Selected Topics in Management and Organizational Studies

Introduction to Data Science

MOS 3398A Section 550 (Fall 2021)

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Course schedule: Tuesday 11:30 AM to 13:30 PM and Thursday 11:30 AM to 12:30 PM

Office hours: By appointment (Zoom)

COURSE DESCRIPTION:

Data science is the field of study that combines domain expertise, programming skills, and knowledge of mathematics and statistics to extract meaningful insights from data. This course will focus on simultaneously teaching introductory skills needed to collaborate on teams with data scientists, analysts, and other information professionals. Topics include: Database Management, Data Science methods in R/Python, Data Visualization techniques, Machine Learning technique case studies, critical Topics in Big Data and Emerging AI Technologies.

Course Prerequisite(s): MOS 2242A/B, or taken concurrently with MOS 2242A

COURSE LEARNING OBJECTIVES

As a result of this course, students will be able to:

- Build and manage a database
- Develop interdisciplinary skills on how to integrate critical and creative thinking with examples from computational tools.
- Apply analytical techniques to datasets to produce insights for decision making.

DESCRIPTION OF CLASS METHODS

This course is heavily based on experiential learning activities, providing the students with an environment where they can improve their statistical literacy and interpretation skills in practice using powerful tools and programming languages. The course materials including instructions, PPT slides and exercise files will be uploaded in advance. The students are expected to follow the instructions posted on the course website to submit their weekly assignments before each deadline.

© Instructor generated course materials (e.g., any video, slides, instructions, notes, summaries, exam questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.

TEXTBOOKS AND OTHER REQUIRED RESOURCES

| Textbook | No textbook is required; readings will be assigned from free online resources, e-books or software documentation. However, access to a laptop that has an operating system of Windows 10, Mac OS X, or any common Linux distribution is required to be able to access a bash terminal. Students will be required to code in Python. |
| Course Notes and data files | To be found on the course website at https://owl.uwo.ca. |

METHOD OF EVALUATION/ASSESSMENT

Weekly Assignments	20%
Midterm Exam - online	31%
Quiz	14%
Group Assignment	35%

NOTE: The content and/or evaluation scheme in this course is subject to change.

SPECIAL INSTRUCTIONS, IF ANY

Students must pay attention to e-mails and announcements in OWL related to the special assignment/reading/exercises.

COURSE POLICIES

➢ **Assignments & tests**
- Always make sure you have a backup of your assignments and of your tests.
- Late submissions **will not be accepted** and **no mark will be given** after the deadlines.
- If you are not satisfied with the grading of an assignment or test, you may request a review **within 1 week of grade posting.**
    ▪ Indicate in writing where and why you feel the marks are unjustified and give it back to the instructor for re-grading.
    ▪ Note that the entire assignment will be re-graded and your grade can go up or down (or stay the same).

If you are to miss a test, you must report this as soon as possible to your instructor. It will be up to the instructor to decide an appropriate course of action.

TENTATIVE SCHEDULE OF CLASSES.

- This schedule and some topics may change – updates are posted to OWL.

Week	Dates	Topic
1	Sept 9 and Sept 14	Introduction to Data Science, Data Science Tasks, Supervised Learning and Unsupervised Learning
2	Sept 16 and Sept 21	Understanding Data Structures, Entities, Relationships and ER diagrams
3	Sept 23 and Sept 28	Data Manipulation using SQL (DML) In a Business Context
4	Sept 30 and Oct 5	Data Definition using SQL (DDL) In a Business Context
5	Oct 7 and Oct 12	Advanced Statistical Analysis and Data Visualization using Tableau
6	Oct 14 and Oct 19	Advanced Statistical Analysis and Data Visualization using Tableau (continued)
7	Oct 21 and Oct 26	Review, Midterm Week **Midterm exam: Thursday, October 28 from 11:30 AM to 13:30 PM**
Fall Reading Week : November 1, 2021 to November 7, 2021		
8	Nov 9 and Nov 11	Clustering, Linear regression and Correlations, Correlation Matrix, Forecasting
9	Nov 16 and Nov 18	Introduction to Python (Basic operations, Data Cleaning and Scientific Computation)
10	Nov 23 and Nov 25	Python for Data Science (Probability and Hypothesis Testing) **Quiz : Thursday, November 25 from 11:30 AM to 13:30 PM**
11	Nov 30 and December 2	Python for Data Science (Predictive methods, Data Visualization using Matplotlib and Seaborn)
12	Dec 7 and Dec 9	Group Presentations

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a scholastic offence, at the following website:
http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf.

Plagiarism is the submission of work that is in whole or in part someone else's work (including, but not limited to, text, calculations and exhibits), which you claim as your own. Students must

write their assignments, essays, reports, exams, etc. in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by using proper references such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

All required case exams and reports may be subject to submission for similarity review to the commercial plagiarism detection software under licence to the University for the detection of plagiarism. All papers submitted will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement currently in effect between The University of Western Ontario and Turnitin.com (www.turnitin.com).

UNIVERSITY RESOURCES

The website for the Office of the Registrar is http://www.registrar.uwo.ca. Students may also wish to contact Student Development Services at http://www.sdc.uwo.ca.

Appendix to Course Outlines: Academic Policies & Regulations 2021 - 2022

Prerequisite and Antirequisite Information

Students are responsible for ensuring that they have successfully completed all course prerequisites and that they have not completed any course antirequisites. Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Pandemic Contingency

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, typically using a combination of synchronous instruction (i.e., at the times indicated in the timetable) and asynchronous material (e.g., posted on OWL for students to view at their convenience). Any remaining assessments will also be conducted online at the discretion of the course instructor. In the unlikely event that changes to the grading scheme are necessary, these changes will be clearly communicated as soon as possible.

Student Code of Conduct

Membership in the community of Huron University College and Western University implies acceptance by every student of the principle of respect for the rights, responsibilities, dignity and well-being of others and a readiness to support an environment conducive to the intellectual and personal growth of all who study, work and live within it. Upon registration, students assume the responsibilities that such registration entails. While in the physical or online classroom, students are expected to behave in a manner that supports the learning environment of others. Please review the Student Code of Conduct at:
https://huronatwestern.ca/sites/default/files/Res%20Life/Student%20Code%20of%20Conduct%20-%20Revised%20September%202019.pdf.

Attendance Regulations for Examinations

A student is entitled to be examined in courses in which registration is maintained, subject to the following limitations:

1) A student may be debarred from writing the final examination for failure to maintain satisfactory academic standing throughout the year.

2) Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course will be reported to the Dean of the Faculty offering the course (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean of that Faculty, the student will be debarred from taking the regular examination in the course. The Dean of the Faculty offering the course will communicate that decision to the Dean of the Faculty of registration.

Review the policy on Attendance Regulations for Examinations here: https://www.uwo.ca/univsec/pdf/academic_policies/exam/attendance.pdf.

Statement on Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following website: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf. The appeals process is also outlined in this policy as well as more generally at the following website: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/appealsundergrad.pdf.

Turnitin.com

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Statement on Use of Electronic Devices

It is not appropriate to use electronic devices (such as, but not limited to, laptops, cell phones) in the classroom for non-classroom activities. Such activity is disruptive and distracting to other students and to the instructor, and can inhibit learning. Students are expected to respect the classroom environment and to refrain from inappropriate use of technology and other electronic devices in class.

Statement on Use of Personal Response Systems ("Clickers")

Personal Response Systems ("clickers") may be used in some classes. If clickers are to be used in a class, it is the responsibility of the student to ensure that the device is activated and functional. Students must see their instructor if they have any concerns about whether the clicker is malfunctioning. Students must use only their own clicker. If clicker records are used to compute a portion of the course grade:
- the use of somebody else's clicker in class constitutes a scholastic offence
- the possession of a clicker belonging to another student will be interpreted as an attempt to commit a scholastic offence.

Academic Consideration for Missed Work

Students who are seeking academic consideration for missed work during the semester may submit a self-reported absence form online provided that the absence is **48 hours or less** and the other conditions specified

in the Senate policy at
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf are met.

Students whose absences are expected to last **longer than 48 hours**, or where the other conditions detailed in the policy are not met (e.g., work is worth more than 30% of the final grade, the student has already used 2 self-reported absences, the absence is during the final exam period), may receive academic consideration by submitting a Student Medical Certificate (for illness) or other appropriate documentation (for compassionate grounds). The Student Medical Certificate is available online at
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

All students pursuing academic consideration, regardless of type, must contact their instructors no less than 24 hours following the end of the period of absence to clarify how they will be expected to fulfill the academic responsibilities missed during their absence. **Students are reminded that they should consider carefully the implications of postponing tests or midterm exams or delaying submission of work, and are encouraged to make appropriate decisions based on their specific circumstances.**

Students who have conditions for which academic accommodation is appropriate, such as disabilities or ongoing or chronic health conditions, should work with Accessible Education Services to determine appropriate forms of accommodation. Further details concerning policies and procedures may be found at:
http://academicsupport.uwo.ca/.

Policy on Academic Consideration for a Medical/ Non-Medical Absence

(a) **Consideration on Medical Grounds for assignments worth *less than 10%* of final grade: Consult Instructor Directly and Contact Academic Advising**

When seeking consideration on **medical grounds** for assignments worth *less than 10%* of the final course grade, and if the student has exceeded the maximum number of permissible Self-Reported absences, the student should contact the instructor directly. The student need only share broad outlines of the medical situation. The instructor **may** require the student to submit documentation to the academic advisors, in which case she or he will advise the student and inform the academic advisors to expect documentation. If documentation is requested, the student will need to complete and submit the Student Medical Certificate. The instructor may not collect medical documentation. The advisors will contact the instructor when the medical documentation is received, and will outline the severity and duration of the medical challenge as expressed on the Student Medical Certificate and in any other supporting documentation. The student will be informed that the instructor has been notified of the presence of medical documentation, and will be instructed to work as quickly as possible with the instructor on an agreement for accommodation.

(b) **Consideration on Non-Medical Grounds: Consult Huron Support Services/Academic Advising, or email huronsss@uwo.ca.**

Students seeking academic consideration for a **non-medical** absence (e.g. varsity sports, religious, compassionate, or bereavement) will be required to provide appropriate documentation where the conditions for a Self-Reported Absence have not been met, including where the student has exceeded the maximum number of permissible Self-Reported. All consideration requests must include a completed Consideration Request Form. Late penalties may apply at the discretion of the instructor.

Please review the full policy on Academic Consideration for medical and non-medical absence at:
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf. Consult Huron Academic Advising at huronsss@uwo.ca for any further questions or information.

Support Services

For advice on course selections, degree requirements, and for assistance with requests for medical accommodation, students should email an Academic Advisor in Huron's Student Support Services at huronsss@uwo.ca. An outline of the range of services offered is found on the Huron website at: https://huronatwestern.ca/student-life/student-services/.

Department Chairs, Program Directors and Coordinators are also able to answer questions about individual programs. Contact information can be found on the Huron website at: https://huronatwestern.ca/contact/faculty-staff-directory/.

If you think that you are too far behind to catch up or that your workload is not manageable, you should consult your Academic Advisor. If you are considering reducing your workload by dropping one or more courses, this must be done by the appropriate deadlines. Please refer to the Advising website, https://huronatwestern.ca/student-life/student-services/academic-advising/ or review the list of official Sessional Dates on the Academic Calendar, available here: http://www.westerncalendar.uwo.ca/SessionalDates.cfm.

You should consult with the course instructor and the Academic Advisor who can help you consider alternatives to dropping one or more courses. Note that dropping a course may affect OSAP and/or Scholarship/Bursary eligibility.

Huron Student Support Services: https://huronatwestern.ca/student-life/student-services/
Office of the Registrar: https://registrar.uwo.ca/
Student Quick Reference Guide: https://huronatwestern.ca/student-life/student-services/#1
Academic Support & Engagement: http://academicsupport.uwo.ca/
Huron University College Student Council: https://huronatwestern.ca/student-life/beyond-classroom/hucsc/
Western USC: http://westernusc.ca/your-services/#studentservices

Mental Health & Wellness Support at Huron and Western
University students may encounter setbacks from time to time that can impact academic performance. Huron offers a variety of services that are here to support your success and wellbeing. Please visit https://huronatwestern.ca/student-life-campus/student-services/wellness-safety for more information or contact staff directly:

Wellness Services: huronwellness@huron.uwo.ca
Community Safety Office: safety@huron.uwo.ca
Chaplaincy: gthorne@huron.uwo.ca

Additional supports for Health and Wellness may be found and accessed at Western through, https://www.uwo.ca/health/.