



ITIS5433
Business Analytics Methods
Fall 2024

Instructor: Hugh Cairns
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Phone: NA
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Office Hours: By appointment only

Class Meeting: Lectures will be held in person on Wednesday at 2:35pm-5:35pm

Course Calendar Description: Tools for data analytics; analyzing data beyond statistics; data mining and predictive modeling; decision trees; logistic regression; neural networks; time series analysis and forecasting; algorithms for business analytics.

Includes: Experiential Learning Activity

Course Description: Introduction of the role of data mining in current business organizational strategy. This course will provide an overview of the different Analytics approaches by situating data mining in organizational and commercial context. Students will be expected to understand and communicate the business value of the business analytics and the merits of different analytical approaches.

The students will also participate in exercises in data preparation and profiling and hands on predictive modelling using a variety of data analytic techniques and practices using a SAS Visual Statistics, Visual Analytics, and VDMML

Course Learning Objectives:

1. Students will become familiar with the SAS Viya Analytics platform
2. Students will be introduced to programming
3. Students will use SAS Viya to conduct analysis using different supervised and unsupervised data mining methods.

Course Prerequisites: Precludes additional credit for [ITIS 5432](#).
Prerequisite(s): [ITIS 5431](#) and [BUSI 5801](#) or equivalent.

Required Materials: Students are required to have a stable internet connection. Students will be using the SAS Viya for Learners platform. I will send you an invitation to the platform before the second class.

Final Exam Date: TBD

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

Grading Scheme

Paper	10%
SAS Prog 1 (online)	10%
4 Hands on Assignments	30%
Journal Readings	20%
Final Exam	30%
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TOTAL	100%

Each component of your grade will be assigned a percentage score. Your final course grade will be a weighted average of each of these components.

- **Prog 1 Certification:** SAS Studio and the SAS Viya platform will be used to complete assignments. It is highly recommended that students familiarize themselves with SAS as much as possible before the assignments are distributed. SAS offers a free e training called *Prog 1* that provides an overview of the SAS interfaces and introduces data manipulation techniques that will be used in this course. The course can be located at: <http://support.sas.com/training/tutorial> at the bottom of the page. The Prog 1 course is usually 3 days in duration so please give yourself enough time to complete. Once Prog 1 is completed, SAS will offer the student a certificate to print. Please save print or save the certification and submit before class.
- **Hands on Assignments:** Students will be given five assignments for completion before the beginning of class on the assigned date. Assignments must be submitted electronically before the start of the class on the dates indicated on the course outline. Failure to submit the assignments on time may result in the loss of marks. Students may work in groups to complete the assignments; however, each student must prepare and submit their own assignment.
- **Journal Readings:** Students will be asked to read 4 journal papers on selected topics and present to the class a summary of each paper. Students will be provided with a list of potential topics and suggested readings. If they wish to add or substitute papers, they must provide the readings to the instructor at least 7 days before their presentation.
- **Final Exam:** A final written exam will be held in class during regular scheduled exam hours

e-Proctoring: The University's e-proctoring system (CoMaS) will be used to administer the (midterm and) final exam. These exams are in-person, but we will still use this system as you will be writing using your laptops. Details about this system and your requirements will be laid out well before the exams so that you are ready. You can find more information at <https://carleton.ca/ses/e-proctoring/>.

The minimum computing requirements for e-proctoring service are as follows:

- Hardware: Laptop
- OS: Windows 10, Mac OS 10.14, Linux Ubuntu 18.04
- Internet Browser: Google Chrome, Mozilla Firefox, Apple Safari, or Microsoft Edge

Note: Tablets, Chromebooks and Smartphones are not supported at this time. Windows-based tablets are not supported at this time.

Late Assignments:

To ensure fairness for all students, penalties will be applied to late assignments: Failure to submit an assignment on time will result in an initial penalty of five (5) percentage points, followed by an additional (2) percentage points per day thereafter. For example, an assignment that would normally merit a grade of 80% would receive a grade of 75% if submitted after the deadline on the due date, 73% if submitted the following day, and so on. Requests for extension will be considered in cases of illness, family emergency, or other exceptional circumstances.

Preparation and Participation:

Students are expected to have completed the reading and the practical exercises before lectures.

Contribution to Program Learning Goals ([MBA](#)):

MBA Learning Goal	Not Covered	Introduced	Taught but Not Assessed	Taught <u>and</u> Assessed
MB1 Leadership and Collaboration <i>Graduates will be equipped for leadership and collaboration.</i>			✓	
MB2 Communication <i>Graduates will be effective communicators</i>				✓
MB3 Critical Thinking and Problem Solving <i>Graduates will be skilled in critical thinking and problem solving.</i>				✓
MB4 Functional Knowledge <i>Graduates will have functional knowledge of all areas of business.</i>		✓		
MB5 Global Business <i>Graduates will have an appreciation of the global environment of business.</i>	✓			
MB6 Ethical Reasoning <i>Graduates will be skilled in ethical reasoning and decision-making.</i>			✓	

COURSE SCHEDULE

Week	Date	Topic/Agenda	Pre-class Preparation
1	03/09/2024	<ul style="list-style-type: none"> • Introductions and review of course outlines, class norms and technical environment • Discussion on the spectrum of business Analytics and the types of business problems that can be solved. • Introduction to the concept of Big Data • Overview of Different types of Analytic Methods • Introduction to Machine Learning 	<ul style="list-style-type: none"> • Lecture notes • MLWSV chapter 1 • Holsapple, C., Lee-Post, A., & Pakath, R. (2014). A Unified Foundation for Business Analytics. <i>Decision Support Systems (64)</i>, 130-141.
2	10/09/2024	<ul style="list-style-type: none"> • Overview of Data Management and Integration • Review of the properties of data • Self Service Data Preparation with SAS Viya • Discovering and Ingesting Data in SAS Viya 	<ul style="list-style-type: none"> • Lecture notes • Assigned Readings • MLWSV chapter 2&3 • Viya Exercises
3	17/09/2024	<ul style="list-style-type: none"> • Data Management for Modelling Cont'd • Transforming Data • Making Data Analytics Ready • Managing data governance • Introduction to Forecasting • Forecasting vs OLS regression • Creating Visual forecasting in SAS Viya • Data Preparation for Forecasting • Introduction to SAS VF • Assignment 1 distributed 	<ul style="list-style-type: none"> • Lecture notes • Assigned Readings • Viya Exercises • Lecture notes • Assigned Readings • Viya Exercises • https://www.youtube.com/watch?v=V3YM6veD9Bs
4	24/09/2024	<ul style="list-style-type: none"> • Data Preparation for Machine Learning • Feature Extraction • Introduction to machine Learning • Directed vs Undirected data mining • Missing, Unstructured, and Extreme Values 	<p style="text-align: center;">SAS Prog 1 Completed Certificate submitted before Class</p>
5	01/10/2024	<ul style="list-style-type: none"> • Creating Hierarchal forecasts • Adding exogenous variables to the forecast • Decomposing the signal • Adding Overrides • Journal Reviews 	<ul style="list-style-type: none"> • Lecture Notes • Assigned Readings
6	08/10/2024	<ul style="list-style-type: none"> • Discussion of the motivation for Customer Segmentation • Review of Steps in the Data Mining Process • Segmentation to the marketing function 	<ul style="list-style-type: none"> • VS Course Outline • MLWSV – Chapter 1-4 Assignment 1 due

		<ul style="list-style-type: none"> • Overview of Methods of Segmentation • Classification Techniques • Association mining • Journal Reviews • Assignment 2 Distributed 	
7	15/10/2024	<ul style="list-style-type: none"> • Discussion of problems with response definition • Discussion of Classical Statistical Techniques for data mining. • Discussion of problems with response definition <p>Introduction to Regression and Logistical Regression</p> <p>Journal Reviews</p>	<ul style="list-style-type: none"> • Lecture Notes • Assigned Readings • MLWSV – Chapter 5 & 6 • Assignment 2 Due
	22/10/2024	<i>No Classes</i>	<i>NA</i>
8	29/10/2024	<ul style="list-style-type: none"> • Continuation of Logistical Regression Models • Generalized Linear Modelling • Additive Models • Model Comparison • Scoring Data • Assignment 3 Distributed • Journal Reviews • Guest Speaker : Data Management 	<ul style="list-style-type: none"> • Lecture Notes • Assigned Readings • Viya Exercises • MLWSV – Chapter 7&8
9	05/11/2020	<ul style="list-style-type: none"> • Introduction to Decision Trees • Random Forests • Interpretation <p><i>Introduction to SAS VDMML</i></p> <p>Journal Reviews</p>	<ul style="list-style-type: none"> • Lecture Notes • Assigned Readings • MLWSV – Chapter 9&10 • Viya Exercises •
10	12/11/2024	<ul style="list-style-type: none"> • Algorithms Cont'd • Gradient Boosting • Bayesians • Machine Factorization • Assignment 4 Distributed • Journal Reviews 	<ul style="list-style-type: none"> • Lecture Notes • Chapter • Assigned Readings • MLWSV – Chapter 11&12 • Viya Exercises • Assignment3 Due
11	19/11/2024	<ul style="list-style-type: none"> • Algorithms Cont'd • Gradient Boosting • Bayesians • Machine Factorization • Journal Review • Assignment 4 Distributed 	<ul style="list-style-type: none"> • Lecture Notes • Chapter • Assigned Readings • MLWSV – Chapter 11&12 • Viya Exercises •
12	26/12/2024	<ul style="list-style-type: none"> • End to end modelling with model studio • Review 	<ul style="list-style-type: none"> • Viya Exercises • Assignment 4 Due
13	03122024	<ul style="list-style-type: none"> • Final Take Home Exam 	

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).

Recommended Calculator for 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. They provide you with opportunities to develop and enhance interpersonal, communication, leadership, followership and other group skills. Group assignments are also an effective way to learn integrative skills for putting together a complex task. Your professor may assign one or more group tasks, assignments, or 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.

Peer Evaluation for Group Work

To deter social loafing and ensure fairness in grading, you will be asked to assess the contribution of your fellow group members. This information will be used when assigning the grade for the final project. The procedure is as follows: Each student should take 100 points and allocate those points to the various members of the group (including him/her/themself) to reflect the contributions made by each member. For instance, if there are four members in a group and everyone contributed equally, each individual would receive 25 points. Conversely, if an individual contributed relatively little, the remaining group members might allocate few points to that member. To ensure that these peer evaluation scores are reasonable and free from personal bias, you will be asked to provide a detailed written explanation for your point allocation.

Letter Grades:

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	F = Below 50
A = 85-89	B = 73-76	C = 63-66	D = 53-56	
A - = 80-84	B - = 70-72	C - = 60-62	D - = 50-52	

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:

<https://calendar.carleton.ca/grad/gradregulations/>

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**
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: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>
- **Religious Obligations**
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: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>
- **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. <https://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: <https://carleton.ca/sexual-violence-support/>
- **Student Activities**
Carleton University recognizes the substantial benefits, to both the individual student and the university, that result from participating in activities beyond the classroom experience. Reasonable

accommodation will 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: <https://students.carleton.ca/course-outline/>

Academic Integrity:

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—are a serious academic offence, weaken the quality of the degree, and will not be tolerated. 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. 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/>

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: <https://carleton.ca/csas/>

Other Important Information:

- Students must always retain a hard 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 can do so by visiting <https://carleton.ca/its/get-started/new-students-2/>