SIADS 680: Learning Analytics

Course Syllabus

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. Nick Sheltrown - sheltro@umich.edu

Course Lecturer:

Deepti Wilson - 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 guide s. (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 (Ann Arbor, Michigan time - Eastern Time Zone)

- **Deepti:** Wednesays, 8 am ET
- **Nick**: Thursdays, 8 pm ET

Weekly Readings

Week 1

- Krumm, A. E., Means, B., & Bienkowksi, M. (2018). *Learning analytics goes to school: A collaborative approach to improving education*. New York: Routledge. Chapter 1: Introduction (pp. 1-15).
- Siemens, G. (2013). Learning analytics: The emergence of a discipline. *American Behavioral Scientist*, *57*(10), 1380-1400.
- Baker, R. S., & Inventado, P. S. (2014). Educational data mining and learning analytics. In J. A. Larusson & B. White. (Eds.), *Learning Analytics from Research to Practice: Methods, Tools, and Approaches* (pp. 103-119). Berlin: Springer-Verlag.

Week 2

- Krumm, A. E., Means, B., & Bienkowksi, M. (2018). *Learning analytics goes to school: A collaborative approach to improving education*. New York: Routledge. Chapter 2: Data used in educational data-intensive research (pp. 17-37).
- Krumm, A. E., Means, B., & Bienkowksi, M. (2018). *Learning analytics goes to school: A collaborative approach to improving education*. New York: Routledge. Chapter 6: Supporting conditions for collaborative data-intensive improvement (pp. 108-134).
- Krumm, A. E., Means, B., & Bienkowksi, M. (2018). *Learning analytics goes to school: A collaborative approach to improving education*. New York: Routledge. Chapter 7: Data used in educational data-intensive research (pp. 17-37).

Week 3

- Niemi, Pea, Saxburg, & Clark (2018). Inferential foundations for learning analytics in the digital ocean. In: Niemi D., Pea R. D., Saxberg, B., Clark R. E. (eds) *Learning analytics in education* (pp. 1-48). Charlotte, NC: Information Age Publishing.

- Rosé, C. P., McLaughlin, E. A., Liu, R., & Koedinger, K. R. (2019). Explanatory learner models: Why machine learning (alone) is not the answer. *British Journal of Educational Technology, 50*(6), 2943-2958.
- Slade, S., & Prinsloo, P. (2013). Learning analytics: Ethical issues and dilemmas. *American Behavioral Scientist*, *57*(10), 1510-1529.

Week 4

- Cooper, M., Ferguson, R., & Wolff, A. (2016, April). What can analytics contribute to accessibility in e-learning systems and to disabled students' learning?. In *Proceedings of the sixth international conference on learning analytics & knowledge* (pp. 99-103).
- Connor, C. M. (2019). Using technology and assessment to personalize instruction: Preventing reading problems. *Prevention Science*, *20*(1), 89–99.
- Campos, C. F., Ahn, J., DiGiacomo, D. K., Nguyen, H., & Hays, M. (2021). Making Sense of Sensemaking: Understanding How K–12 Teachers and Coaches React to Visual Analytics. *Journal of Learning Analytics*, *8*(3), 60-80.

Learning Outcomes

- *Identify anchoring technologies and key settings for applying educational data science*
- *Describe the development of learning analytics, educational data, and educational data science*
- *Be able to connect available data to learning context*
- *Critically evaluate available data from administrative, learning, and assessment systems*
- *Identify the opportunities and constraints in using data from digital environments and administrative systems*
- *Describe ethical considerations in working with educational data*
- *Identify factors associated with a successful learning analytics intervention*
- *Evaluate effective learning analytics dashboards*

Course Schedule

- This course begins on **Tuesday, September 26 and ends on Monday, October 23, 2023** (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, October 23, 2023** (Ann Arbor, Michigan time - Eastern Time Zone).

Grading

Course Item	% of Final Grade	Due
Week 1 - Reflection	10%	Week 1
Week 1 - Notebook Assignment	15%	Week 1
Week 2 - Reflection	10%	Week 2
Week 2 - Notebook Assignment	15%	Week 2
Week 3 - Reflection	10%	Week 3
Week 3 - Notebook Assignment	15%	Week 3
Week 4 - Reflection	10%	Week 4
Week 4 - Notebook Assignment	15%	Week 4
Total	**100%**	

Note: All assignments must be submitted to earn credit for this course. (See late submission policy below.)

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:

Letter Grade	Point needed
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.

Use the Student Application Form [in Accommodate](#) 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 .