JSGS 843 397 – Data Science for Health Analytics and Decision Support

	UNIVERSITY OF SASKATCHEWAN CAMPUS	UNIVERSITY OF REGINA CAMPUS
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OFFICE HOURS:		TBA
OFFICE LOCATION:		Online
TERM:		Spring/Summer 2022
ROOM:		Online
DATE AND TIME:		May 2 – June 15

The syllabus for this course is comprised of this document plus the document titled "JSGS Common Syllabus 2021-22."

INTELLECTUAL PROPERTY ACKNOWLEDGEMENT

This course is developed by Moez Ali.

CALENDAR DESCRIPTION

In this course you will learn how artificial intelligence is disrupting various industries including healthcare. Taking a broad-but-shallow approach, the course will introduce you to the history and future of artificial intelligence. You will learn about the different types of artificial intelligence and its application in both healthcare and outside of healthcare. You will gain a one level deeper understanding of Machine Learning (a type of AI). We will follow the structured approach for learning ML using CRISP-DM framework. The course doesn't require any prior programming experience. However, for students interested in learning hands-on approach will get opportunities to do so.

Key topics include:

- Artificial Intelligence and its types
- Supervised Machine Learning
- Unsupervised Machine Learning
- Exploratory Data Analysis
- Data preprocessing
- Model Training, Selection, and Analysis
- Natural Language Processing and key tasks of NLP
- Big Data Landscape in 2022

LEARNING OBJECTIVES

JSGS has developed a set of three competencies that all graduates will be able to demonstrate. The specific readings, assignments, and activities in JSGS 843 397 will help you both acquire and demonstrate the ability to:

- Apply artificial intelligence and machine learning definitions to real life applications.
- Understand end-to-end machine learning implementations using CRISP-DM framework.
- Explore how text data is used in analyzing and building state-of-the-art AI systems.
- Understand key concepts in big data including different types of data stores.

COURSE CONTENT AND APPROACH

The course will be taught as a combination of live weekly classes / recorded lectures and through information communicated on course portal. The attendance in live classes is not mandatory. All recordings will be uploaded on portal. Students are encouraged to attend live classes to have the ability to ask questions, interact with instructor and other students, and learn from their experience.

SCHEDULE OF CLASS

Week	Class Details
Week 1	Saturday, May 7, 2022 (9 AM – 11 AM EST)
Week 2	Saturday, May 14, 2022 (9 AM – 11 AM EST)
Week 3	Saturday, May 21, 2022 (9 AM – 11 AM EST)
Week 4	Saturday, May 28, 2022 (9 AM – 11 AM EST)
Week 5	Saturday, June 4, 2022 (9 AM – 11 AM EST)
Week 6	Saturday, June 11, 2022 (9 AM – 11 AM EST)

All classes are online. Zoom link will be provided on portal. All sessions will be recorded for students who can't attend. Attendance is **not** mandatory.

REQUIRED READINGS

No required pre-readings. Instructor will provide optional readings on weekly basis for students interested in taking deep dive in specific areas.

COURSE OUTLINE

Week	Topic	Details
Week 1	Artificial Intelligence	- What is Artificial Intelligence - History of Artificial Intelligence - Types of Artificial Intelligence - Practical Applications of AI in daily life - Application of AI in industry - Latest trends in AI
Week 2	Introduction to Machine Learning	- What is Machine Learning - Types of Machine Learning - CRISP-DM Framework - Regression - Classification
Week 3	Exploratory Data Analysis	- What is Exploratory Data Analysis? - Univariate Analysis - Multivariate Analysis - EDA Frameworks and Tools
Week 4	Advanced Machine Learning	- Unsupervised Machine Learning - Clustering - Key concepts: Bias vs. Variance **Deliverables:** **Individual Assignment**
Week 5	Natural Language Processing	- What is Natural Language Processing? - Key tasks in NLP - Transfer Learning - Demo: Hugging Face
Week 6	Big Data Landscape	- What is Big Data (V's of big data) - Key Technologies used for Big Data in 2022 - Data stores (relational and non-relational) **Deliverables:** <ol start="2"> **Final Assessment**

ASSIGNMENTS

There is only one assignment in this course. It consists of short descriptive questions that will test your understanding on various topics taught during Week 1 through Week 4.

EVALUATION

The course will be assessed via a combination of:

- MCQ based quiz to be completed online on last day of the course (50% weight).
- Individual assignment consists of short descriptive questions due on day prior to last class (50% weight).

Final grades will be uploaded to course portal within 10 days of last day of the class.

ENROLLMENT LIMIT

Class enrollment will be limited to 30 students.

JSGS GRADE DESCRIPTIONS

85+ excellent
A *superior performance* with consistent strong evidence of:
- a comprehensive, incisive grasp of the subject matter;
- an ability to make insightful critical evaluation of the material given;
- an exceptional capacity for original, creative and/or logical thinking;
- an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently; and
- an excellent ability to apply theories to real-world problems and intersect with related disciplines.

80-85 very good
An *excellent performance* with strong evidence of:
- a comprehensive grasp of the subject matter;
- an ability to make sound critical evaluation of the material given;
- a very good capacity for original, creative and/or logical thinking;
- an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently; and
- a strong ability to apply theories to real-world problems and intersect with related disciplines.

75-80 good
A *good performance* with evidence of:
- a substantial knowledge of the subject matter;
- a good understanding of the relevant issues and a good familiarity with the relevant literature and techniques;
- some capacity for original, creative and/or logical thinking;
- a good ability to organize, to analyze, and to examine the subject material in a critical and constructive manner; and
- some ability to apply theories to real-world problems and intersect with related disciplines.

70-75 satisfactory

A *generally satisfactory and intellectually adequate performance* with evidence of:

- an acceptable basic grasp of the subject material;
- a fair understanding of the relevant issues;
- a general familiarity with the relevant literature and techniques;
- an ability to develop solutions to moderately difficult problems related to the subject material; and
- a moderate ability to examine the material in a critical and analytical manner.

ATTENDANCE AND PARTICIPATION EXPECTATIONS

Students are expected to attend all the synchronous sessions. If you are unable to attend (e.g., Internet problems), you must let the instructor know.

Active participation in class discussion is expected by all students**.**

ACADEMIC INTEGRITY AND CONDUCT

Understanding and following the principles of academic integrity and conduct is vital to your success in graduate school. Ensuring that your work is your own and reflects both your own ideas and those of others incorporated in your work is important: ensuring that you acknowledge the ideas, words, and phrases of others that you use is a vital part of the scholarly endeavour. The JSGS has developed an Honour Code (see above) that encapsulates these values.

If you have any questions at all about academic integrity in general or about specific issues, contact any faculty member and we can discuss your questions. For more information, please see:

Academic Integrity – https://www.uregina.ca/gradstudies/current-students/academic-integrity/index.html

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University of Regina Copyright information: https://www.uregina.ca/copyright/guidelines/fair-dealing.html

STUDENT RESOURCES

Remote learning information page for students. This resource engages students in learning about the skills associated with remote learning success.

https://www.uregina.ca/remote-learning/

RIGHTS & RESPONSIBILITIES OF GRADUATE STUDENTS

https://www.uregina.ca/gradstudies/current-students/Rights%20/index.html

STUDENTS WITH SPECIAL NEEDS

Students in this course who, because of a disability, may have a need for accommodations are encouraged to discuss this need with the instructor and to contact one of the following:

Centre for Student Accessibility – accessibility@uregina.ca or 306-585-4631.
https://www.uregina.ca/student/accessibility/students/index.html

STUDENTS EXPERIENCING STRESS

Counselling Services – http://www.uregina.ca/student/counselling/contact.html or call (306) 585-4491 between 8:30 a.m. to 4:30 p.m. Saskatchewan time Monday to Friday.

USE OF VIDEO AND RECORDING OF THE COURSE

Video conference sessions in this course, including your participation, will be recorded and made available only to students in the course for viewing via Canvas after each session. This is done, in part, to ensure that students unable to join the session (due to, for example, issues with their Internet connection) can view the session later. This will also provide students with the opportunity to review any material discussed. Students may also record sessions for their own use, but they are not permitted to distribute the recordings (see below).

Please remember that course recordings belong to the instructor, the University, and/or others (like a guest lecturer) depending on the circumstance of each session, and are protected by copyright. Do not download, copy, or share recordings without the explicit permission of the instructor.

For questions about recording and use of sessions in which you have participated, including any concerns related to your privacy, please contact your instructor.

ADDITIONAL EVALUATION INFORMATION

More information on the Academic Courses Policy on course delivery, examinations and assessment of student learning can be found at: https://www.uregina.ca/student/registrar/resources-for-students/academic-calendars-and-schedule/undergraduate-calendar/assets/pdf/2018-2019/2018-19-UG-Calendar-05b-Academic-Regulations.pdf