



BUSI5510Z: Data Science for Business

MFin Fall 2026

Instructor	Dr. Qi Deng
Email Address	qi.deng@carleton.ca
Class Times	Wednesday 6:05 pm - 8:55 pm
Modality	In-person
Office Hours	By appointment
Office Location	Nicol 6031
TA Name/Email	TBD

Pre-Requisites & Preclusions:

Prerequisites: None

Preclusions: None

Course Description/Instructor's Statement

Carleton Calendar Description

Application of advanced quantitative and qualitative techniques to collect, store, clean, analyze and visualize structured and unstructured data. Discussion of data-driven business decision making.

Instructor's Course Description:

In today's data-driven landscape, understanding how to derive value from data is a crucial asset for any aspiring business professional. This course aims to equip students with the fundamental understanding and essential skills to harness data analytics using Python. Machine learning techniques will also be introduced. Students will expose to various Python libraries for data analytics, such as, Pandas, Matplotlib, Seaborn, NLTK, Scikit-learn, etc.

Course Learning Objectives:

This course will help students become familiar with using Python to conduct data analysis tasks. By doing so, it will give students a foundation from which they can learn more advanced and specialized data analytic skills in the future. Upon completion of this course, students will:

1. gain data science fundamentals, including data retrieving, manipulation, cleaning, and visualization using Python libraries like Pandas and Matplotlib

2. understand the unique challenges of working with textual data and master basic techniques for text preprocessing, manipulation, and sentiment analysis using Python libraries like NLTK
3. dive into the world of machine learning, learning about supervised and unsupervised learning, and training and evaluating simple predictive models using Python libraries like Scikit-learn
4. apply your skills to real business scenarios, understanding how companies have leveraged data to optimize operations, enhance customer experiences, and drive innovation

Required/Optional Materials & Prices

Textbooks

- Sweigart, A. (2020). Automate the boring stuff with Python: practical programming for total beginners (Second edition.). No Starch Press. (You can access the eBook here for free from the author's website: <https://automatetheboringstuff.com/> or purchase in print online)
- For other readings, please refer to the course schedule table.
- Note: Every week we will use electronic learning materials developed in Jupyter provided by the instructor. There will be readings provided throughout the course which could be useful to completing your course deliverables.

Device

- Students need to bring their own laptops for in-class exercises.

Software

- Virtually all technical components of this course will be conducted using Jupyter Lab running via a distribution of the Python programming languages called Anaconda. This software is entirely open source and can be downloaded using this link. (<https://www.anaconda.com/>).
- Note: There will be a demo on how to set up the software environment in the beginning of the semester, so you do not need to worry about it if you are unfamiliar with it.

Grading Scheme

In-class Exercises (10 × 3%)	30%
Capstone in-class coding quiz	10%
Individual Assignment	20%
Group Project	40%
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.

- In-class exercises: Every week, we will work on small in-class exercises together following the lecture. 10 exercises (from week 2 to 11) must be submitted on Brightspace for 3 points each. The exercises are always due on the next day after class at 11:59 pm.
- Capstone in-class coding quiz: After completing the Python fundamentals, an in-class

coding quiz will be hosted. In this quiz, some programming questions will be provided, and you will need to answer the questions by coding.

- Individual assignment: *Throughout the term, you will do one individual assignment where you will be using the programming skills that you have learned and work with business data. The objective of the assignment is to help you build the linkages between data analytics skills and concepts and real-world problems.*
- Final group project: *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 report your findings. The group project is subject to the instructor's approval and includes three components described below: (1) Project proposal (5%); (2) Project presentation (10%); (3) Project report (25%). Detailed requirements of the presentation and report will be discussed in class later this semester.*

Note: Peer evaluation will be used for all group works. Details will be available later the semester.

Policies & Accommodations

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

<https://carleton.ca/pmc/current-students/academic-accommodations/>



Stay updated with important notifications and announcements from Carleton University, by downloading the Carleton University App!

Preparation and Participation:

- The course will start from step zero and has an ultimate objective of making you feel comfortable with playing with data using Python.
- This course will heavily rely on in-class hands-on exercises. Students are expected to embrace the 'learning by doing' style. Although this course is less theory-intense, students are still expected to complete the required readings before attending weekly classes.
- This course will rely on group works. The objective is to provide students with peer-support when completing the required deliverables. Students are expected to work with peers, contribute to group works, and provide fair feedback to their peers.

Late Assignments:

To ensure fairness for all students, penalties will be applied to late assignments: Late submission will be penalized 10% of the deliverable grade per day (e.g., an assignment graded 8 marks will be penalized 0.8 marks per day). No late deliverables will be accepted after one week past the stated deadline. Missing deliverable will receive a mark of zero. Requests for extension will be considered in cases of illness, family emergency, or other exceptional circumstances. You must discuss these circumstances with your instructor at least 24 hours before the assignment due date (Note: Discussing the situation is not the same as merely informing your instructor).

Midterm and Final Exam

There is no final examination for this course.

Deferred In-Class Tests:

In the event that you are unable to write a midterm, test, or other scheduled assessments due to extenuating circumstances (such as a death in the family, illness, etc.), you must provide appropriate supporting documentation to your professor. Upon review, a deferred test may be offered. Please note that students who do not provide valid documentation or fail to offer a reasonable explanation for missing an assessment will receive a grade of 0% for that test.

Use of Generative Artificial Intelligence

AI use in this course varies by assignment. Some activities will explicitly invite you to use AI tools; others will require work completed independently. Please read each assignment's instructions carefully for permitted and prohibited uses. When AI is used, be transparent about how you used it and apply critical judgment to verify its accuracy and relevance.

COURSE SCHEDULE

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

Session / Date	Topic / ICE & Assignment	Reading
1 / Sep 9	Course Overview	CFA Institute. What Is a Data Scientist? (Click HERE.) How to Learn Python From Scratch in 2024: An Expert Guide. Access via HERE.
2 / Sep 16	Getting started with Python I / ICE1	Sweigart (2020) Ch. 0 & 1
3 / Sep 23	Getting started with Python II / ICE2	Sweigart (2020) Ch. 2 & 3
4 / Sep 30	Getting started with Python III / ICE 3	Sweigart (2020) Ch. 4 & 5
5 / Oct 7	Data Retrieving, Cleaning, Exploration & Visualization I / ICE4 & Capstone in-class coding quiz	10 minutes to pandas. Pandas User Guide.
6 / Oct 14	Data Retrieving, Cleaning, Exploration & Visualization II / ICE5	Visualization. Pandas User Guide. (Click Here.) An introduction to seaborn. (Click Here.) Tutorials – Introductory. Matplotlib. (Click Here.)
7 / Oct 21	Data Retrieving, Cleaning, Exploration & Visualization III / ICE6	What Is Data Visualization? Definition, Examples, And Learning Resources (Click Here.) Visual Analysis Best Practices: A Guidebook (Click Here.)
October 26-30, 2026: Fall break, no classes.		
Individual Assignment due on Nov 1 at 11:59 pm		
8 / Nov 4	Machine Learning I / ICE7	Davidson, J. (2018). No, machine learning is not glorified statistics. (Click Here.) Scikit Learn (2023). An introduction to machine learning with scikit-learn. (Click Here.)
Project proposal due on Nov 10 at 11:59 pm		
9 / Nov 11	Machine Learning II / ICE8	Google Comics Factory. Machine learning: An online comic from Google AI. (Click Here.)
10 / Nov 18	Natural Language Processing / ICE9	A Complete Guide to Natural Language Processing. (Click Here.) Natural Language Processing With Python's NLTK Package. (Click Here.)
11 / Nov 25	ChatGPT for data analysis / ICE10	A Guide to Using ChatGPT for Data Science Projects. (Click HERE.) ChatGPT Cheat Sheet for Data Science. (Click HERE.)
12 / Dec 2	Group Project Presentation	
Group Project Report due on December 5 at 11:59 pm		

***Refer to Academic Calendar for dates University Closed Dates and Holidays**

<https://calendar.carleton.ca/academicyear/>

Contribution to Program Learning Goals (MFin):

MFin Learning Goal	Not Covered	Introduced	Taught but Not Assessed	Taught <u>and</u> Assessed
MF1 Ethical and Professional Conduct <i>Graduates will conduct themselves in alignment with the CFA Code of Ethics and Standards of Professional Conduct.</i>	✓			
MF2 Financial Markets, Institutions, and Instruments <i>Graduates will demonstrate an understanding of financial markets, instruments, and institutions.</i>	✓			
MF3 Portfolio Management <i>Graduates will understand the motivations of investors and manage an investment portfolio that achieves those objectives.</i>	✓			
MF4 Data Analysis <i>Graduates will be proficient in data management, analytics, and modeling.</i>				✓
MF5 Communication <i>Graduates will be effective communicators.</i>		✓		

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 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).

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, please review the [pregnancy academic accommodation process](#).

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, please review the [religious academic accommodation process](#).

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. For more details, visit the [Paul Menton Centre website](#).

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 where 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 the [Equity and Inclusive Communities website](#).

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. For more details, see the [Senate Policy on Accommodation for Student Activities \(PDF, 25 KB\)](#).

Academic Consideration for Medical and Other Extenuating Circumstances

Due to medical and other extenuating circumstances, students may occasionally be unable to fulfil the academic requirements of their course(s) in a timely manner. The university supports the academic development of students and aims to provide a fair environment for students to succeed academically. Medical and/or other extenuating circumstances are circumstances that are beyond a

student's control, have a significant impact on the student's capacity to meet their academic obligations, and could not have reasonably been prevented. Students may request Academic Consideration for Coursework or Other Academic Deliverable. For further information please review the [Procedure for Academic Consideration](#) and the [FAQ page](#).

Scheduling and Examination Support

Scheduling and Examination Services provides various supports for both in-term and end-of-term tests and exams. Details can be found on the [Exam Support website](#).

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 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/>