Syllabus - Statistical Machine Learning

Course Information

Course Title: MSSC 6250: Statistical Machine Learning
Meeting Time: TuTh 12:30pm - 1:45pm
Location: Cudahy Hall 208 (Microsoft Teams)
Website: http://tinyurl.com/SML-MU

Instructor Details

- **Name:** Mehdi Maadooliat, Ph.D.
- **Office:** CU 351
- **Office Hours:** TTh (CU 351) 1:45pm - 3:15pm or by e-mail

Course Description

Multivariate data and exploratory analysis, random vector and multivariate normal distribution, multivariate linear regression, principal component and other dimensional reduction techniques, linear discriminant analysis, recursive partition and tree-based methods including classification tree and regression tree, cluster analysis, neural network, support vector machine.

Flyer

Statistical Machine Learning (SML) - https://www.mssc.mu.edu/~mehdi/SML-Sp26-Flyer.pdf

Prerequisites

- A course in Statistical Methods, and
- A course in Linear Algebra.

Textbooks

- *An Introduction to Statistical Learning*, with Applications in Python by G. James, D. Witten, T. Hastie, R. Tibshirani, and J. Taylor, 2023. ISBN: 978-3031387463.
- *An Introduction to Statistical Learning*, with Applications in R, Second Edition by G. James, D. Witten, T. Hastie, and R. Tibshirani, 2021. ISBN: 978-1071614174.

Grading Breakdown

- **Homework:** 25%
- **Project:** 25%
- **Midterm Exam:** 25%
- **Final Exam or Project Report (Instructor will decide):** 25%

Grading Scale

Grade	Range
A	93.5 - 100%
A-	90- 93.49%
B+	86.5 - 89.99%
B	83.5 - 86.49%
B-	80 - 83.49%
C+	76.5 - 79.99%
C	73.5 - 76.49%
C-	70 - 73.49%
D+	66.5 - 69.99%
D	60 - 66.49%
F	$< 59.99\%$

Exams

- There will be a midterm (in class) on Mar. ~~5th~~ 19th, plus
- A tentative final (in-class or take-home): May. 5th from 10:30 - 12:30 pm.

Homework

Homework is required so that you get a better understanding of the material covered, plus it will help you to keep up. You will get a better understanding of the material if you discuss it with someone. However, you must submit **YOUR OWN** work to D2L website. Assignments are **mostly** due at 11:50pm (check for due dates in D2L).

NO LATE HOMEWORK WILL BE ACCEPTED NOR WILL YOU BE ALLOWED TO MAKE UP MISSED HOMEWORK! Plan accordingly! It is better to submit something, even if it is incomplete. You need to type your homework (preferably using LaTeX, or Quarto) and submit it as a PDF file. Scanned homework will be graded out of 80. Low quality scanned homework will be considered as NO submission.

Make-up Policy

There will not be any make-up exam or homework unless there is an emergency.

Attendance

Attendance is required and subject to the College of Arts and Sciences policy.

Academic Honesty

Students are expected to follow the University's policy on academic honesty as outlined in the Bulletin.

TL;DR: Don't cheat!

Please abide by the following as you work on assignments in this course:

- **Collaboration:** Only work that is clearly assigned as team work should be completed collaboratively.
  - The homework assignments must also be completed individually and you are welcomed to discuss the assignment with classmates at a high level (e.g., discuss what's the best way for approaching a problem, what functions are useful for accomplishing a particular task, etc.). However you may not directly share answers to questions (including any code) with anyone other than myself.
  - For the projects, collaboration within teams is not only allowed, but expected. Communication between teams at a high level is also allowed however you may not share code or components of the project across teams.

  - On individual assignments you may not directly share code with another student in this class, and on team assignments you may not directly share code with another team in this class.

- **Online resources:** I am well aware that a huge volume of code is available on the web to solve any number of problems. Unless I explicitly tell you not to use something, the course's policy is that you may make use of any online resources (e.g., StackOverflow) but you must explicitly cite where you obtained any code you directly use (or use as inspiration). Any recycled code that is discovered and is not explicitly cited will be treated as plagiarism.

- **Use of generative artificial intelligence (AI)**: You should treat generative AI, such as ChatGPT, the same as other online resources. There are two guiding principles that govern how you can use AI in this course:[1] (1) *Cognitive dimension:* Working with AI should not reduce your ability to think clearly. We will practice using AI to facilitate—rather than hinder—learning. (2) *Ethical dimension***:** Students using AI should be transparent about their use and make sure it aligns with academic integrity.

  - **AI tools for code:** You may make use of the technology for coding examples on assignments; if you do so, you must explicitly cite where you obtained the code. Any recycled code that is discovered and is not explicitly cited will be treated as plagiarism. You may use these guidelines for citing AI-generated content.

  - **AI tools for narrative:** Unless instructed otherwise, you may not use generative AI to write narrative on assignments. In general, you may use generative AI as a resource as you complete assignments but not to answer the exercises for you.

  You are ultimately responsible for the work you turn in; it should reflect *your* understanding of the course content.

If you are unsure if the use of a particular resource complies with the academic honesty policy, please ask the instructor.

Important dates

- **Monday, January 12**: Classes begin
- **Monday, January 19**: Martin Luther King Jr. Day
- **Tuesday, January 20**: Drop/add ends
- **Sunday - Saturday, March 8 - 14**: Spring Break
- **Thursday - Sunday, April 2 - 5**: Easter Break
- **Friday, April 10**: Last day to withdraw with W
- **Saturday, May 2**: Classes end
- **Tuesday, May 5, 10:30 am - 12:30 pm**: Presentations

For more important dates, see the full MU Academic Calendar.

Important Note

The syllabus may be modified throughout the course. Any substantial modifications will result in a reissued syllabus.