



# Course outline for YCBS 256

## DATA SCIENCE FOR BUSINESS DECISIONS

**McGill University School of Continuing Studies**

*Technology & Innovation*

Taught by

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Section 039 for Winter 2024

8 CEUs

Non-credit course

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# 1 Course Information

**Office hours** Upon request

**Teaching Assistant** Thi Khanh

**Description** This course aims to provide an overview of how data science can help drive business decisions and create new business models. The emphasis is placed on data strategy and how to move from data to insight. The course explores the data science process and how companies could surmount the different challenges they face when implementing a data driven business including ethics, data governance and privacy. The evolution of data technology and storage, as well as application of data science tools and techniques to different business areas such as customer and web analytics, operations analytics, human resources related analytics are explored through examples from various fields such as retail, healthcare and marketing.

**Pre-requisites** No pre-requisites

**Co-requisites** No co-requisites

**Contact hours** 20 hours

**Independent study hours** Approximately 60 hours in total

**Learning outcomes** Upon completion of this course, you should be able to:

- Outline the various elements of a successful data driven strategy
- Analyze a business or an organization by using the Business Model Canvas, and how different data types and sources could be leveraged to create new business opportunities
- Explain the commonalities and the differences of the application of data analytics / science techniques within different industry sectors
- Apply critical thinking methods to understand the impact of data and algorithms on business and society taking into consideration ethical and legal issues
- Assess ethical and privacy considerations that arise when gathering, storing and working with data
- Re-frame a business question as a data question
- Apply tools, techniques and data visualization principles to different phases of the data cycle
- Appreciate the applications of Machine Learning to different business contexts
- Explain the key elements that constitute a properly implemented data governance framework

**Instructional methods** Online

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*The official version of this course outline is the version posted on myCourses on the day of the first class session.*

*In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.*



**Note on email policy** In accordance with McGill University's official email policy, the instructor *will not respond* to email messages sent from **outside** the McGill network (e.g., gmail or hotmail). As well, while instructors appreciate that email correspondence is an efficient method of communication, students should keep in mind that instructors are not on call. Students should therefore not expect a response to emails during the weekend or after 5:00 p.m., Mondays through Fridays.

Prior to contacting instructors via email, students seeking course-related information, including information about assignments, should first attempt to locate that information by (a) consulting the course syllabus or textbook, (b) consulting materials uploaded to the course website (myCourses), or (c) consulting with other students in the class. Generally speaking, during the week, a valid request submitted via e-mail will receive a response within 36 hours, exclusive of weekends and statutory holidays.

## 1.1 Evaluation

%	Item	Deadline	Description
5	Attendance and active participation	See myCourses for more information	This course consists of a community of learners of which you are an integral member; your active participation is therefore essential to its success. This may include elements such as reviewing class content, visiting myCourses, carrying out readings and exercises, including group work and study groups, and engaging in discussions or other activities with the instructional team and/or the other participants, synchronously or asynchronously.
20	Quiz	Weekly	Multiple Choice Questions
10	Learning Journals	Weekly	Free Form Document
5	In-Class Assessment Report	Week 2	Group Activity
5	In-Class Assessment: Quiz	Week 6	Individual Activity
5	DataCamp Assignments	Week 1 to Week 5	Individual take-home assignment
15	Exploratory Data Analysis with Alteryx	Week 7: Individual take-home assignment	8 hours
15	Exploratory Data Analysis with Tableau	Week 9	Individual Take Home Assignment
20	Business Case	In-Class Team Project	Week 10



## 1.2 Course Content

### 1. Introduction to Data Science and Analytics

- Course logistics and Introduction to Data Science
- Introduction to Data Science and Analytics
- Alteryx Hands-on Exercises In/Out & Preparation tools
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 1

### 2. Ethics in AI

- Introduction to Ethics in AI -Backgrounder
- Ethics in AI Workshop
- Tableau Hands-on Exercises Connecting to Data Sources
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 2

### 3. Law and Privacy

- Introduction to Law and Privacy
- Law and Privacy
- Alteryx Hands-on Exercises Join and Parse Tools
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 3

### 4. Industry Disruption

- Introduction to Disruption
- Industry Disruption
- Tableau Hands-on Exercises Processing Data
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 4

### 5. Critical Thinking

- Introduction to Critical Thinking
- Critical Thinking with Data



- Alteryx Hands-on Exercises Data Investigation Tools
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 5

#### 6. Data Strategy

- Introduction to Data Strategy
- Data Strategy
- Tableau Hands-on Exercises Displaying Data
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 6

#### 7. Data Science Process

- Introduction to Data Science Process
- Data Science Process
- Alteryx Hands-on Exercises Transform
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 7

#### 8. Visualization Techniques and Storytelling

- Introduction to Visualization Techniques and Storytelling
- Visualization Techniques and Storytelling
- Tableau Hands-on Exercises Dashboards and Stories
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 8

#### 9. Analytics Techniques

- Introduction to Analytics Techniques
- Analytics Techniques
- Alteryx Hands-on Exercises Predictive Tools
- Module Questionnaire (Quiz)
- Learning Journal
- Tutorial 9

#### 10. Analytics Business Case



- Solve an Analytics Business Case
- Analytics Business Case
- Course Evaluation
- Learning Journal





## **2 Materials**

Please note that any electronic materials available on the LMS will be accessible to students for six months after the conclusion of the course.

### **2.1 Hardware**

#### **2.1.1 Required computer hardware**

- At least 16 GB of RAM
- At least 250 GB free disk space

### **2.2 Software**

#### **2.2.1 Required software and services**

- Zoom
- Web browser to access the LMS myCourses
- Google Chrome, specifically
- MS Suite (Word, Powerpoint, Excel)
- Alteryx
- Tableau

#### **2.2.2 Recommended software and services**

- For the YCBS-256, Linux is not an ideal environment.
- Mac and PC users should have admin access rights to install Tableau.
- Alteryx does not require admin access rights.
- Mac users will need to install a virtual environment (e.g. Bootcamp or VM Parallels) to run Windows for Alteryx

### **2.3 Connectivity**

- 100 Mbps or above

## 2.4 Required Readings

INFORMS Analytics body of Knowledge <https://mcgill.on.worldcat.org/oclc/1054129045>

# 3 Additional Course Information & Support

## 3.1 Student Support

Please note that there is an **MS Team for all Technology & Innovation students** you are encouraged to join: log into Microsoft Teams with your McGill email and use the join code `e8i8f26` in the lower-left corner ("Join or create a team").

You can email [help.ti.scs@mcgill.ca](mailto:help.ti.scs@mcgill.ca) for technical-academical assistance and [ti.scs@mcgill.ca](mailto:ti.scs@mcgill.ca) if you have administrative academic questions.

## 4 Important Information

### 4.1 Land Acknowledgment

McGill University is located on land, which has long served as a site of meeting and exchange amongst Indigenous peoples, including the Haudenosaunee and Anishinabeg nations. McGill honours, recognizes and respects these nations as the traditional stewards of the lands and waters on which we meet today.

### 4.2 McGill Resources for Academic Success

**Inclusive Learning Environment** McGill is committed to providing an inclusive and supportive learning environment. If you experience barriers to learning in this course, do not hesitate to discuss them with your instructor. If you have a special learning need or disability, you are encouraged to contact *Student Accessibility & Achievement*. For more information, please visit <https://www.mcgill.ca/access-achieve/>.

**Health and Wellness** Student well-being is a priority for the University, the School (SCS), and the McGill Association of Continuing Education Students (MACES). Should you find yourself in need of support, please keep in mind that there are a number of resources available to help you. Many SCS students are automatically covered by the MACES Health and Dental Plan. For further details, please visit <https://maces.ca/>. In addition, eligible students will also be covered by a virtual healthcare service provided by *Dialogue* through MACES. The Dialogue service allows students to connect virtually with nurses and physicians in Canada via a mobile or web app. Both the MACES Health and Dental Plan and the Dialogue app include access to professional psychologists. MACES students also currently have free access to Keep.meSAFE, a psychological counselling service where students can speak to a counsellor in one of six languages. For more information, please visit <https://www.mcgill.ca/continuingstudies/student-services>.

**McGill Writing Centre** Writing well is key to both academic and professional success. The *McGill Writing Centre* (MWC) offers credit courses in academic and professional writing, and a tutorial service open to all McGill students. The tutorial service offers one-to-one sessions with seasoned instructors and experienced tutors who will work with you at any stage of the writing process. For information about the availability of in-person and online appointments, please visit <https://www.mcgill.ca/mwc/tutorial-service>.

**McGill Library** Find a workshop, learn about library services, and reach out to your liaison librarian for research help at <https://www.mcgill.ca/library/orientation>.

### 4.3 Academic Conduct

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the *McGill Code of Student Conduct and Disciplinary Procedures*.

**The work submitted for all assessments is expected to be your own. The use of technologies such as ChatGPT are prohibited and will be considered a violation of the Code of Student Conduct.**

See <https://www.mcgill.ca/students/srr/honest/> for more information.

**Academic Integrity** Students are responsible for knowing McGill's rules and regulations concerning academic honesty, which can be found on the Student Rights and Responsibilities website. Violations of academic integrity undermine not only the value of honest students' work, but also the academic integrity of the University and the value of a McGill credential. The Student Rights and Responsibilities website provides resources that can help students avoid dishonest work, and an explanation of the disciplinary measures that go with it. **All newly admitted students must complete the Academic Integrity Tutorial (AIT) in Minerva during their first semester at McGill.** Failure to complete the tutorial will restrict the student from registering for courses in the following semester. The Tutorial can be accessed as follows: Minerva / Student Menu / Academic Integrity Tutorial.

**Respectful and Professional Communication** This course is designed to help you learn to communicate professionally both during your time at McGill and in your future workplaces. In keeping with McGill's policies on student rights and responsibilities, it is expected that during class discussions and small group interactions you will communicate constructively and respectfully. Sexist, racist, homophobic, ageist, and ableist expressions will not be tolerated in the classroom or during group meetings held outside of class.

To learn more about these policies, please consult <https://mcgill.ca/students/srr/policies-student-rights-and-responsibilities>.

Students **may not record any class proceedings** or collect any electronic data (including photos and videos) from class activities without the express consent of the instructor. Instructor generated course materials (e.g., handouts, notes, summaries, test questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without the explicit permission of the instructor. Note that infringements of copyright can be subject to followup by the University under the *Code of Student Conduct and Disciplinary Procedures*.

## 4.4 Policy Against Sexual Harassment and Violence

McGill University is committed to creating and sustaining a safe environment through proactive, visible, accessible, and effective approaches that seek to prevent and respond to sexual harassment and sexual violence. McGill's Policy against Sexual Violence underlines this commitment and ensures that procedures are in place to address complaints. To learn more, visit <https://www.mcgill.ca/osvrse/>.

## 4.5 Policy on Harassment and Discrimination

McGill University is committed to promoting an equitable environment where the fundamental dignity of all of its members is respected. The objectives of *McGill's Policy on Harassment and Discrimination Prohibited by Law* are to promote education and awareness about equity issues and to ensure that procedures are in place to address complaints. To learn more about McGill's policy, including how to report a complaint, please visit <https://www.mcgill.ca/how-to-report/>.

## 4.6 Right to Submit in English or French

In accord with McGill University's *Charter of Students' Rights*, students in this course have the right to submit in English or in French any written work that is to be graded. This does not apply to courses in which acquiring proficiency in a language is one of the objectives.

Please reach out to the instructors and the assistants to inquire if they are able to additionally advise you in other languages, remembering that they are not required to do so. If you do share a language, there is no impediment to using that in informal discussions, as long as submitted work and any written agreements and complaints are either in English or in French.

## 4.7 Grades

### 4.7.1 Final Grades

For **non-credit courses** (that are measures in CEUs), the official final course grade is the one that appears in the *Athena Student Portal* on your Record of Study.

A final grade appearing in other locations (for example, myCourses) may be subject to change. The School of Continuing Studies reserves the right to correct mistakes.

### 4.7.2 Non-Credit Course Grading System

Result	Numerical Scale (%)	Letter Grade
Pass	85–100	A
	80–84	A-
	75–79	B+
	70–74	B
	65–69	B-
Failure	0–64	F

You must obtain a grade of B- or better to fulfil program requirements. You may not register in a course unless you have passed all the prerequisite courses with a grade of B- or better.

**What does a final course grade of *J* mean?** A *J* grade is a failing grade due to either (i) an unexcused absence for an official final exam, or (ii) failure to submit required work worth more than 20% of the final grade for the course as a whole. A *J* grade is calculated as a failure.

## 4.8 Assessments

Work submitted for evaluation as part of this course **may be checked with text-matching software** within my-Courses.

To learn more about assessment of student work, consult McGill's Student Assessment Policy at [https://mcgill.ca/secretariat/files/secretariat/2016-04\\_student\\_assessment\\_policy.pdf](https://mcgill.ca/secretariat/files/secretariat/2016-04_student_assessment_policy.pdf).

### 4.8.1 Assignments

Please refer to Section 1.1 concerning assignment submission for this course. Unless this outline or another written document from your instructor authorizes you to **share** the assignment results online or directly, please keep the questions and the responses *confidential*.

Legitimate exceptions for late submission of assignments include documented medical, family, and personal emergencies, and observance of holy days. Students planning to observe holy days (see <https://www.mcgill.ca/importantdates/holy-days-0/policy-holy-days>) listed in the McGill calendar should notify the instructor by email no later than two (2) weeks prior, and preferably at the beginning of the course.

### 4.8.2 Examinations

If the course includes exams, students should not make other commitments during a scheduled exam, which is indicated on your course outline. Vacation plans do not constitute valid grounds for the deferral or the rescheduling of examinations, tests or assignments. See the School of Continuing Studies Calendar for the regulations governing examinations, or go to <https://www.mcgill.ca/continuingstudies/current-students/exams>.

Students who have a documented disability and require academic accommodation must contact *Student Accessibility & Achievement*. For information on Exam Accommodation, visit <https://www.mcgill.ca/osd/exams> and <https://mcgill.ca/osd/student-resources/forms/scs-accommodation-request>.

Students may *request a deferral* of final examinations or timed tests and assignments for medical reasons or out-of-town business commitments, which must be justified in writing with a medical certificate or company letter. To learn more, visit <https://www.mcgill.ca/continuingstudies/exams-conflicts-deferrals-and-rereads>.

Students requesting the *rescheduling of a mid-term examination(s)* due to a religious, business-related, or scheduling conflict must submit the Mid-term Examination Conflict form, together with supporting documentation, to the School of Continuing Studies, Client Services Office, at least two (2) weeks prior to the date of the scheduled mid-term examination(s). Students who miss a mid-term examination(s) due to medical reasons must complete and submit the *Mid-term Examination Conflict form*, with supporting documentation, within two (2) business days from the date of the missed mid-term examination(s). The forms are available at <https://www.mcgill.ca/continuingstudies/forms>.

Examination schedules are posted online approximately six (6) weeks before the examination period begins. The exam schedule can be found at <https://www.mcgill.ca/continuingstudies/important-dates-exam-information>.

## 4.9 Resources

**Student Services** Various services are available to Continuing Studies students. To learn more, visit <https://www.mcgill.ca/continuingstudies/getting-started>.

**Students with Disabilities** McGill is committed to providing an inclusive learning environment. If you experience barriers to learning in this course, do not hesitate to discuss them with me. If you have a special learning need or disability, you are encouraged to contact *Student Accessibility & Achievement*. To learn more, visit <https://www.mcgill.ca/access-achieve>.

**Computer Labs** Free access to computer labs is available at 688 Sherbrooke (12th floor), MACES, the McLennan Library and other locations on campus.

**MACES** The McGill Association of Continuing Education Students (MACES) is located at 3437 Peel, 2nd floor, tel. (514) 398-4974. To learn more, visit <https://maces.ca/>.

**Career Advising and Transition Services** Gain the clarity, skills, confidence and connections you need to succeed in your career thanks to the support provided by *Career Advising and Transition Services* (CATS). To learn more, visit <https://www.mcgill.ca/continuingstudies/career-advising-and-transition-services>.

**myCourses** Please check the myCourses site on a daily basis. Failure to do so may result in your missing important information. Neither absence from class nor failure to check myCourses is an acceptable excuse for being unaware of important course-related information.

**Athena** For non-credit courses, access your **student profile and course information** including online access to myCourses at <https://continuingstudies.mcgill.ca/portal/logon.do?method=load>.

**IT Support** Information related to online resources such as email, VPN, myCourses, etc. can be found at IT Services <https://www.mcgill.ca/it/>.