Course Syllabus for SIADS 680: Learning Analytics

Course Overview and Prerequisites
SAIDS 680 provides an overview of a key application domain for data scientists—education. In this course students will examine the application of data science as a means to better understand and improve learning. Specifically, students will think critically about the ways in which data scientists can support research and improvement in educational organizations of all types. Anchored in the fields of learning analytics (LA) and educational data mining (EDM), this course analyzes the unique opportunities and challenges associated with applying data science methods to data stemming from schools, universities, and a myriad of learning opportunities. The course will cover the history of learning analytics, typical data and methods used, the importance of measurement, and the implementation of learning analytics products.

The prerequisites for this course are fulfilled by having completed the coursework necessary to achieve Milestone II.

Instructor and Course Assistants

Instructors:
Dr. Andrew Krumm, Assistant Professor, Medical School, School of Information - aekrumm@umich.edu

Course Lecturers:
Dr. Nick Sheltrown - sheltro@umich.edu, Deepti Pandey - deeptip@umich.edu

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.

Course Communication Expectations

- Contacting instructor and course assistant: Course channel in Slack or email
- Slack and email response time: 24 - 48 hours
- Office hours via Zoom: Please use passcode 680 to join
  A. Andrew: Thursdays at 11 am (ET)
  B. Deepti: Tuesdays at 5 pm (ET)
  C. Nick: Wednesdays at 8 pm (ET)

Weekly Readings

Week 1: Required

Optional
http://www.laceproject.eu/learning-analytics-review/analysing-at-risk-students-at-open-university/

Week 2: Required

Optional

Week 3: Required

Optional

Week 4: Required

Optional

Learning Outcomes
- Be able to describe the field of Learning Analytics and identify key technologies and settings for applying educational data science
- Understand ethical concerns associated with collecting, communicating, and taking action on educational data.
● Think critically about available data
● Be able to connect available data to learning context
● Be able to describe differences between prediction and inference
● Be able to identify opportunities for applying inferential modelling, predictive modelling, and unsupervised learning.
● Understand the role of latent constructs in educational measurement
● Be able to identify limitations of behavioral data and how it can be used
● Understand the importance of implementation supports
● Be able to develop a predictive model and understand implications of using a predictive model

Course Schedule

● This course begins on Monday, September 27 and ends on Sunday, October 24, 2021 (Ann Arbor, Michigan time - Eastern Time Zone).
● Instructors must submit final grades one week after the course ends. Therefore, any late assignments - subject to course reduction specified below or an instructor-approved extension - cannot be accepted after 11:59 pm, Monday, November 1, 2021 (Ann Arbor, Michigan time - Eastern Time Zone).

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. Office hours are recorded and published in respective weeks.

There will be 3 office hours per week. Each instructor and the course assistant will lead one of these hours. Drs. Teasley & Krumm will answer questions about materials in the lectures and readings, and the course assistant will address questions and any issues with the course assignments.

Grading

<table>
<thead>
<tr>
<th>Course Item</th>
<th>Points</th>
<th>% of Final Grade</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1- Notebook Assignment: Exploratory Data Analysis</td>
<td>100</td>
<td>20%</td>
<td>Thursday, 10/7 at 11:59 pm Eastern Time</td>
</tr>
<tr>
<td>Week 1 - Reflection Questions</td>
<td>100</td>
<td>10%</td>
<td>Monday, 10/4 at 11:59 pm Eastern Time</td>
</tr>
<tr>
<td>Week 2 - Notebook Assignment: Building Prediction Models</td>
<td>100</td>
<td>20%</td>
<td>Thursday, 10/14 at 11:59 pm Eastern Time</td>
</tr>
<tr>
<td>Week 2 - Reflection Questions</td>
<td>100</td>
<td>10%</td>
<td>Monday, 10/11 at 11:59 pm Eastern Time</td>
</tr>
<tr>
<td>Week 3 - Notebook Assignment: Bias Metrics</td>
<td>100</td>
<td>20%</td>
<td>Thursday, 10/21 at 11:59 pm Eastern Time</td>
</tr>
<tr>
<td>Week 3 - Reflection Questions</td>
<td>100</td>
<td>10%</td>
<td>Monday, 10/18 at 11:59 pm Eastern Time</td>
</tr>
<tr>
<td>Week 4 - Reflection Questions</td>
<td>100</td>
<td>10%</td>
<td>Monday, 10/25 at 11:59 pm Eastern Time</td>
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</tbody>
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| Total                                            | 800    | 100%             |                                          |
Note: All assignments must be submitted to earn credit for this course. (See late submission policy below.)

Reflection Scoring Checklist

1. Are examples from readings, videos, and/or Jupyter notebook work used in responding to each prompt? (0-2 points)
2. Are examples effectively used to fully address each prompt? (0-2 points)
3. Are citations used in responding to each prompt? (0-2 points)
4. Does each response have between 150-200 words? (0-2 points)
5. Is the response free from spelling and grammar errors? (0-2 points)

Letter Grades, Course Grades, and Late Submission Policy

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

For this course, the late submission policy is 15% reduction if assignment is turned in one day late, 30% reduction if two days late, 45% reduction if three days, and a zero (0) if four or more days late. (But remember, you must turn in all assignments to pass.) The late penalty may be waived for personal circumstances beyond the student’s control. You must contact all three instructors via email as soon as possible to discuss the terms for a late submission.

The grading scale for this course is as follows:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Point % needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93%</td>
</tr>
<tr>
<td>A-</td>
<td>90%</td>
</tr>
<tr>
<td>B+</td>
<td>87%</td>
</tr>
<tr>
<td>B</td>
<td>83%</td>
</tr>
<tr>
<td>B-</td>
<td>80%</td>
</tr>
<tr>
<td>C+</td>
<td>77%</td>
</tr>
<tr>
<td>C</td>
<td>73%</td>
</tr>
<tr>
<td>C-</td>
<td>70%</td>
</tr>
<tr>
<td>D+</td>
<td>67%</td>
</tr>
<tr>
<td>D</td>
<td>63%</td>
</tr>
<tr>
<td>D-</td>
<td>60%</td>
</tr>
<tr>
<td>F</td>
<td>0%</td>
</tr>
</tbody>
</table>
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.