

COURSE WEBSITE: www.cs.rpi.edu/~magdon/courses/mlos2.php

PREREQUISITES: 4xxx ML course, e.g. CSCI 4100 (MLFD). Registration by instructor permission only.

TEXT: None. Material will be provided as needed, subject to copyright.

COURSE DESCRIPTION: Structured, intensive research for students interested in Machine Learning, AI and Data. Students will focus on a single research project through the semester to answer a novel research question within an open source, open science framework. Projects will use data from a variety of application domains including medical (e.g. disease modeling), environment, finance, text, image, etc. The primary outcomes for students will be open source tools and research publications in peer-reviewed venues. Students must have prior extensive knowledge in Machine Learning and be proficient in calculus, linear algebra, probability, algorithms and programming.

COURSE OBJECTIVES: Perform fundamental research of publishable quality.

LEARNING OUTCOMES: The successful student will be able to

1. Critically read research literature related to Machine Learning.
2. Formulate and critically analyze research questions.
3. Leverage ML techniques to answer research questions.
4. Produce publication-quality research papers, open source software and visualization.
5. Perform collaborative research in a group setting.
6. Effectively orally communicate research findings.

ASSESSMENT MEASURES:

Learning outcomes 1-4: Publication quality research paper.

Learning outcome 5: Peer evaluation of collaborative contribution to project.

Learning outcome 6: Weekly presentations of project and publication progress.

COURSE GRADE: 100% based on the presentations and research paper:

- B+ Sufficient level of collaborative contributions to project during presentations and peer-evaluation.
- A- In addition to B+ requirement, paper produced by group meeting minimal standards.
- A In addition to B+ requirement, publication quality paper produced.
- F Student does not effectively contribute to the collaborative group effort.

ATTENDANCE: Mandtory for in person class and weekly progress check-in during office hours.

ACADEMIC INTEGRITY: Student-teacher relationships are built on trust. Acts that violate this trust undermine the educational process. The Rensselaer Handbook of Student Rights and Responsibilities defines various forms of Academic Dishonesty and you should make yourself familiar with these. Plagiarizing another person's work is forbidden. Use of writing tools (such as ChatGPT) is forbidden. Use of grammar tools (such as spellcheck) is permitted. Any violations will result in an F for the course and will be reported to institute disciplinary committees. **If in doubt, before submitting work, please ask for clarification.**