

COMPSCI 2034B / DIGIHUM 2144B

Data Analytics: Principles and Tools

Winter 2022

Course Outline

1. Course Information

Lecture Schedule

<i>Prof. Morey</i>	Tuesdays 2:30pm to 4:30pm	AHB-1R40
--------------------	---------------------------	----------

Lab Schedule

This term there are 6 lab sections. Check Western's Academic Timetable 2021/2022 to see times and locations for these sections.

2. Instructor Information

Instructor	Email	Office	Office Hours*
Jim Morey	jmorey2@uwo.ca	MC 362	TBD

Teaching Assistants (TAs)	Email	Office Hours*
TBD		

Students must use their Western (@uwo.ca) email addresses when contacting their instructors or TAs. Include the course code (CS2034 or DH2144) in the subject line of emails you send regarding this course.

*Office hours will be held on Zoom unless announced otherwise.

3. Course Syllabus, Delivery Mode, Schedule

Course Description

A comprehensive and interdisciplinary introduction to data analytics using modern computing systems, with equal attention to fundamentals and practical aspects. Topics include sources of data, data formats and transformation, usage of spreadsheets and databases, statistical analysis, pattern recognition, data mining, big data, and methods for data presentation and visualization.

Course Learning Outcomes

- Describe types, sources, and facets of data.

- Use spreadsheets, macros and VBA to analyze data.
- Utilize programming constructs to process data.
- Explain relevant statistical analysis and machine learning techniques.
- Evaluate different visual artifacts for data presentation.
- Choose data analytics tools appropriate for data problems.

Lecture Topics

Data and information, Computing History, Spreadsheets, Statistics, Data Transformation, Regular Expressions, Excel Macros and VBA, Textual and Social Media Analytics, Data Visualization, AI, Machine Learning, Feature Classification, Data Ethics, Big data, Cloud Analytics

Key Sessional Dates:

Classes begin: January 10, 2022

Reading Week: February 19–27, 2022

Classes end: April 8, 2022

Classroom Mask Policy

Students will be expected to wear triple layer non-medical masks at all times in the classroom as per Western policy and public health directives. Students who are unable to wear a mask for medical or religious reasons must seek formal accommodation through Accessible Education at aew@uwo.ca.

Students are expected not to eat or drink while in class to ensure masks stay in place. Students will be able to eat and drink outside of the classroom during scheduled breaks.

Students unwilling to wear a mask as stipulated by Western policy and public health directives will be referred to the Department, and such actions will be considered a violation of the student Code of Conduct.

Contingency plan for an in-person class pivoting to 100% online learning

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, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

Course schedule

Week of	Topics (tentative)	lab topics (tentative)
Jan 10	Introduction	no lab
Jan 17	Data and information, Computing History and Hardware, Spreadsheets	lab 1: Spreadsheet Basics
Jan 24	Statistics, Data Prep & Transformation, RegEx	lab 2: Correlating Data Sources
Jan 31	Computation, Excel Macros and VBA	lab 3: Rank Analysis

Feb 7	VBA Programming Part 1	lab 4: Benford's Law
Feb 14	VBA Programming Part 2, debugging	lab 5: Debugging
Feb 28	Midterm	lab 6: TBA
Mar 7	VBA Programming Part 3, textual and social media analytic	lab 7: Course Calendar Search Engine
Mar 14	Data Visualization	lab 8: Visualization
Mar 21	AI, Machine Learning, Feature Classification	lab 8: Entropy and Decision Trees
Mar 28	Modeling and simulation	lab 10: Simulation
Apr 4	Data Ethics Big Data, Cloud Analytics	lab 11: TBD

4. Course Materials

The readings will come from online resources. As well, there is an optional electronic zyBook that will be used as a supplemental resource for spreadsheet reference. A subscription may be purchased online via zybooks.com or through the university bookstore (bookstore.uwo.ca).

Instructions for Subscribing to the zyBook

1. Sign in or create an account at learn.zybooks.com. Ensure that you use your UWO e-mail for your account so your participation can be properly recorded.
2. Enter zyBook code: TO BE POSTED ON OWL
3. Subscribe.

Weekly readings will be posted on OWL.

Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical Requirements

You are required to have a modern laptop or desktop computer. You must also have a reliable internet connection.

Office Hours are going to be held on Zoom, so it is recommended that you have a working microphone and webcam to join the office hours when you have a question.

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Assignments (3 at a1 6%, a2 6%, a3 8%)	20%
Labs (10 of 11 at 2% each)	20%
Midterm Test	25%
Final Exam	35%

If an assignment or lab has to be cancelled for any reason, the remaining assignment or lab weight will be prorated (scaled) for

Assignments

- There will be 3 assignments.
- Assignments are due 5 minutes before midnight (23:55) of the due date.
- All submissions will be submitted electronically through OWL. Details will be given in the assignment descriptions.
- Late assignments are strongly discouraged:
 - 15% will be deducted from a late assignment up to 24 hours after the due date/time.
 - 30% will be deducted from a late assignment 24 to 48 hours after the due date/time.
 - After 48 hours from the due date/time, late assignments will receive a zero grade.
- Any changes, updates, and clarifications to assignments will also be posted on the website. It is your responsibility to monitor these pages closely.
- A program that produces the correct output is not necessarily a “working” program; it must also satisfy the specifications given in the assignment description.
- Your assignment solutions are expected to be your own individual work, not the products of group effort. **You may not share your assignment solutions** with another student for any reason nor are you to request solutions from another student or make use of solutions available on-line. Such sharing of solutions is considered a scholastic offence and will be penalized as such.
- It is your responsibility to keep up-to-date off-site backups (e.g. on OneDrive or Dropbox) of assignment files. Retain copies of all material handed in, as well as the graded assignment, to guard against the possibility of lost assignments or errors in recording marks. You should keep these materials until you are satisfied that your final mark for the course has been computed properly.
- Assignments will be marked by the TAs, who follow marking schemes provided by the instructor.
- Every effort will be made to have assignments marked and handed back within 3 weeks after the due date, preferably sooner. When assignment marking has been completed, you will be informed via the course website and/or e-mail.
- You should direct any questions or appeals about marking to your TA. If your discussion with the TA is not satisfactory, you may further discuss the issue with the course instructor.
- A request for an adjustment in an assignment mark must be made within 1 week following the date the assignment is returned. All assignment marks are considered to be final after that date.

- The course instructor reserves the right to completely remark an appealed assignment. This may raise or lower the grade compared to that given by the TA.
- Extensions are only granted for approved accommodations from the Dean's Office, Academic Counselling or SSD (see Sections 10.5 and 10.6).

Tentative Assignment Due Dates:

Assignment 1	Thursday, February 3
Assignment 2	Monday, March 9
Assignment 3	Tuesday, March 28

Labs

- Labs start the week of January 17th and run to April 8th.
- There will be 11 equally weighted two-hour labs, worth 1% each. Only 10/11 labs are required.
- See the Western Timetable for location and time information.
- Labs will be run by TAs and act as practical tutorial sessions that may cover new material or review concepts discussed in lectures. Collaboration on lab problems with other students is allowed and encouraged.
- Lab descriptions will be posted on the OWL course site before the dates listed above. Any changes, updates, or clarifications to labs will also be posted on the website. It is your responsibility to monitor these pages closely.
- It is expected that you read over lab materials beforehand and come prepared to lab sessions with any required resources or reference material.
- As seating in labs is limited, **you are required to attend the lab section you are registered in.**
- To obtain full marks for a given lab session, you must attend the lab in person and complete the lab to the TA's satisfaction (see the Lab Rubric at the end of this document for details on how lab marks are evaluated).
- The TA's are not required to sign anyone out for the first 25 minutes of the lab session. This is to prioritize student questions.
- TAs may give a zero or reduced lab mark to students that are late to or do not work on lab material during the lab session. It is expected that students abstain from working on assignments during lab time until they have completed and received a mark for the lab. Labs cannot be made up for in future lab sessions or submitted via e-mail.
- Labs missed as part of an approved accommodation will result in the student's lab mark being reweighted to not include the missed lab. Please contact the course instructor as soon as possible if you have an accommodated lab absence.

Midterm Exam

An in-class Midterm will be held on March 1st during class time. More information will be given later and announced in class and/or on OWL. It will most likely be administered using OWL and Proctortrack. **There is NO MAKEUP exam for this course**, except for students who receive an accommodation for religious reasons. These students must have notified the course instructor and filed documentation with their Dean's office at least 2 weeks prior to the date of the Midterm Exam. Please consult University's list of recognized religious holidays (updated annually) at <https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

Final Exam

The final exam will be scheduled by the University. The exam period is from April 8 to 30 and the exact date, time, and location for our exam will likely be announced in March.

The final exam is cumulative, meaning it covers topics from the entire semester. However, the post-midterm topics are typically more prevalent than pre-midterm topics on the final exam.

Accommodated Evaluations

Accommodations are handled differently depending on the assessment type, as outlined below. Note that for any of these accommodations, you must submit a self-reported absence (SRA) or receive approval from academic counselling. You must follow up with the instructor of your section of the course within two days of obtaining the accommodation to confirm that it has been received. Failure to follow up within two days may result in the accommodation being void.

Labs – accommodations for a missed lab results in the lab weight being shifted to the final exam

Assignments – accommodations for an assignment results in a 48-hour extension (or longer if academic counselling recommends a longer extension).

Midterm – accommodations for missing the midterm results in the weight of the midterm being shifted to the final exam.

Final Exam – accommodations for missing the final exam results in the opportunity to write the make-up final exam. Note that SRAs **cannot** be used for the final exam.

6. Student Absences

Academic Consideration for Student Absences

Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

- (i) Submitting a Self-Reported Absence (SRA) form provided that the conditions for submission are met. To be eligible for a Self-Reported Absence:
 - an absence must be no more than 48 hours
 - the assessments must be worth no more than 30% of the student's final grade
 - no more than two SRAs may be submitted during the Fall/Winter term
- (ii) For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration.
- (iii) Submitting appropriate documentation for non-medical absences to the Academic Counselling office in their Faculty of Registration.

Note that in all cases, students are required to contact their instructors within 24 hours of the end of the period covered, unless otherwise instructed in the course outline.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For the policy on Academic Consideration for Student Absences – Undergraduate Students in First Entry Programs, see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

and for the Student Medical Certificate (SMC), see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

6. Accommodation and Accessibility

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

[https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf),

7. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

No electronic devices (including phones, calculators, etc.) are permitted on the midterm or final exam.

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 Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Code submitted for labs, assignments, and/or exams may be run through comparison-checking software such as MOSS to look for cases of cheating.

In the event of a lock-down or an unexpected mandate to hold tests online rather than in person, they would be conducted using a remote proctoring service such as Proctorio. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

<https://remoteproctoring.uwo.ca>.

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at (519) 661-2147 if you have any questions regarding accommodations.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (<http://www.health.uwo.ca/mentalhealth>) for a complete list of options about how to obtain help. Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.