

Course Syllabus for SIADS 694/695: Milestone II

Version 2021.03.29.1

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 oral 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 two 1-unit courses that encompass a comprehensive exam and a significant project.

Note: This run of the course coincides with Ramadan. While I am hopeful that the design of the course will allow flexibility in terms of timing course workload, please feel free to reach out about issues—I'm sure we can work together to find a solution.

Prerequisites

The required prerequisites for SIADS 694 & 695 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:

- **Eric Gilbert, Ph.D., Associate Professor of Information and Computer Science, University of Michigan. (eegg@umich.edu)**
- **Coco Krumme, Ph.D., Affiliate Lecturer, University of Michigan. (ckrumme@umich.edu)**

Course Assistant: **Hasan Tahir, Course Operations Specialist. (hasanthr@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 **SIADS694** 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).

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

Your instructors will hold weekly, synchronous office hours 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. Additionally, all office hours will be recorded and archived so that you can retrieve them at a later date. Archived office hours can be found by clicking on the **Resources** link in the left-hand navigation menu then clicking the **Archived Sessions** link.

It is highly recommended that you check in with the instructor at least once every two weeks, either via Slack or Zoom; it is also highly recommended that you check in with the instructor at least once using Zoom before your comprehensive oral exam to ensure you're comfortable with the technology.

Office Hours are held on:

- **Mondays 2:00-3:00pm Eastern Time (Eric Gilbert)**
- **Thursdays 4:30-5:30pm Eastern Time (Coco Krumme)**

The instructors will also be available via appointment for one-to-one sessions. [Sign up](#) for appointment with Eric Gilbert.

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 at least two fundamentally different choices of learning framework for a learning problem, and two substantially 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) for each learning framework and representation choice, 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 March 31, 2021 and ends Monday May 31, 2021**

Week	Topic	Videos/Resources	Soft skills	Due at end of week
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1 Wed 3/31	Introduction	<ol style="list-style-type: none"> 1. Video: Welcome to Milestone II 2. Video: Introduction to the Projects 3. Reading: Milestone II Project Guidelines 4. Video: Introduction to Comprehensive Exam 5. Reading: Milestone II Comprehensive Exam Guidelines 	Team formation, exam prep, sign up for exam time	Due Tue 4/6: <ul style="list-style-type: none"> <input type="checkbox"/> Project Team Formation <input type="checkbox"/> Sign-up for Exam Time
2 Wed 4/7	Collaboration	Comprehensive Quiz goes live.	Proposal draft, exam prep, Sign up for exam time	Due Tue 4/13: <ul style="list-style-type: none"> <input type="checkbox"/> Project topic selected <input type="checkbox"/> Draft Project Proposal
3 Wed 4/14	Peer review	None	Exam prep, Peer reviews (2)	Due Tue 4/20: <ul style="list-style-type: none"> <input type="checkbox"/> Peer Review of Proposals
4 Wed 4/21	Comprehensive Exams and Revised Project Proposal	<ol style="list-style-type: none"> 1. Video: Comprehensive Exam Experience for Milestone II 	Exam, project work with team	Due Tue 4/27: <ul style="list-style-type: none"> <input type="checkbox"/> Revised project proposal submitted (PDF submitted via Coursera) for instructor review and feedback, <input type="checkbox"/> Complete comprehensive quiz (in Coursera) <input type="checkbox"/> Async Comprehensive Exam
SIADS 695 (Continuation to 2nd part of the course)				
5 Tue 5/4	Project	None	Project work with team	View Comprehensive Exam Results from Instructor
6 Tue 5/11	Project	<ol style="list-style-type: none"> 1. Reading: Continue to work on Project 	Project work with team	Due Tue 5/17: <ul style="list-style-type: none"> <input type="checkbox"/> Complete brief project check in form
7	Project	<ol style="list-style-type: none"> 1. Reading: Continue to 	Project work	Due Tue 5/24:

Tue 5/18		work on Project	with team	<input type="checkbox"/> Complete brief project check in form
8 Tue 5/25	Project	None	Project work with team	Due Tue 5/31: <input type="checkbox"/> Submit Project Final Report (Submitted via Coursera)

Comprehensive Exam Component

There is a separate document describing the Milestone II comprehensive exam process, with link here: [MADS Milestone II - Comprehensive Exam Guidelines](#)

Project Component

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

[MADS Milestone II: Project Guidelines](#)

Grading and Course Checklist

Note that compared to Milestone 1, the weight of the project component has increased, so that it has been given 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)
Comprehensive oral exam sign up	0 (but required)

Draft proposal for peer review	5
Peer reviews (2)	$2 \times 2.5 = 5$
Final revised proposal for instructor review	0 (but required)
Week 6 & 7 check-ins	0 (but required)
Final report	50
Comprehensive quiz (not proctored)	5
Comprehensive oral exam	35
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)

Late Submission Policy

The late submission policy for SIADS 694/695 follows the same scheme as Milestone I: it gives you a limited total number of "late day" credits that can be applied during a course. You do not need permission to use these, and we will track them for you. And at the end of the course, once the submission times for all the assignments are known, if there are late assignments, we will apply the late day credits in such a way (i.e. to the appropriate late assignments) that it maximizes your final grade.

For Milestone II, you have a total of **two (2) free late days** to use up during **part A (694)**, and a total of **two (2) free late days to use during part B (695)** of Milestone II. One late day equals exactly one 24-hour period after the due date of the assignment (including weekends). No fractional late days: they are all or nothing. Once you have used up your late days, 25% penalty for each subsequent 24-hour period after the deadline that an assignment is late. For example, if the due date is 11:59pm Tuesday, with no late days left, penalties would be:

Before 5pm Wednesday: 25% deduction
Before 5pm Thursday: 50% deduction
Before 5pm Friday: 75% deduction
After 5pm Saturday: 100% deduction

For SIADS 694 assignments are due at 11:59 pm on Tuesday with the penalties being:

Before 5pm Wednesday: 25% deduction
Before 5pm Thursday: 50% deduction
Before 5pm Friday: 75% deduction
After 5pm Saturday: 100% deduction

For SIADS 695 assignments are due at 11:59 pm on Tuesday with the penalties being:

Before 5pm Wednesday: 25% deduction
Before 5pm Thursday: 50% deduction
Before 5pm Friday: 75% deduction
After 5pm Saturday: 100% deduction

You don't need to explain or get permission to use late days, and we will track them for you. We will apply the late days in a way that maximizes your grade, and because of this, the late day calculation can only be applied at the end of the course. **Note that resubmissions after the deadline will be counted as late submissions.** Also, **late days may not be applied to the Final Project Report.**

Please note: Submitting your work on time is very important in this course. The instructional team may periodically reach out to you and ask you about your progress; if you fall behind your project work you will 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%

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.