

**Commerce 4KG3  
Data Mining and Business Intelligence  
Winter 2020 Course Outline  
Information Systems Area  
DeGroot School of Business  
McMaster University**

**COURSE OBJECTIVE**

Business intelligence (BI) is a technology-driven process for analyzing data and presenting actionable information to help corporate executives, business managers and other end users make more informed business decisions. Students will learn the concepts, techniques, and applications of data mining for business intelligence through lectures, class discussions, hands-on assignments, and seminar presentations. Data mining and business intelligence is a very important topic in information systems area as well as in other areas such as finance, marketing, supply chain management, healthcare etc. It will help students to advance in their future career.

**INSTRUCTOR AND CONTACT INFORMATION**

**Dr. Yufei Yuan**  
**Instructor**

[yuanyuf@mcmaster.ca](mailto:yuanyuf@mcmaster.ca)

Office: DSB A204

Office Hours:

To be arranged

Tel: (905) 525-9140 x23982

**Fateme Akbari**  
**TA**

[akbarif@mcmaster.ca](mailto:akbarif@mcmaster.ca)

Office: DSB A211

Office Hours:

To be arranged

Tel: (905) 525-9140 x

**Class Time: Wednesdays 11:30-2:20 pm**

**Classroom: DSB B105**

**Course Website:** <http://avenue.mcmaster.ca>

**COURSE ELEMENTS**

Credit Value: 3	Team skills: Yes	IT skills: Yes	Global: Yes
Avenue: Yes	Verbal skills: Yes	Numeracy: No	Political: No
Participation: Yes	Written skills: Yes	Innovation: Yes	Social: No

**COURSE DESCRIPTION**

This advanced commerce course introduces basic data mining technologies and their use for business analytics. Students will learn how to analyze the business needs for knowledge discovery in order to create competitive advantages and how to apply data mining technologies appropriately in order to realize

their real business value. Students will gain hands-on experience through assignments and learn from real world practice through seminar presentations.

The course will cover the following topics:

- The need for business intelligence
- Data mining concepts, methods, and process
- Data mining technologies
- Data mining applications
- Data mining case studies

## LEARNING OUTCOMES

Upon completion of this course, students will be able to complete the following key tasks:

- Understand the basic concept of business analytics
- Understand the basic concept and the process of data mining
- Learn basic data mining technologies
- Learn how to use business analytics to solve business problems

## REQUIRED COURSE MATERIALS AND READINGS

[Yuan]Yufei Yuan, “4KG3 Lecture Notes” available at Avenue course website	Free
[Shmueli] Galit Shmueli, Peter C. Bruce, Mia L. Stephens, and Nitin R. Patel, “Data Mining for Business Analytics: Concepts, Techniques, and Applications with JMP PRO”, John Wiley & Sons, Inc. 2017, (ISBN 9781118877432)	\$ 135.00
JMP Documents (In JMP software Home window, select help > books)	Free

## OPTIONAL COURSE MATERIALS AND READINGS

Reference Textbook (Reserved in INNIS Library)

[Sharda] Ramesh Sharda, Dursun Delen, and Efraim Turban, “Business Intelligence, Analytics and Data Science: A Managerial Perspective”, 4th edition, Pearson Prentice Hall, 2018 (ISBN 978-0-13-463328-2)	\$113.80
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Reference Material on the Web

- [W1] The resource for business intelligence <http://www.businessintelligence.com/>
- [W2] SAS Business Intelligence <http://www.sas.com/technologies/bi/>
- [W3] Microsoft Business Intelligence <http://www.microsoft.com/bi/>
- [W4] Data warehouse information centre <http://www.dwinfocenter.org/>
- [W5] Guide to Data Mining <http://www.data-mining-guide.net/>
- [W6] BI service Adastracorp Canada <http://www.adastracorp.com/>
- [W7] Dataset for data mining <http://www.kdnuggets.com/datasets/>
- [W8] Data Mining Book <http://www.dataminingbook.com/>
- [W9] Conferences / Workshops [http://www.kmining.com/info\\_conferences.html](http://www.kmining.com/info_conferences.html)
- [W10] IBM Power System <https://www.ibm.com/power/solutions/bigdata-analytics>

<b>EVALUATION</b>
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Learning in this course results primarily from reading, in-class discussion, assignments, seminars, and exams. Final exam is in the form of true/false, multiple choices and sort-answer questions. Your final grade will be calculated as follows:

**Components and Weights**

Assignment 1	Linear Regression (individual)	10%
Assignment 2	Decision tree analysis (individual)	10%
Assignment 3	Clustering analysis (individual)	10%
Assignment 4	Neural Networks (individual)	10%
Seminar proposal	Business analytics applications (group)	5%
Seminar presentation	Business analytics applications (group)	10%
Final Exam	Cover materials for the full course (individual)	45%
Total		100%

NOTE: The use of a McMaster standard calculator is allowed during examinations in this course. See McMaster calculator policy at the following URL:

[www.mcmaster.ca/policy/Students-AcademicStudies/UndergraduateExaminationsPolicy.pdf](http://www.mcmaster.ca/policy/Students-AcademicStudies/UndergraduateExaminationsPolicy.pdf)

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme:

LETTER GRADE	PERCENT	LETTER GRADE	PERCENT
A+	90-100	C+	67-69
A	85-89	C	63-66
A-	80-84	C-	60-62
B+	77-79	D+	57-59
B	73-76	D	53-56
B-	70-72	D-	50-52
		F	0-49

**Communication and Feedback**

Students who wish to correspond with instructors or TAs directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student. Emails regarding course issues should NOT be sent to the Area Administrative Assistants.

Instructors may solicit feedback via an informal course review with students by Week #4 to allow time for modifications in curriculum delivery.

## **ACADEMIC INTEGRITY**

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at:

[www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity)

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations

## **AUTHENTICITY/PLAGIARISM DETECTION**

In this course we will be using a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. Students will be expected to submit their work electronically either directly to Turnitin.com or via Avenue to Learn (A2L) plagiarism detection (a service supported by Turnitin.com) so can be checked for academic dishonesty. Students who do not wish to submit their work through A2L and/or Turnitin.com must still submit an electronic and/or hardcopy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com or A2L. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). To see the Turnitin.com Policy, please go to:

[www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

## **ONLINE COURSE COMPONENTS**

In this course we will be using X\*. Students should be aware that when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure.

If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

X\* = e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, ThinkingCap, etc

## **REQUESTING RELIEF FOR MISSED ACADEMIC WORK**

Students may request relief from a regularly scheduled midterm, test, assignment or other course components. Please refer to the policy and procedure on the DeGroote website at the link below;

<http://ug.degroote.mcmaster.ca/forms-and-resources/misled-course-work-policy/>

## **STUDENT ACCESSIBILITY SERVICES**

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail [sas@mcmaster.ca](mailto:sas@mcmaster.ca).

For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities:

<http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

## **ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)**

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request, including the dates/times needing to be accommodated and the courses which will be impacted, to their Faculty Office normally within 10 days of the beginning of term or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

## **POTENTIAL MODIFICATIONS TO THE COURSE**

The instructor reserves the right to modify elements of the course during the term. There may be changes to the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

The University reserves the right to change the dates and deadlines for any or all courses in extreme Circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

## RESEARCH USING HUMAN SUBJECTS

All researchers conducting research that involves human participants, their records or their biological material are required to receive approval from one of McMaster's Research Ethics Boards before (a) they can recruit participants and (b) collect or access their data. Failure to comply with relevant policies is a research misconduct matter. Contact these boards for further information about your requirements and the application process.

McMaster Research Ethics Board (General board): <https://reo.mcmaster.ca/>

Hamilton Integrated Research Ethics Board (Medical board): <http://www.hireb.ca/>

## ACKNOWLEDGEMENT OF COURSE POLICIES

Your enrolment in Commerce 4KG3 will be considered to be an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on A2L. **It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.**

Lack of awareness of the course policies **cannot be invoked** at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand.

**COURSE SCHEDULE (SUBJECT TO POSSIBLE MODIFICATION)**

**COMMERCE 4KG3  
Winter 2019 Course Schedule**

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Readings/Assignments</b>
1	Jan. 8	Introduction to business analytics	[Shmueli] Ch. 1
2	Jan. 15	Data mining objectives, functions and process	[Shmueli] Ch. 2 Seminar proposal (due on Jan. 21)
3	Jan. 22	Learning to use JMP PRO Data explore and preparation	[Shmueli] Ch. 3, 4
4	Jan. 29	Multiple linear regression Case: Predicting Used Car Prices	[Shmueli] Ch. 5, 6 [Shmueli] Ch. 6 Problem 6.1 pp. 150-151 Assignment 1 (due on Feb. 4)
5	Feb. 5	Classification performance evaluation K-Nearest Neighbors The Naïve Bayes Classifier	[Shmueli] Ch. 7, 8
6	Feb. 12	Classification and Regression trees Case: Acceptance of Personal Loan	[Shmueli] Ch. 9 [Shmueli] Ch. 9.4 Example 2. p.193 Assignment 2 (due on Feb. 25)
7	Feb.17-21	Spring recession	
8	Feb. 26	Association rules and cluster analysis Case: EastWest Airlines Frequent Flier Program	[Shmueli] Ch. 14 [Shmueli] Ch. 18.6 Assignment 3 (due on Mar. 4)
9	Mar. 4	Logistic regression and combining methods	[Shmueli] Ch. 10, 13
10	Mar. 11	Neural Nets Case: Winery classification	[Shmueli] Ch. 11, Assignment 4 (due on Mar. 18)
11	Mar. 18	Business performance management	

12	Mar. 25	Guest speech (to be arranged) Course review	
13	April 1	Student Seminar	Presentation and evaluation

## ***Student Seminar Guidelines***

### **Objective:**

To present a research topic that investigate the application, the new trend, and the issues associated with data mining and business intelligence. Students are expected to work as a team with up to 3 students.

### **Topic Selection:**

The topic of your seminar may be on any contemporary issue relating to data mining technology and business applications. Following are suggested but not limited topics:

1. Issues and challenges of big data and business analytics
2. Review business analytics applications in a special field
3. Business analytics case study
4. Advances of data mining technologies
5. Security and privacy issues of big data collection and data mining
6. Data mining application success factors
7. New trends of big data and business analytics

### **Tasks:**

1. You are expected to form a team with up to 3 students and submit a proposal for the topic presentation. The proposal should include the team member name, title, brief description of the topic under investigation, research method, references.
2. Student teams will be assigned to present their topic in one of the four student seminar slots based on your choice and the similarity of your topic with other teams.
3. You may search and collect relevant information from news and articles from variety of sources but mainly from Internet. You need to have clear focus and to organize your presentation in a meaningful way.
4. Each team should prepare a well-designed PowerPoint presentation file with about 10-15 slides. The file should be submitted to the drop box the day before presentation.
5. Each team will make 12 minutes presentation plus 3 minutes discussion. Student presentation will be evaluated by classmates and the instructor based on the well-defined objectives, the business value of the project, the interesting content and useful references, the quality of presentation and knowledgeable discussion.