

ITM 760 - Big Data Analytics

COURSE OUTLINE FOR 2026-2027

Semester, Section
Classroom, Class Time

Prerequisite(s): ITM 618

Antirequisite(s): ITM 805

Faculty/Contract Lecturer Information

- **Faculty/Contract Lecturer Name:**
- **Office Location:**
- **Office Hours:**
- **Phone:** (416) 979 – 5000, ext.
- **Course Website:** my.torontomu.ca (for courses using D2L)
- **Email Address:** youremail@torontomu.ca

Mode of Course Delivery: In person

[Academic Program Advising Contacts](#)

Chair/Director for this Course: Sameh Al Natour

Email Policy

Students are expected to monitor and retrieve messages and information sent through D2L and TMU email on a frequent and consistent basis. In accordance with the Policy on TMU Student E-mail Accounts ([Policy 157](#)), Toronto Metropolitan University (TMU) requires that any electronic communication by students to TMU faculty or staff be sent from their official university email account. Communications sent from other accounts may be disregarded.

Course Description

The objective of this course is to introduce topics in business analytics and data mining with special emphasis on Big Data. Topics may include, but are not limited to, Big Data processing systems, Big Data visualization, data stream mining and large-scale machine learning. Applications will be drawn from various areas such as social network analysis, recommendation systems, and web analytics. Students will gain knowledge on

the practical design principles of big data-driven solutions for purposes of business analytics.

Course Details

Teaching Methods

If you are registered in an in-person or a virtual classroom, instruction will take place at scheduled hours, following the approach outlined in D2L Brightspace. If you are registered in a Chang School Distance Education course, please follow the schedule, course outline and learning modules as outlined in D2L Brightspace.

Note: All assessments in this course, regardless of its delivery format, will be held in-person on campus. This applies to in-person, virtual, and online courses, including sections/courses delivered through the Chang School.

Course Materials

Textbook:

Title: Mining of Massive Datasets, 3rd Edition

Author: Jure Leskovec, Anand Rajaraman, Jeffrey David Ullman

Publisher: Cambridge University Press

ISBN: 978-1108476348 (Hardcopy), 978-1108684163 (e-book)

Price: \$87.17

Suggested/Recommended Textbook

Title: Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking

Author: Foster Provost, Tom Fawcett

Publisher: O'Reilly Media

ISBN-13: 978-1449361327

Price: \$74.95

Course Learning Outcomes

With rapid advances in computing power and dramatic expansion of data collection and storage capability, nowadays, businesses and organizations have collected vast amounts of data about their business processes. These data are modern-day treasure stores that can be mined to glean insights into a business' products, services and customers. Despite great efforts that have been made in the field of data analytics, there are still many

challenges while transcending towards Big Data. How can we discover actionable knowledge from dynamically changing data? How can we effectively combine human and machine intelligence to gain more effective insights from Big Data? This course is a business centric approach to Big Data Analytics where the focus is to train, design and development of techniques and technologies that can be used to answer these challenges. This course will discuss key business analytics techniques, frameworks, and strategies as they are employed to analyze large volumes of data and its application to intelligence discovery in different business area.

- Identify a business problem and translate it to an analytics problem and design data-driven solutions.
- Understand the unique challenges of processing and analyzing Big Data at the theoretical and practical level.
- Understand state of the art methods, practices and technologies behind the Big Data processing systems.
- Utilize data mining and machine learning methods to effectively and efficiently process Big Data to support a wide range of queries including business intelligence and data mining.
- Understand the issues involved in building and designing efficient big data systems, and the strategies, data-structures, and technologies used in the implementation of these systems

Academic Integrity

Academic integrity is integral to your learning, the credibility of your degree or certification, and the integrity of the university as a whole. [Senate Policy 60: Academic Integrity](#) defines academic misconduct, provides a non-exhaustive list of examples of behaviours that may be considered as academic misconduct, and explains how academic misconduct concerns are evaluated and decided. The entirety of the policy applies in this course. As well, please note that submitting work created in whole or in part by artificial intelligence tools unless expressly permitted by the faculty/contract lecturer, is considered a violation of Policy 60.

Generative AI Course Policy, Plagiarism Detection, and Virtual Proctoring

Generative AI Course Policy

Use of Generative AI (e.g. ChatGPT, Grammarly, Perplexity, DeepL Translator) to develop or assist with any ideas or material submitted for coursework is expressly prohibited in this course. Use of Generative AI in this manner will be considered a breach of Policy 60.

Turnitin or another originality detection software

Turnitin is a plagiarism prevention and detection service to which TMU subscribes. It is a tool to assist faculty/contract lecturers in determining the similarity between students' work and the work of other students who have submitted papers to the site (at any university), internet sources, and a wide range of books, journals and other publications. While it does not contain all possible sources, it gives faculty/contract lecturers some assurance that students' work is their own. No decisions are made by the service; it generates an "originality report," which faculty/contract lecturers must evaluate to judge if something is plagiarized.

Students agree by taking this course that their written work will be subject to submission for textual similarity review to Turnitin. We strongly recommend that faculty/contract lecturers can opt to have student's papers included in TMU's institutional repository rather than the default Turnitin repository. Use of the Turnitin service is subject to the terms-of-use agreement posted on the Turnitin website. Students who do not want their work submitted to this plagiarism detection service must, by the end of the second week of class, consult with their faculty/contract lecturer to make alternate arrangements. Students who choose not to have their papers screened for textual similarity review by turnitin may be required to submit additional work with their research essay. For example:

- an annotated bibliography of each source used in your paper; and/or
- the first few pages of each cited source used in your paper

Even when a faculty/contract lecturer has not indicated that a plagiarism detection service will be used, or when a student has opted out of the plagiarism detection service, if the faculty/contract lecturer has reason to suspect that an individual piece of work has been plagiarized, the faculty/contract lecturer is permitted to submit that work in a non-identifying way to Turnitin.

Copyright

The course materials provided to you are copyrighted, and may not be shared without my express written permission. Do not share these materials (e.g. course outline, lecture slides, assignment instructions) with others and do not post them on the internet during the course, or at any time after. If you do so, Policy 60 will apply.

Academic Integrity Resources

To learn more about Policy 60 and how to avoid academic misconduct, please review and take advantage of these resources:

- Policy 60: Academic Integrity: www.torontomu.ca/senate/policies/academic-integrity-policy-60/
- Academic Integrity Office website: www.torontomu.ca/academicintegrity
- “Academic Integrity in Space” game: <https://games.de.torontomu.ca/aio/#/>
- “Academic Integrity in Cyberspace!” game: <https://www.torontomu.ca/aic/#/>
- Student Life and Learning Support: www.torontomu.ca/student-life-and-learning/learning-support

If you are a student registered with Academic Accommodation Support (AAS):

Please inform your faculty/contract lecturer if you have test accommodation needs that include the use of assistive technology (including text-to-speech, dictation, or literacy software). Some software may require additional configurations by the faculty/contract lecturer, so it is important you inform them in advance and leverage the sample quiz to ensure the tools are compatible with the Brightspace Quiz in LockDown Browser.

However, not all Assistive Technology tools approved by AAS work well with Respondus' software; if your experience of the sample quiz does not function as expected, please notify your faculty/contract lecturer and/or Accommodation Facilitator.

Topics and Course Schedule

Week	Topic	Readings
1	Introduction to Big Data Analytics Get familiarized yourself with data analytics process, Big Data analytics terminology, concepts and challenges	Chapter 1 Lecture notes
2	MapReduce and the New Software Stack - Understand how distributed file systems and MapReduce work - Explain major big data environments such as Apache Hadoop and Apache spark - Describe main challenges in Big Data environments	Chapter 2 Lecture notes
3	Mining Data Streams - Understand concepts of data streams, data stream mining and main challenges - Explain how to do sampling over data streams	Chapter 4 Lecture notes
4	Mining Data Streams - Get familiarized with data stream processing models such as sliding window and decaying model - Understand how to filter data streams	Chapter 4 Lecture notes
5	Link Analysis - Understand how first generation of Web search engines were working - Describe popular link analysis methods such as PageRank	Chapter 5 Lecture notes
6	Advertising on the web - Describe online advertising terminology, concepts and challenges - Understand matching and ad-words problems	Chapter 8 Lecture notes
7	Midterm	
8	Large Scale Machine Learning (Nearest neighbors analysis and Perceptrons) - Understand supervised vs unsupervised learning techniques - Explain techniques such Nearest neighbors analysis and Perceptrons	Chapter 12 Lecture notes

Week	Topic	Readings
9	Large Scale Machine Learning (Discriminant-based classification) • Get familiarized with support vector machine for classification • Understand kernel methods	Chapter 12 Lecture notes
10	Recommendation Systems • Describe recommendation system models • Explain content-based and collaborative filtering approaches • Identify big data challenges in applying recommendation systems • Explain dimensionality reduction to recommendation systems	Chapter 9 Lecture notes
11	Mining Social Network-Graphs • Get familiarized with concepts of social networks as graphs • Describe clustering and community detection in social networks • Explain neighborhood properties to analyze social networks	Chapter 10 Lecture notes
12	Location-based Analysis • Get familiarized with location-based analysis process, concepts and techniques • Explain state-of-the-arts for location-based analysis.	Lecture notes

Evaluation

The grade for this course is composed of the mark received for each of the following components:

Evaluation Component	Due Date	Percentage of Final Grade	Anticipated Return Date
Assignment #1	Week 6	5%	Week 8
Assignment #2	Week 10	5%	Week 12
Course Project	Week 11	15%	Week 12
Midterm Exam	Week 7	30%	Week 8
Final Exam	TBA	45%	TBD
Final Grade		100%	

Note: Students must achieve a course grade of at least 50% to pass this course. At least 20% of the grade based on individual work will be returned to students prior to the last date to drop a course in good academic standing. For Fall 2026 this must be before Friday, November 20, 2026 and for Winter 2027 before Friday, April 2, 2027.

University Policies

Students must be reminded that they are required to adhere to all relevant university policies found in their online course shell in D2L and/or on [the Senate website](#).

Important Resources Available at Toronto Metropolitan University

- **Addressing Academic Concerns:** Students are expected to address any questions or concerns through open and timely communication with the course faculty/contract lecturer, as soon as they arise. If a concern cannot be resolved through this initial communication or if additional support is required, students are encouraged to reach out to their program advisor or the chair/director of the teaching department for further guidance. These individuals can help provide clarity, facilitate next steps, and ensure that matters are reviewed in a fair and appropriate manner.
- [The University Libraries](#) provide research [workshops](#) and individual consultation appointments. There is a drop-in Research Help desk on the second floor of the library, and students can use the [Library's virtual research help service](#) to speak with a librarian, or [book an appointment](#) to meet in person or online.
- [Student Life and Learning Support](#) offers group-based and individual help with writing, math, study skills, and transition support, as well as [resources and checklists to support students as online learners](#).
- You can submit an [Academic Consideration Request](#) when an extenuating circumstance has occurred that has significantly impacted your ability to fulfill an academic requirement. You may always visit the [Senate website](#) and select the blue radio button on the top right hand side entitled: Academic Consideration Request (ACR) to submit this request.

For Extenuating Circumstances, [Policy 167: Academic Consideration](#) allows for a once per semester ACR request without supporting documentation if the absence is less than 3 days in duration and is not for a final exam/final assessment. Absences more than 3 days in duration and those that involve a final exam/final assessment, always require documentation. Students must notify their faculty/contract lecturer once a request for academic consideration is submitted. See Senate [Policy 167: Academic Consideration](#).

Longer absences are not addressed through Policy 167 and should be discussed with your Chair/Director/Program to be advised on next steps.

- [FAQs Academic Considerations and Appeals](#)

- Information on Copyright:
 - [Copyright FAQs for Faculty/Contract Lecturers](#)
 - [Copyright FAQs for Students](#)
- Information on Academic Integrity:
 - [Academic Integrity for Faculty/Contract Lecturers](#)
 - [Academic Integrity for Students](#)

Accessibility

- At Toronto Metropolitan University, we are committed to ensuring that all courses are accessible to everyone and to removing barriers that may prevent some individuals from enrolling in courses.
- All technologies and tools used in this course are accessible.
- Students who discover an accessibility barrier with any of the course materials or technologies should contact their faculty/contract lecturer.
- As outlined in [Policy 159: Academic Accommodation of Students with Disabilities](#), students are required to proactively consult with AAS, the faculty/contract lecturer, Department or Faculty, as soon as feasible, including prior to enrolling in a course or program, on any concerns they may have about their ability to meet the essential academic requirements of a course/program.

Academic Accommodation Support

[Academic Accommodation Support](#) (AAS) is the university's accessibility services office, supporting students with disabilities. AAS works with students, faculty, and staff to create inclusive learning environments, reduce barriers, and promote accessibility across the university.

If you have (or suspect you may have) a disability, AAS can provide consultation, guide you through registration, develop accommodation plans where appropriate, and connect you with supports and services. For information about eligibility, documentation requirements, registration, deadlines, and available services, visit [AAS](#).

Academic Accommodations (for students with disabilities) and Academic Consideration (for short-term extenuating circumstances) are governed by **different university policies**. [Learn more about each process](#) and how to access support. Students registered with AAS may request academic consideration (related or unrelated to their disability) if they experience extenuating circumstances that impact their ability to meet their shorter term academic obligations. This includes short term physical or mental

health issues that are sudden/acute (e.g, the flu), unexpected illness or injury, hospitalization or treatment, and significant aggravation of a pre-existing condition. Please see [Policy 167: Academic Consideration](#) for more information and details.

Please note that there is no accommodation for missing/rescheduling or reweighting of tests - this is considered an alternate arrangement. Any student who misses a test/exam will be directed to submit an ACR to explore if possible alternate arrangements under [Policy 167: Academic Consideration](#) can apply .

Wellbeing Support

At Toronto Metropolitan University, we recognize that things can come up throughout the term that may interfere with a student's ability to succeed in their coursework. These circumstances are outside of one's control and can have a serious impact on physical and mental well-being. Seeking help can be a challenge, especially in those times of crisis.

If you are experiencing a mental health crisis, please call 911 and go to the nearest hospital emergency room. You can also access these outside resources at anytime:

- **Distress Line:** 24/7 line for if you are in crisis, feeling suicidal or in need of emotional support (phone: 416-408-4357)
- **[Good2Talk](#):** 24/7-hour line for postsecondary students (phone: 1-866-925-5454)
- **[GuardMe Student Support Program \(GMSSP\)](#):** 24/7 access to confidential support through counsellors via the [Student Support app](#) or 1-844-451-9700

If non-crisis support is needed, you can access these campus resources:

- **[Centre for Student Development and Counselling](#):** 416-979-5195 or email csdc@torontomu.ca
- **[Consent Comes First – Office of Sexual Violence Support and Education](#):** 416-919-5000 ext 3596 or email osvse@torontomu.ca
- **[Medical Centre](#):** call (416) 979-5070 to book an appointment

We encourage all Toronto Metropolitan University community members to access available resources to ensure support is reachable. You can find more resources available through the [Toronto Metropolitan University's Wellbeing Central](#) website.