



MEMORIAL UNIVERSITY OF NEWFOUNDLAND
Faculty of Business Administration

Business 4720
Business Analytics

Course Information and Schedule for Winter 2024

CONTACT INFORMATION

Instructor: Joerg Evermann
Office: BN-3024
Office hours: By appointment. As well, feel free to drop by my office at any other time (if my office door is open).
E-mail: jevermann@mun.ca
Note: All email correspondence with current students must be through @mun.ca email accounts. If you have not already set up your @mun.ca account, please do so at my.mun.ca.

COURSE DESCRIPTION AND PREREQUISITES

Business analytics introduces concepts and techniques to select, evaluate, prepare, and process data for decision making in organizations. Students learn to select and apply descriptive, predictive, and prescriptive techniques, including deep learning, sequence analysis, and text mining, to solve business problems, and learn to interpret and communicate results. The course also examines ethical and legal issues in the use of business analytics and discusses appropriate governance and oversight. Students analyze real-life data using modern software.

PR: BUSI 2720, MATH 1000, STAT 2500

COURSE OBJECTIVES

Statements referencing the course content and course objectives should be included here. For example:

Learning objectives

By the end of this course, you will be able to:

- List and explain core statistical, computational, and mathematical concepts in business analytics and demonstrate corresponding techniques.
- Specify data requirements and evaluate the quality and suitability of various, possibly heterogeneous data sources for different analytics techniques and analytics problems.
- Evaluate the applicability of different descriptive, predictive, and prescriptive business analytics techniques to a variety of business problems.
- Apply descriptive, predictive, and prescriptive business analytics methods to identify and solve business problems.
- Present and interpret analysis results for use in decision making.
- Identify and explain potential ethical and legal problems with different applications of business analytics.
- Specify appropriate limitations and governance/oversight mechanisms to business analytics to address ethical and legal concerns.

Program Learning Goals

Through our undergraduate programming, students acquire a wealth of fundamental business knowledge. In addition, through our program learning goals, we instill a number of important skills, attitudes and behaviours in our graduates that help them to be effective and successful in a wide range of business situations.		
Our graduates will be:	Learning Goal	How this Course Reinforces the Goal
Innovative	Our graduates are able to adapt to complex and changing environments and, when conditions warrant, actively seek new solutions.	You will learn how to use modern analytics techniques to solve problems
Communicators	Our graduates are able to effectively communicate information that is appropriate for the intended audience, purpose and context.	You will learn how to visualize data for presentation and communication.
Thinkers	Our graduates are able to draw meaning from information, to make logical connections and formulate balanced and informed decisions.	You will interpret analytics results.
Our graduates will have:	Learning Goal	How this Course Reinforces the Goal
Business and Social Acumen	Our graduates are able to demonstrate the professional knowledge, skills, and attitudes required to succeed in the business	

	world.	
Ethical Awareness	Our graduates are able to identify and investigate ethical dilemmas as they arise and, when conditions warrant, propose and defend solutions.	You will identify and discuss ethical issues in using analytics.
Global Perspective	Our graduates are able to investigate the world beyond their immediate environment and can distinguish global issues and stakeholder perspectives that may impact or be impacted by business activities.	

Land Acknowledgement

The island of Newfoundland is the ancestral homeland of the Mi'kmaq and Beothuk. The Inuit of Nunatsiavut and NunatuKavut and the Innu of Nitassinan, and their ancestors, are the original inhabitants of Labrador.

This land acknowledgement is made as a call to action for greater reciprocity with First Nations, Inuit, and Métis, and to recognize that Memorial University is founded on—and continues to benefit from—land taken from Indigenous Peoples. Through this course and within the classroom we strive to create and uphold respectful relationships with all communities—Indigenous, immigrant, refugee, visitor, and settler—as we work towards a more just future.

Assurance of Learning - Course Embedded Assessment

If you have been informed that assessment will be conducted in your course, please include the following statement:

The Faculty of Business Administration and its programs are accredited by the Association to Advance Collegiate Schools of Business International (AACSB). As part of the maintenance of its accreditation, the Faculty must provide assurance of student learning in its degree programs.

Assessment of learning for our accreditation may be carried out in this course. The assessment will be conducted later in the semester and may be in the form of an in-class essay on a particular topic. Participation marks will be awarded for completing the essay and no prior preparation will be required; it will be analyzed anonymously for accreditation purposes but your mark in the course will not be affected by its content. Work you submit as part of the requirements for the course may be analyzed for accreditation purposes. This analysis will not affect your grade in the course. Further information will be provided as necessary.

The assessment of learning will be used by the Faculty to maintain and improve the quality of student learning. This is a very important consideration for the Faculty's accreditation and its reputation.

COURSE MATERIALS

Additional readings

Additional readings may be assigned throughout the course as and when necessary. They will be posted on the Brightspace course web space.

COURSE FORMAT

Classes

This course meets twice weekly for 75-minute classes. To get the most out of this course, you should attend all classes. Classes are heavily hands-on, using computer software and will include in-class exercises.

When class time is limited, at the discretion of the instructor and on a case-by-case basis, some in-class exercises may be assigned as homework to be completed prior to the following class.

In-class exercises must be submitted via Brightspace.

Evaluation

Due date	Item	Value
Classes 2 through 24	In-class exercises*	30%
February	Midterm 1	15%
March	Midterm 2	15%
TBA	Final examination	40%
Total:		100%

* When class time is limited, at the discretion of the instructor and on a case-by-case basis, some in-class exercises may be assigned as homework to be completed prior to the following class.

In-class exercises and assignments must be submitted via Brightspace.

Exemptions from Parts of the Evaluation

1. For information and procedures regarding exemptions from final examinations, refer to [Exemptions From Final Examinations and Procedures for Applying to Write Deferred Final Examinations](#).
2. A student is, at times, prevented from completing a part of the evaluation by illness or medical conditions of less than five calendar days' duration. In such cases, a student may apply for an alternate evaluation by declaring to the relevant instructor that the student has experienced such an illness or medical condition. This declaration must be made in writing through the student's University

- approved e-mail account. This declaration should be made in advance of the original date on which an in-class part of the evaluation is to be held or a take-home part of the evaluation is due, wherever possible, but no later than 48 hours after the original date of the part of the evaluation.
3. A student who is prevented from completing a part of the evaluation by illness of at least five calendar days' duration, bereavement or other acceptable cause, duly authenticated in writing, may apply for an alternate evaluation. This application should be made in advance of the original date on which an in-class part of the evaluation is to be held or a take-home part of the evaluation is due, wherever possible, but no later than 48 hours after the original date of the part of the evaluation. If application is made by telephone, written confirmation must then be received by the head of the appropriate academic unit within seven calendar days of the original date of the part of the evaluation. The following supporting documentation is required:
 - For illness or medical conditions, medical documentation from a health professional is required. This should normally be in the form of the Student Health Certificate, available at www.mun.ca/regoff/forms.php.
 - For bereavement or other acceptable cause, official documents or letters that support the reason for the request (e.g. death certificate, letter from employer, etc.) are required.
 4. The alternate evaluation may consist of the deferral of in-class work, the extension of the deadline for take-home work, an alternative allocation of marks, or another appropriate accommodation as determined by the course instructor. A student who is dissatisfied with the accommodation offered by the instructor may consult with the head of the appropriate academic unit.

Deferred examinations for any missed term tests will not be given. If a student has a valid documented reason for missing a term test, the weight of the missed deliverable will be added to the final examination. Appropriate documentation for a missed deliverable must be submitted, in writing, within one week of the missed deliverable.

Please note the Faculty of Business Administration Policy with respect to deferred final exams.

- A student who is scheduled to write three final examinations which begin and end within a twenty-four-hour period may request to write a deferred examination. Normally, only the second examination in the twenty-four-hour period may be deferred. The application to defer this examination should be made in writing to the Undergraduate Programs Office by email to busihelp@mun.ca. It should be submitted as soon as possible after the release of the final examination schedule, and in any case no later than two weeks before the end of the semester or session.
- A student who is prevented from writing a final examination by illness, bereavement or other acceptable cause, duly authenticated in writing, may apply to write a deferred examination. The application to defer the examination should be made in person or via telephone to the Undergraduate Programs Office by email to busihelp@mun.ca. This application should be made in advance of the examination wherever possible, but no later than 48 hours after the original date

of the examination. If application is made by telephone, written confirmation must then be received by the Undergraduate Programs Office within seven calendar days of the original date of the examination.

- All deferred final exams will be held at the commencement of the semester following the one in which the deferred final exam has been approved.
- Deferred final exams will be written on the first Friday of the semester following the semester in which the deferred exam was granted, with the exception of Intersession.
- For courses where classes were scheduled to start between 9:00 a.m. and 5:00 p.m., the deferred exam will be on the first Friday afternoon of the following semester. (Note these deferred exams will start at 2:00 p.m.)
- For courses where classes were scheduled to start after 5:00 p.m., the deferred exam will take place at 7:00 p.m. on the first Friday evening of the following semester

Calculators

The only electronic device approved for use during an examination is a calculator. Unless otherwise approved by your course instructor, calculators must adhere to the following guidelines:

- A calculator must be non-programmable
- A calculator must not have the ability to store text
- A calculator must not have graphing capability
- A calculator must be non-communicating
- If you are unsure if your calculator is admissible, please check with your course instructor before the examination.

STUDENT ACCOMMODATION FOR ACCESSIBLE EDUCATION

The Blundon Centre (Student Life) supports all students who experience barriers to accessing post-secondary education. This includes students with disabilities or other accessibility-related challenges. For more information about the Blundon Centre (Student Life), or to register for your academic accommodations, please see <https://www.mun.ca/student/new-student-experience/access.php> (Email: blundon@mun.ca Telephone: (709) 864-2156 (VRS calls welcomed) Text: (709) 693-0918).

COURSE WEBSITE/USE OF TECHNOLOGY

In addition to our face-to-face interactions, the course will use Brightspace, a Learning Management System, to help facilitate communication and some administrative aspects of the course, such as viewing grades. The site is available at: <http://online.mun.ca>

You can login using your standard MUN login id and password that you use to access other web services. If you encounter technical issues using or accessing the system, help is available at <http://www.citl.mun.ca> or by calling 864-8700.

EXPECTATIONS

Professionalism

Professionalism is essential to success in business. A professional businessperson is competent, knowledgeable, prepared, courteous, and respectful to both peers and customers. A professional atmosphere in the classroom promotes a positive learning environment. Please:

- Prepare properly for all classes
- Arrive on time
- Employ basic courtesy at all times and to all class members:
- If you bring your mobile phone to class, turn it off.
- If you bring your computer to class, do not distract others by using it for non-course-related activities (e.g., checking Facebook, playing games). The professor will ban computers from class if he/she decides that there are too many disruptions from their use.
- Honor work commitments you make to members of your group.

Honesty, Integrity & Academic Dishonesty

Members of the university community are expected to adhere to very high standards of honesty. Breaches of these standards cannot be tolerated, as they insult the integrity of each of us. Academic offences include, but are not limited to:

- Cheating on examinations, assignments, or any other tests;
- Impersonating another student or allowing oneself to be impersonated for purposes of taking an exam or carrying out an assignment;
- Plagiarism;
- Theft of examination papers or other material;
- Use and/or distribution of material that has been improperly obtained;
- Submitting false information;
- Submitting work for one course that has been or is being submitted for another course without express permission to do so.

For further information, see General Regulation 6.12 at

<https://www.mun.ca/regoff/calendar/sectionNo=REGS-0748> in the University Calendar.

Avoiding Plagiarism

Some assignments may require you to use information from another source. Such information may take the form of quotations, summaries, paraphrases, or facts or ideas that are not common knowledge. Whatever its form, the source of the information must be clearly documented by in-text citations referring to a list of references at the end of the paper. Omitting such documentation is plagiarism. Plagiarism is a very serious academic offense that may result in a range of penalties up to and including expulsion from the University.

Documenting Sources

For detailed information on how to document sources properly, students are referred to: Finnbogason, J., and Valleau, A., *A Canadian Writer's Pocket Guide* (Second Edition), Scarborough, ON: Nelson, (a division of Thompson Canada Limited), 2002. The

preferred format for documentation in the Faculty of Business Administration is the APA style.

ADDITIONAL SUPPORT FOR STUDENTS

- If you are pursuing an undergraduate business program it is your responsibility to be familiar with [undergraduate program regulations](#), [course prerequisites](#) and to [seek academic advice](#) when needed. You can download [Navigate](#) to book a virtual appointment with your academic advisor or email busihelp@mun.ca for inquiries.
- [MUNUp](#) is Memorial’s online resource hub to help students succeed while learning remotely. Checking the site for details on activities, and supports and services. Explore the [virtual student success centre](#) and find out about [help centres](#), [technical support](#) and [accessibility services](#).
- The [SWCC](#) at Memorial University provides counselling, health, and wellness support for students including primary health care, counselling, health promotion, disease prevention, and wellness education. To book an appointment, visit mun.ca/studentwellness/about/Booking.php
- Please check the Registrar’s Office webpage at for important dates at <https://www.mun.ca/regoff/registration-and-final-exams/important-dates-and-deadlines/> and registration matters at <https://www.mun.ca/regoff/registration-and-final-exams/how-to-register/>.
- Administrative inquiries for the Faculty of Business Administration may be directed to the **Academic Programs Office**, Faculty of Business Administration, Memorial University of Newfoundland:
 Contact us: busihelp@mun.ca | www.business.mun.ca
 Follow us: Facebook: www.facebook.com/MUNBusiness |
 Twitter: www.twitter.com/MUNBusiness |
 Instagram: www.instagram.com/MUNBusiness | LinkedIn: [faculty-of-business-at-memorial-university-of-newfoundland](https://www.linkedin.com/company/faculty-of-business-at-memorial-university-of-newfoundland)

COURSE SCHEDULE

Date	Class	Topic
M, Jan 8	1	Introduction to analytics and software tools
W, Jan 10	2	Data types, data sources, data provenance, data quality
M, Jan 15	3	Managing tabular data with relational databases
W, Jan 17	4	Managing graph data with graph databases
M, Jan 22	5	Introduction to data management with R
W, Jan 24	6	Introduction to data management with Python
M, Jan 29	7	Visualizing data in R using ggplot2
W, Jan 31	8	Visualizing data in Python using Plotly Express

Date	Class	Topic
M, Feb 5	9	Process analytics and process Mining
W, Feb 7	10	Midterm 1
M, Feb 12	11	Introduction to supervised machine learning: Bias-variance tradeoff, overfitting and underfitting, model quality assessment for regression (MSE, MAE) and binary and multi-class classification (precision, recall, cross-entropy, KL divergence) models, resampling methods (cross-validation and bootstrap)
W, Feb 14	12	Regression models, including ridge regression and LASSO Classification models, including logistic regression, naive Bayes, and kNN
M, Feb 26	13	Introduction to unsupervised machine learning, including principal component analysis and clustering
W, Feb 28	14	Time series methods, including smoothing, ARIMA and GARCH models
T, Feb 29		<i>Last date to drop courses without academic prejudice</i>
M, Mar 4	15	Introduction to deep learning with Tensorflow, including concepts of neural networks, activation functions, gradients, and gradient descent optimization, regression and classification models
W, Mar 6	16	Convolutional networks for image analysis and text analysis, feature maps and feature learning in CNN
M, Mar 11	17	Recurrent networks (LSTM, GRU); time series analysis, business process prediction
W, Mar 13	18	Midterm 2
M, Mar 18	19	Reinforcement learning with tabular methods, including multi-armed bandits, Monte-Carlo and temporal-difference learning
W, Mar 20	20	Reinforcement learning with function approximation, including DQN and policy-gradient methods
M, Mar 25	21	Interpretable machine learning, global and local model agnostic explanation methods (PDP, ICE, etc.)
W, Mar 27	22	Analytics at scale: Distributed data infrastructure and analytics, on premises with Apache Hadoop and Spark
M, Apr 1	23	ML Ops; example: model management with MLFlow
W, Apr 3	24	Ethical and Legal Issues in Analytics, e.g. Canada Bill C-27 and the EU AI Act

In the case of a class cancellation, at the instructor's request of the Associate Dean of the Faculty of Business Administration, busihelp@mun.ca will issue notice of the cancellation by e-mail using @mun.ca accounts all students registered in the course. Every attempt will be made to provide students as much notice of the cancellation as possible. When possible, cancellation notice will also be posted by the instructor in the Brightspace course shell(s). Please monitor your @mun.ca email account on a regular basis.