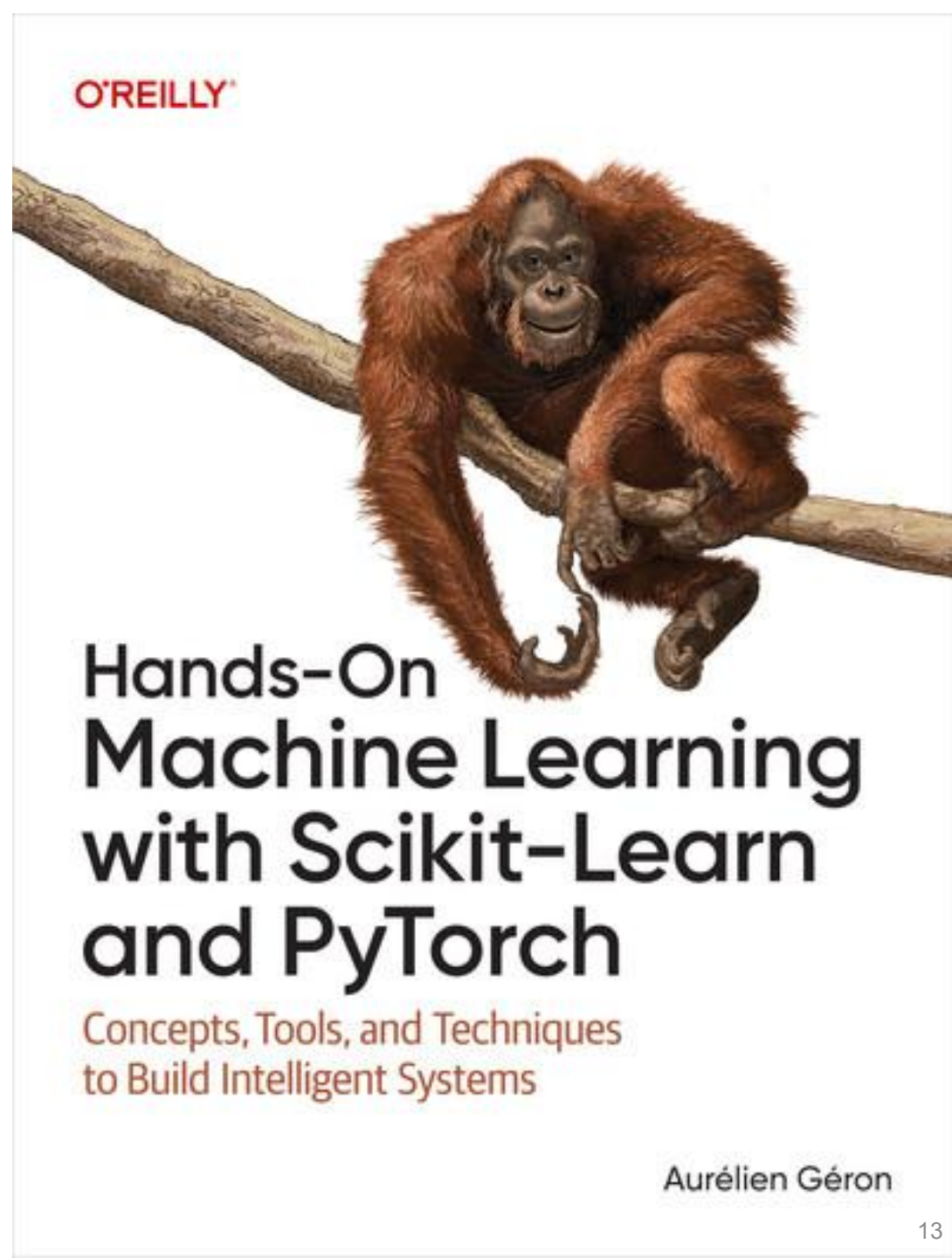
Kevin P. Murphy,
**Probabilistic Machine
Learning: An
Introduction**, MIT Press,
2022. ISBN: 978-
0262046824

Available [online](#)


**Plenty of online
resources will be
provided**



- Available [online](#)
- Login using your QU email and password



How to succeed in this course....

- ❑ Do your weekly assigned readings
- ❑ **Read the slides before you come to the class**
- ❑ **Exercise a lot – study as many examples as possible**
 -  – Understand and enhance the examples I provide as well as the ones in the textbook and the ones in the provided resources
- ❑ **Attend and participate in class**
 - ❑ Many of the exam questions are from the class explanation
- ❑ Do all the assignments and project yourself. Actively contribute to your project.
- ❑ Seek help when needed and ask questions (and do it EARLY): During Lectures & Come to office hours



"Gentlemen, I suggest we learn to swim."

We learn swimming by swimming and we learn
ML by practicing it!

Software we will use

- Python and ML libraries including NumPy, Pandas, Scikit-Learn, PyTorch
- VS Code
- Jupyter Notebook
- GitHub Desktop
- Other tools will be communicated to you as we progress



**GitHub will be used to deliver Slides,
Examples, Assignments, and Project**

<https://github.com/cmeps460s26/cmeps460-content>

Check it regularly!

Communication

- Post your technical questions to <https://github.com/cmeps460s26/cmeps460-content>

Do NOT send me by email

- To contact me do not send emails but use **Microsoft Teams** chat
- For **guidance** on technical issues come to office hours NOT by email

Important Notes

- **Attendance...** QU attendance policies will be enforced
 - Do not miss classes/labs
- **Start your assignments and project early!!!**
- This is a senior-level course and students are expected to learn independently as much as needed in order to complete the course requirements
 - Do not expect me to find/fix your code bugs
 - Do not expect me to find and fix your technical issues
 - => I can only give you high level suggestions and guidance

No 'Free Riding' allowed

- 'free riders' (who do not contribute much) => not acceptable and not fair for hardworking students
 - You must actively contribute to your project and do your ultimate best to deliver the best possible results
 - Otherwise you will be asked to do the project alone
 - **Report free-riders early**



Plagiarism / Cheating

- “Getting an unfair academic advantage”
 - Using other people's work as your own
 - Not doing your assignments yourself
- All the code you submit must be your own
 - Only exception: Code I have provided or explicitly authorized
 - **NO** code you have found on the web. **NO** sharing with others.
- **Do your homework and project yourself**
 - Do NOT copy from each other or from the Internet - **I will know it!**
 - You can be picked-up randomly to explain your implementation
 - Cheating will be treated very seriously
- Penalties START with a zero on the assignment, failing the course! and other disciplinary actions as per QU policy

To do before next class

- Install the required software: VS Code & GitHub desktop (see announcement on Teams)
- Decide your team members and enter them in the spreadsheet on Teams
- Create your GitHub account (firstname-quUsername)
- Prepare any questions you might have



I wish you a fruitful and enjoyable journey!