CSCI 416 Introduction to Machine Learning

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**Office hours**: W/F: 10:00-11:30, McGlothlin-Street Hall 004, and on Zoom by appointment

**Lecture time/location**: M/W: 15:30-16:50, Integrated Science Center Room 1221

**Course website**: <https://lindagaw.github.io/courses/CSCI416/CSCI416.html>

**Piazza signup**: <https://piazza.com/wm/fall2023/csci416516>

**Overview**:

* Machine learning (ML) is a set of techniques that allow computers to learn from data and experience, rather than requiring humans to specify the desired behavior by hand. ML has become increasingly central both in AI as an academic field, and in industry. This course provides a broad introduction to some of the most commonly used ML algorithms. It also serves to introduce key algorithmic principles which will serve as a foundation for more advanced courses, such as Deep Learning.

**Course Schedule**:

* Please check the course website for the materials that we will be covering each week.

**Grading**:

* Homework #1: 15 pts
* Homework #2: 15 pts
* Homework #3: 15 pts
* Midterm: 15 pts
* Final Exam: 20 pts
* Final Project: 20 pts

Final letter grades will be given based on the following scale. A >= 93% > A- >= 90% > B+ >= 85% > B >= 80% > B- >= 75% > C+ >= 70% > C >= 65% > C- >= 60% > D+ >= 55% > D >= 53% > D- >= 50% > F

Grades may be curved at the instructor’s discretion.

**Graduate/Undergraduate Expectations:**

The graduate students (enrolled in CSCI 516) are expected to complete additional coursework, compared to undergraduate students (enrolled in CSCI 416). **Specifically, each homework features additional in-depth questions for graduate students that explore the homework subject in greater depth and that require additional independent reading of current research papers on the topic beyond the material covered in class. Students are expected to show an advanced understanding of the subject and the ability to master new material on the subject.** This is an extra learning outcome for the graduate students. These additional questions constitute 25% - 30% of the marks for homeworks. Undergraduate students are encouraged to attempt these questions for extra credit.

**Learning Outcomes:**

* [416] Understanding foundational principles and algorithms in machine learning.
* [416] Gaining proficiency in model selection, training, and evaluation.
* [416] Applying machine learning techniques to real-world datasets and problems.
* [416] Critically analyzing the ethical implications of machine learning applications.

**Exams**:

* Exams will be closed-book and held during class hours but you are allowed an one-sided cheat sheet. Focus will be placed on material introduced during lecture. More details will be provided during the term.
* Missed exams will get a score of 0 except in the case of a valid medical reason or prior approval by the instructors.

**Homeworks**:

* There will be 3 homeworks in this course. The assignments will be released on the course webpage. Homeworks will be collected on Blackboard. They are due at 23:59 (11:59 pm) at the due dates announced on the course website.
* **Format**: We encourage typesetting using LATEX, but scans of handwritten solutions are also acceptable as long as they are legible
* **Late submissions**: Homeworks will be accepted up to 4 days late, but 10% will be deducted for each day late, rounded up to the nearest day. No credit will be given for assignments submitted after 4 days. Extensions will be granted only in special situations with valid proof (e.g. Doctor’s note).
* **Collaboration policy**: Each student is responsible for their own work. Discussions on homeworks are allowed, but students should write their own submissions solely by themselves. Write down the name and email of every student you’ve discussed with on each homework.
* **Homework grading**: In each homework, there will be additional 1-2 question(s) required for graduate students but optional to undergraduate students. If an undergraduate student answers correctly to such questions, they will receive extra credits, in addition to the (at maximum) 15 pts they could obtain on a homework.

**Final Project:**

This course can be used to satisfy the COLL 400 requirement: your final project expected to synthesize and apply critical analysis, solve problems in an applied and/or academic setting, create original material or original scholarship, and communicate effectively with diverse audiences. In order to grantee this, you are required to submit a final project proposal before attempting the project itself, so that your choice of topic fits the requirement of COLL 400.

20% of your total mark is allocated to a final project, which will require you to apply several algorithms to a challenge problem and to write a short report analyzing the results. You are allowed to collaborate with at most 2 classmates on the final project. In other words, the maximal number of people a group can have is 3.

**Honor Code:**

Presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in our campus policies. Please read the [Honor Code at William and Mary.](https://www.wm.edu/offices/deanofstudents/services/communityvalues/honorcodeandcouncils/honorcode/index.php)

If you violate this rule, you will receive an F as the final grade and be referred to the Honor’s Council.

When you refer to some source codes on GitHub, please cite it with a URL in your report. Please do not copy the answers from Internet directly without any references. You should rephrase your answers based on your own understanding.

## Accommodations:

William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels they may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2512 or at [sas@wm.edu](mailto:sas@wm.edu) to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see [www.wm.edu/sas](https://www.wm.edu/sas).

As per the university's [guidance](https://www.wm.edu/about/administration/provost/resources/holidays/religiousguidelines/index.php), if you have a religious observance that conflicts with a deadline, please notify me as soon as possible so that I can attempt to make an appropriate adjustment.