Course Syllabus for SIADS 696: Milestone II Fall 2023

Version 2023.8.22

Please review this syllabus and the accompanying documents on the comprehensive exam and project components carefully: they contain important information on specific course timelines and policies that you are responsible for understanding. After reading, if there's something in any of the documents you think is at all ambiguous, missing, or unclear, you should contact the instructors and they will be happy to clarify.

Course Overview and Prerequisites

This course has three top-level goals:

(a) You'll undertake a project that you can add to your portfolio that demonstrates the skills you've learned so far, including supervised and unsupervised learning, and effective communication of data analytics results (written and visualization).

(b) It's an opportunity for you to review and test your knowledge in a broad, comprehensive fashion across the main prerequisite courses,

(c) It will provide a space for you to strengthen your knowledge of previous learning through deeper engagement with specific practice problems (for the comprehensive exam portion) and to explore different data analytics methods for a given problem (for the project components).

As with Milestone I, Milestone II will comprise a comprehensive exam and a significant project. This course is a bridge between Milestone I, where the focus is on the exam, and the Capstone, where the focus is on the project. Therefore, Milestone II focuses on the project to a much greater extent than in Milestone I.

Student groups will participate in check-in meetings with the teaching team and submit 2 informal video stand-ups throughout the course.

Prerequisites

The required prerequisites for SIADS 696 are:

- Math methods
- Data mining I & II
- Supervised learning
- Unsupervised learning
- Machine learning pipelines
- Deep learning
- Causal inference

- All courses required by Milestone I (Being a data scientist, data manipulation, efficient & scalable data processing, data science ethics, database I, infovis I, visual exploration of data).

Instructor and Course Assistants

Instructors:
- **(Lead Instructor) Qiaozhu Mei Ph.D., Professor of Information and Computer Science, University of Michigan. (qmei@umich.edu)**
- **Coco Krumme, Ph.D., Affiliate Lecturer, University of Michigan. (ckrumme@umich.edu)**
- **Alexis Castellanos, MADS, Affiliate Lecturer, University of Michigan. (acastel@umich.edu)**
- **Alexander Levin-Koopman, Lecturer, University of Michigan. (alevink@umich.edu)**
- **Rachel Wyatt, Lecturer, University of Michigan. (wyattra@umich.edu)**

Course Communication Expectations

Slack is the preferred communication tool for this course. If you have questions about course content (e.g. lecture videos or assignments), please make sure to use Slack. Instructor and course assistant response time to Slack messages will endeavor to be within 24 hours Monday - Friday.

Please try to monitor the Slack channels for the course regularly.

Personal communication that may involve sensitive information may be emailed directly to the instructor or course assistant. If you email the instructor or course assistant, please include **SIADS696** in the email subject. Instructor and course assistant response time to email messages will strive to be within 24 hours during the work week (during weekends may be longer).

Office Hours via Zoom (Ann Arbor, Michigan time):

In the first month of the class, your instructors will hold general office hours to answer questions about course structure and workflow, discuss projects, and assist with exam preparation (at a high level). In the second month of the class, your instructors will hold synchronous meetings for the project teams they coach using the video-conferencing tool, Zoom. The schedule of office hours can be found by clicking on the **Live Events** link in the left-hand navigation menu. Passcode to join Office hours is **696.** This is a highly personalized course and instructors are meeting with individual teams in the office hours. So, the office hours will not be recorded for this course and recordings will not be available to watch for later.

Help Desk(s): How to get Help

If you have questions concerning the degree program, encounter a technical issue with Coursera, or issues using Slack, please submit a report to the ticketing system at umsimadshelp@umich.edu.

If you have an issue specific to the Coursera environment, you can also begin a live chat session with Coursera Technical Support (24/7) or view Coursera troubleshooting guides. (you may be asked to log in to your Coursera account).

For questions regarding course content, refer to the **Communications Expectations** section below.

Weekly Readings

There is introductory material during the first week of the course, but generally speaking, no weekly readings in this course.

Learning Outcomes

Students will:
1. (Competency) Propose a data science project based on SMART goals (specific, measurable, achievable, realistic, time-constrained).
2. (Competency) Analyze a given machine learning problem (e.g. for supervised and unsupervised) and propose several possible approaches, being able to identify which approaches are preferred as well as possible tradeoffs among alternatives.
3. (Literacy) Implement different learning frameworks for a learning problem, and different learning representations (feature engineering).
4. (Competency) Conduct a correct and thorough evaluation (including e.g. ablation tests to identify important features, hyperparameter sensitivity, training data curves, conduct detailed failure analysis), together with a valid and effective comparison between the chosen approaches.
5. (Literacy) Clearly communicate, via written report, results of each analysis, including effective choices of visualization.
6. (Awareness) Be able to identify potential future enhancements or refinements that could be explored (without needing to know these methods specifically, but being aware of their possible relevance to the problems at hand.)

Course Schedule

- **This course begins on Tuesday August 29, 2023 and ends Monday October 23, 2023. This is a two-month course and requires you to work on a project.**
- Group video standups are due in Slack by 11:59 pm (Ann Arbor, Michigan time - Eastern Time) on the following days:.
    - *Thursday, September 28 by 11:59 pm (Ann Arbor, Michigan time - Eastern Time)*
    - *Tuesday, October 10 by 11:59 pm (Ann Arbor, Michigan time - Eastern Time)*
- *For each standup, each student is required to respond with feedback to* <u>two</u> *(2) other teams about their standups by October 1 and October 13 of the standup week. There is a Coursera submission where you can add links to your team's submission and individual feedback submission .*

- There are also individual very brief check-ins for weeks 6 and 7. These are useful to understand e.g. if the workload is being fairly distributed as the deadline approaches, there are any other teams issues that an individual might wish to flag, where they or the team need help from the coach to resolve but would not necessarily be discussed in the public stand-up videos.
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Course Activity	Due Date
❏ Project Team Formation (Google Sheet)	Aug 31, 2023
❏ Project Topic Selected (Coursera & Google sheet))	Sep 3, 2023
❏ Part A of Comprehensive Quiz (Coursera) ❏ Part B of Comprehensive Quiz (Coursera) ❏ Part C of Comprehensive Quiz (Coursera)	Sep 5, 2023
❏ Draft Project Proposal for Peer Review (Google Sheet Entry for weblink)	Sep 5, 2023
❏ Project Data Set Review (Consult with assigned faculty coach in a group DM)	Sep 8, 2023
❏ Comprehensive Exam Submission (Coursera)	Sep 9, 2023 to Sep 14, 2023
❏ Peer Review Feedback (Leave feedback to two teams in their Google Doc after sign up in Google Sheet)	Sep 9, 2023
❏ Submit Revised Project Proposal for Instructor Review (PDF submitted via Coursera)	Sep 11, 2023
☐ First Slack Stand-up Reports and Responses (Slack and Coursera)	Sep 28, 2023 & Oct 1, 2023
☐ Second Slack Stand-up Reports and Responses (Slack and Coursera)	Oct 10, 2023 & Oct 13, 2023
❏ Submit Final Project (Coursera)	Oct 23, 2023

Comprehensive Exam Component

There is a separate document describing the Milestone II comprehensive exam process that will be shared on day 1 of the course.

Project Component

There is a separate document summarizing the Milestone II project component and guidelines, with link here:

MADS Milestone II: Project Guidelines (FA2023)

Grading and Course Checklist

Note that compared to Milestone 1, the weight of the project component has increased, so that it has been given considerably more weight than the comprehensive exam component.

We anticipate no major changes to this course grading scheme. However, as the course progresses, we may make minor adjustments as circumstances require, for any evaluation method in this course. If changes are made, they will always be done in a way that maximizes your grade across options.

You must complete all assignments and assessments, regardless of their weighting in the final grade, to get credit for this course.

Course Item	Percentage of Final Grade
Team formation	0 (but required)
Draft proposal for peer review/Revised proposal for instructor review	5
Peer reviews of project proposals (do 2 reviews) Please sign up and update the sheet after peer review.	2 x 2.5 = 5
Discussions of project with assigned project coach (2)	0 (but required)
Final revised proposal for instructor review	0 (but required)
Week 6 & 7 individual check-ins	0 (but required)
Slack Video Stand up	2 x 5 = 10 Video submissions (Team) = 5

(Week 5 & 7). For each week, submit a team video + give feedback to <u>two</u> other teams.	Peer Feedback (Individual) = 5
Final report	50
Comprehensive quiz (not proctored)	5
Comprehensive exam	25
Total	**100**

Letter Grades, Course Grades

Refer to the MADS Assignment Submission and Grading Policies section of the UMSI Student Handbook (access to Student Orientation course required).

Standups are due on the indicated calendar days and comments on other students' standup are due within 2 days of posting videos; **no partial credit will be awarded for late submissions to do with standups.**

Late Submission Policy

Because of the group project focus and dependencies between stages in Milestone 2, the previous "free late days" policy has been removed. Unless otherwise indicated, there is now a simple 25% penalty for each subsequent 24-hour period after the deadline that a graded item is late. For example, if the due date is 11:59pm Monday, late penalties would be as follows.

Submitted any time before 11:59pm Tuesday: 25% deduction
Submitted any time before 11:59pm Wednesday 50% deduction
Submitted any time before11:59pm Thursday: 75% deduction
Submitted after 11:59pm Friday: 100% deduction

Note that resubmissions after the deadline will be counted as late submissions.
All items that are required must still be handed in, even if the late penalty would result in a grade of zero for that item.

We have a strict policy that no waivers or extensions will be considered for any deadline except in the case of a documented emergency, so please do not send inquiries about extensions unless you have a documented emergency. This policy applies to all graded items (even those that are low stakes), including the final project.

Please note: Submitting your work on time is very important in this course: there are important dependencies between some items, e.g. peer feedback must be on time in order to give teams enough time to incorporate changes for the final revision. Also, it is important to check in regularly with your project coach on team progress: if you fall behind in your project work your team will likely be overwhelmed and you will be at risk for not succeeding in the course.

The grading scale for this course is as follows:

A+	97%
A	93%
A-	90%
B+	87%
B	83%
B-	80%
C+	77%
C	73%
C-	70%
D+	67%
D	63%
D-	60%
F	0%

Re-grade policy

If students would like any assignment in this course re-graded, that request must take place within 1 week of the student receiving the grade, and be made in writing via **email** (not Slack). The instructional team is happy to accommodate this request; however, students should be aware that requests for re-grading open the entire assignment up for re-grading, not just the portion requested by the student.

Therefore, a request for a re-grade could result in a total grade going up, or going down. The result of the re-grade is <u>final</u>: no additional requests for further consideration of the same assignment will be granted.

Academic Integrity/Code of Conduct

Refer to the [Academic and Professional Integrity](#) section of the UMSI Student Handbook. (access to Student Orientation course required).

Accommodations

Refer to the [Accommodations for Students with Disabilities](#) section of the UMSI Student Handbook (access to the Student Orientation course required). Use the [Student Intake Form](#) to begin the process of working with the University's Office of Services for Students with Disabilities.

Accessibility

Refer to the [Screen reader configuration for Jupyter Notebook Content](#) document to learn accessibility tips for Jupyter Notebooks.

Library Access

Refer to the [U-M Library's information sheet](#) on accessing library resources from off-campus. For more information regarding library support services, please refer to the [U-M Library Resources](#) section of the UMSI Student Handbook (access to the Student Orientation course required).

Student Mental Health

Refer to the University's [Resources for Stress and Mental Health website](#) for a listing of resources for students.

Student Services

Refer to the [Introduction to UMSI Student Life](#) section of the UMSI Student Handbook (access to the Student Orientation course required).

Technology Tips

- Recommended Technology
  - This program requires Jupyter Notebook for completion of problem sets and Adobe or other PDF viewer for reading articles.
- Working Offline
  - While the Coursera platform has an integrated Jupyter Notebook system, you can work offline on your own computer by installing Python 3.5+ and the Jupyter software packages, including pyspark. For more details, consult the Jupyter Notebook FAQ.