BUSINESS ANALYTICS METHODS
BUSI 4407 A
WINTER 2025

Instructor:	Dr. Qi Deng
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Office Hours:	By Appointment
TA:	N/A
Office Hours:	N/A
Email:	N/A
Modality:	In-person
Class Times:	Friday, 8:35 – 11:25 am

In order to stay updated with important notifications and announcements from Carleton University, please download the Carleton University App. This will ensure you receive timely information regarding your courses and other university-related updates throughout the term.

Pre-requisites: Third-year standing, BUSI 3406 (with a grade of C or higher)

Precludes: N/A

Course Calendar Description (from the 2024/2025 University Calendar)

Frameworks and quantitative methods used in predictive and prescriptive business analytics for decision-making with less risk and better outcomes. Practical applications with various analytical tools across a range of industries. Data integration; model formulation, implementation, solutions, and managerial insights.

Course Description:

In today's competitive landscape, businesses rely heavily on data to gain valuable insights and stay ahead of the curve. With a focus on descriptive, predictive, and prescriptive analytics, this course will equip students with the knowledge and practical skills needed to harness the power of data to make informed decisions that can drive success in various industries. This course

emphasizes hands-on learning and real-world applications. Students will work with various analytical tools commonly used in the industry to solve business challenges and identify opportunities. Business analytics is applicable across a wide range of industries. Whether you're interested in finance, marketing, operations, or any other field, the skills acquired in this course will be valuable and versatile.

Drop Course Policy

The deadline for academic withdrawal follows the dates prescribed by Carleton University: https://calendar.carleton.ca/academicyear/

The deadline to drop this course with full fee adjustment is January 31st, 2025. The last day to withdraw from full winter courses is March 15th, 2025.

Learning Outcomes:

Upon completion of this course, students will:
1. have a comprehensive understanding of business analytics methods and their applications within business contexts.
2. be able to perform descriptive, predictive, and prescriptive analytics, including classification and regression models, forecasting, time series analysis, clustering, etc.
3. be ready to navigate the intricate landscape of data science, making informed decisions based on insights extracted from data.
4. understand emerging trends and techniques in business analytics.

Reading(s)/Textbook(s)/Required Material

Textbook & Readings
- Provost, F., & Fawcett, T. (2013). *Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking* (1st edition). O'Reilly. (**_NOTE:_** You can access free eBook via Carleton Library.)
- Google Machine Learning Education *(Free online learning contents by Google)*
- Other required readings/cases/videos will be assigned via Brightspace throughout the term.

Device
- Students need to bring their own laptops (and power cable if needed) for in-class exercises. It is also recommended to bring a mouse for the ICEs.

Software
Note: Other software may be required later at the discretion of the instructor.

| SAS Viya for Learner 4 (SAS VFL) | *This is a cloud-based software pack provided by SAS. It is free for students. To get the access, you need to:*
1. Go to: https://www.sas.com/en_ca/software/viya-for-learners.html
2. Click on *Access for Students*
3. Click on *Create Profile*
4. Use your **Carleton cmail email** address (the one ended with |

	@cmail.carleton.ca) to create the profile 5. You will receive an email that asks you to activate your SAS Profile 6. After you activate your SAS Profile, you will receive another email instructing you how to access SAS VFL *NOTE: You need to get the access before class. I strongly recommend you do this ASAP as it may take a while to get the access.*
Internet Browser	You need to use Chrome, Firefox, or Safari to access SAS VFL. If you have not, please install the software before class. Professor's in-class demo will be using Chrome. *Note: The language of SAS VFL is determined by the browser. So, make sure your browser is set to English.*
MS Excel	1. Carleton Students can use Microsoft 365 (including various MS products, e.g., Word, PowerPoint, Excel, Teams, etc.) for free 2. If you are not setting this up properly, please follow the instruction here: https://carleton.ca/its/help-centre/get-microsoft-office-for-students/ 3. It guides you on how to set up the free MS 365 account using your Carleton student email
Orange Data Mining	1. You can download the software here: https://orangedatamining.com/ 2. It is Windows and Mac OS compatible and free to use.
MS Power BI Desktop	1. You need to download it here: https://www.microsoft.com/en-us/power-platform/products/power-bi/desktop 2. If you have downloaded it before, make sure your software is up to date. 3. It is free to use, but only compatible with Windows. Mac users can access Power BI via CU Desktop. Students can either install the VMWare client in their devices or launch it from their browser to use Sprott's Virtual Desktop Interface through Carleton's CU Desktop

Methods of Evaluation / Course Completion Requirements

Activity	Weight
In-class Exercises (10 × 2.5%)	25%
Individual Assignments (30%)	
• Assignment 1	15%
• Assignment 2	15%
Group Project (40%)	
• Project Proposal	5%
• Project Presentation	10%
• Project Report	25%
Feedback to other group presentations	5%
Total	**100%**

Late Assignments:

Late submission will be penalized 20% of the deliverable grade per day (e.g., an assignment graded 8 marks will be penalized 1.6 marks per day). No late deliverables will be accepted after 5 days past the stated deadline. Missing deliverable will receive a mark of zero, and there is no make-up assignment. Extensions may be granted in the case of exceptional circumstances. You
must discuss these circumstances with your instructor at least 24 hours before the assignment due date
Please note that discussing the situation is not the same as merely informing your instructor.
Note: Please keep an electronic copy for every exercise and assignment you submit.

In-class exercises (25%)
In many of the classes, you will work on a data-analytics task given to you during the session. You will be expected to complete the task in the allocated time and then hand in the work at the end of the session. You are required to bring a laptop to class to complete the assigned work. Depending on the weekly contents, the in-class exercises may be either individual or group submissions.

Individual assignments (30%)
Throughout the term, you will do two individual assignments covering various data-analytics perspectives. In these assignments, you will analyze common business data and provide solutions to the problems faced by businesses. The objective of individual assignments is to help students build the linkages between data analysis skills and real-world problems.

Group project (40%)
You are expected to form a group of 4-5 members in this course and apply the data analytics skills learned in this class in analyzing real-world data. The purpose of the project is for you to develop an understanding of how data analytics skills can be employed to answer business-related questions and create value for individuals, organizations, or even society. In this group project, you can select a field of interest, develop a series of questions, find online data or collect your own data, clean and analyze the data, and develop findings. The group project is subject to the instructor's approval and includes three components described below.

- Project proposal. Your group will submit a formal 2-page project proposal outlining the field and questions of interest, briefly describing the data sets you hope to use and explaining how you will apply the data analytics methods in answering your questions. This proposal is meant to guide your group to a successful project and will be graded out of 5 marks based on completeness, ambition, feasibility, and clarity.
- Project presentation. Your group will present your findings in the last class at the end of the semester. Each team's presentation should be 20-25 minutes, followed by a 5-minute Q&A session.
- Project report. Your group will submit a professionally-looking report that *describes the chosen field and proposed questions, datasets, analysis process, findings, and implications of the findings.* At the end of the report, you also need to give *a detailed discussion on the limitations of your project/findings and potential future improvements*. The length of the report should be within 25 single-spaced pages (including charts, graphs, tables, appendices, etc., but excluding references).
- *Note:* Peer evaluation will be used for all group works. Individual's group project grade will be adjusted based on the peer evaluation results. Details will be available later the semester.

Feedback to other group presentations (5%)
You will provide the 'rated feedback' to the other groups' presentations in terms of given criteria. The format of feedback will be available later the semester. The instructor will partially incorporate this peer-evaluated rated-feedback into the grades of the group project presentation.

Preparation and Participation:

The course is highly intensive in its technical components, requiring students to engage in an immersive, hands-on experience throughout the semester. While there is less emphasis on theoretical concepts, students are expected to complete the required readings before each class to develop a deeper understanding of the "why" behind the processes (e.g., the reasoning for specific steps in the software), rather than just the "how" (e.g., executing tasks using the software). This foundational understanding is especially crucial for success in the course.

Course Schedule

NOTE: While every attempt will be made to keep to the schedule listed below, unforeseen circumstances may necessitate modifications throughout the semester.

Week / Date	Topic / ICE & Assignments	Reading*
1 / Jan 10	Course overview & Software set up	How to Become a Data Scientist in 2024
2 / Jan 17	Descriptive Analytics I / ICE 1	Ch. 1 & Ch. 2
3 / Jan 24	Descriptive Analytics II / ICE 2; Group formed	Data Cleaning Tutorial The Ultimate Guide to Data Cleaning Data Cleaning Checklist
4 / Jan 31	Descriptive Analytics III / ICE 3	Present Your Data Like a Pro How to Give a Data-Heavy Presentation
	Assignment 1 due: 11:59 pm, Feb 6	
5 / Feb 7	Predictive Analytics I / ICE 4	Machine Learning: An online comic from Google AI Ch. 3 & Ch. 4
6 / Feb 14	Predictive Analytics II / ICE 5	Ch. 7 & Ch. 8
	Group Project Proposal due: 11:59 pm, Feb 16	
Feb 17-21, 2024: Winter break, no classes.		
7 / Feb 28	Predictive Analytics III / ICE 6	Ch. 5
	Assignment 2 due: 11:59 pm, Mar 6	
8 / Mar 7	Predictive Analytics IV / ICE 7	Time Series Forecasting Tutorial
9 / Mar 14	Predictive Analytics V / ICE 8	Ch. 6
10 / Mar 21	Prescriptive Analytics / ICE 9	TBD
11 / Mar 28	AI for Business Analytics / ICE 10	Data analysis with ChatGPT Extracting Insights with ChatGPT Data Analysis
12 / Apr 4	Group Presentation	
	Group Project Report due: 11:59 pm, Apr 6	

* NOTE: Additional weekly readings/cases/videos will be assigned throughout the term

Contribution to Learning Goals of the Program (BCom, BIB):

Program Learning Goal	Competencies Not Covered	Competencies Introduced (only)	Competencies Taught But Not Assessed	Competencies Taught and Assessed
BC1 Knowledge *Graduates will be skilled in applying foundational business knowledge to appropriate business contexts.*				✔
BC2 Collaboration *Graduates will be collaborative and effective contributors in team environments that respect the experience, expertise and interest of all members.*			✔	
BC3 Critical Thinking *Graduates will be discerning critical thinkers, able to discuss different viewpoints, challenge biases and assumptions, and draw conclusions based on analysis and evaluation.*				✔
BC4 Communication *Graduates will be effective and persuasive in their communications.*			✔	
BI5 Global Awareness (BIB ONLY) *Graduates will be globally-minded.*	✔			

ADDITIONAL INFORMATION

Course Sharing Websites

Materials created for this course (including presentations and posted notes, labs, case studies, assignments, and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

Required calculator in BUSI course examinations.

If you are purchasing a calculator, we recommend any one of the following options: Texas Instruments BA II Plus (including Pro Model), Hewlett Packard HP 12C (including Platinum model), Staples Financial Calculator, Sharp EL-738C & Hewlett Packard HP 10bII

Group work

The Sprott School of Business encourages group assignments in the school for several reasons. They provide you with opportunities to develop and enhance interpersonal, communication, leadership, followership, and other group skills. Group assignments are also good for learning integrative skills for putting together a complex task. Your professor may assign one or more group tasks/assignments/projects in this course. Before embarking on a specific problem as a group, it is your responsibility to ensure that the problem is meant to be a group assignment and not an individual one.

Grading

In accordance with the Carleton University Undergraduate Calendar (p 34), the letter grades assigned in this course will have the following percentage equivalents:

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

Grades entered by Registrar:

WDN = Withdrawn from the course

DEF = Deferred

Academic Regulations

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/

Requests for Academic Accommodation

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes,

including information about the *Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances*, are outlined on the Academic Accommodations website (students.carleton.ca/course-outline).

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy Accommodation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: **carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf**

Religious obligation
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: **carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf**

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. **carleton.ca/pmc**

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and its survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: **carleton.ca/sexual-violence-support**

Accommodation for Student Activities
Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. **https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf**

For more information on academic accommodation, please contact the departmental administrator or visit: **students.carleton.ca/course-outline**

Academic Integrity

Violations of academic integrity are a serious academic offence. Violations of academic integrity – presenting another's ideas, arguments, words or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student – weaken the quality of the degree and will not be tolerated.

Process: If an alleged violation occurs, all relevant documentation will be forwarded to the Dean. If the allegation proves true, the penalties may include; a grade of Failure on the submitted work and/or course; academic probation; a refusal of permission to continue or to register in a specific degree program; suspension from full-time studies; suspension from all studies at Carleton; expulsion from Carleton, amongst others. **For a first offence, at a minimum, the penalty assigned will normally be a zero on the submitted work and at least a minimum full grade reduction of the final course grade. For a second offence, at a minimum, the penalty assigned will normally lead to a suspension from studies.**

Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy which is available, along with resources for compliance at: https://carleton.ca/registrar/academic-integrity/.

Sprott Student Services

The Sprott Undergraduate Student Services Office offers program advising and overall student success support. Our team is available to discuss your academic goals and your program progression plans. We can also work with you to develop strategies for success, including study skills for Business. If you experience any difficulty this term or if you would like to access support, please contact our team at bcom@sprott.carleton.ca or at bib@sprott.carleton.ca.

Centre for Student Academic Support

The Centre for Student Academic Support (CSAS) is a centralized collection of learning support services designed to help students achieve their goals and improve their learning both inside and outside the classroom. CSAS offers academic assistance with course content, academic writing and skills development. Visit CSAS on the 4th floor of MacOdrum Library or online at: carleton.ca/csas.

Important Information:

- Students must always retain a copy of all work that is submitted.

- All final grades are subject to the Dean's approval.

- For us to respond to your emails, we need to see your full name, CU ID, and the email must be written from your valid CARLETON address. Therefore, in order to respond to your inquiries, please send all email from your Carleton CMail account. If you do not have or have yet to activate this account, you may wish to do so by visiting **https://carleton.ca/its/get-started/new-students-2/**