

## COURSE OUTLINE

### CEBD 1100 – Introduction to Data Analysis and Python

January 20, 2021 to March 24, 2021

Wednesdays 18:00-21:00

**Instructor:** Brendan Wood  
**Email:** [brendan.wood@concordia.ca](mailto:brendan.wood@concordia.ca)  
**Course Prerequisite(s):** General computer knowledge to accomplish tasks such as copying files, compressing files, working with text editors will be an asset.

### Course Description

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This course will introduce students to Python and the world of Data Analysis. When companies, researchers, engineers, and analysts develop solutions, create products, or make policy recommendations, they rely on Data Analysis to make informed decisions. In this course, students will learn about the basics of programming in Python and applying these skills to analyze data. They will start with the basics of designing an algorithm, basic Python programming, an introduction to the Scipy scientific computing ecosystem, and learn the fundamentals of machine learning.

*Online Version: This semester, the course will be given online. Virtual desktops can/will be provided to students for lab work, and for work outside of class hours. The virtual desktops might have “lab hours” which will be provided in a separate document. The class will be given in via Zoom and will be recorded to reference outside of class times.*

### Course Objectives

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- Understand Python code and develop and program using the Python language
- Develop software methodically
- Code with a formal IDE like PyCharm
- Understand and program using object-oriented techniques
- Implement proper exception handling
- Use software repositories and versioning
- Develop software using test-driven development
- Be able to participate in projects in a group environment
- Consume and process structured data with Python
- Plot data using Python
- Use the libraries SciPy and NumPy within Python
- Explore using Pandas and Pandas using Jupyter notebook
- Use the “Dash” library to create data visualizations / dashboards.

## Evaluation

	Evaluation	Weight
1	Assignment 1	20%
2	Assignment 2	30%
3	Journals	10%
4	Quizzes Quiz1: 10% Quiz2: 15% Quiz3: 15%	40%
		100%

*Important note: A minimum grade of 60% is required to successfully complete this course.*

### Assignment 1 + Assignment 2 (50%)

Individual assignments will be given throughout the course. If a student fails to submit any of these assignments, a grade of zero (0) will be awarded for that assignment unless prior permission with legal documentation is provided. Note that you should plan for at least 3 hours per week of work outside of class time. Those with little to no prior knowledge will require more time to gain familiarity with the concepts. Assignment 1 has 20% weight. Assignment 2 is more complex and has 30% weight.

### Journals (10%)

Students will be asked to submit a journal before the end of the course which will be composed of a list of responses to homework questions or research which will be asked at the end of most classes.

The journal topics will be posted to Moodle for easy reference.

A template will be provided at the start of the course.

### Quizzes (Theoretical – Non programming) (40%)

There will be three quizzes included within the course with approximately 10 to 15 questions each.

- Quizzes can be a useful tool for students to assess their comprehension of the course as they move through the topics.
- Questions are formulated about the language itself, and it's properties. You would not be required to write a program script for these quizzes.
- The test and test grading are common between all sections of the course (if applicable).

## Materials

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### Suggested Textbook / Material

<b>Text</b>	<b>Python Crash Course, 2<sup>nd</sup> Ed.</b> by Eric Matthes
Recommended	Publisher: No-Starch Press (2019)
	Language: English
	ISBN: 978-1593279288

### Software Used / Configuration

*All software listed are assumed to be the latest versions of the software.*

<b>Development Tool(s) (IDE)</b>	Jetbrains PyCharm (Community Edition, not the “Edu” version)
<b>Other Tool(s)</b>	Pip, Jupyter Notebook
<b>SDK</b>	Python (64bit version)

## Schedule

Class #	Content	Assignment	Quiz
1	<ul style="list-style-type: none"> <li>• <b>Introduction</b> <ul style="list-style-type: none"> <li>○ Introduction to the class</li> <li>○ Survey (Possible)</li> </ul> </li> <li>• <b>Python Basics</b> <ul style="list-style-type: none"> <li>○ Introduction to Python</li> <li>○ Working in the Python Shell</li> <li>○ Working with PyCharm IDE</li> <li>○ Intro to Jupyter Notebook</li> <li>○ Variables in Python</li> <li>○ Expressions and operators</li> <li>○ Input</li> </ul> </li> <li>• <b>GIT and GitHub (How to access instructor demos)</b></li> </ul>		
2	<ul style="list-style-type: none"> <li>• <b>Python Basics</b> <ul style="list-style-type: none"> <li>○ Arrays</li> <li>○ Strings / Formatting Strings</li> </ul> </li> <li>• <b>Conditions</b> <ul style="list-style-type: none"> <li>○ IF, Switch</li> </ul> </li> <li>• <b>Control flow and looping</b></li> </ul>		
3	<ul style="list-style-type: none"> <li>• <b>Functions</b> <ul style="list-style-type: none"> <li>○ Function arguments</li> </ul> </li> <li>• <b>Data structures</b> <ul style="list-style-type: none"> <li>○ Lists</li> <li>○ Dictionaries</li> <li>○ Sets / Tuples</li> </ul> </li> </ul>	Assignment 1 Given	Quiz 1
4	<ul style="list-style-type: none"> <li>• <b>Python Packages</b></li> <li>• <b>Exception Handling</b></li> </ul>		
5	• <b>Object Oriented Programming I – Intro</b>	Assignment 1 Due	
6	• <b>Object Oriented Programming II – More in Depth</b>	Assignment 2 Given	
7	<ul style="list-style-type: none"> <li>• <b>Handling structured Data</b> <ul style="list-style-type: none"> <li>○ CSV File Datasets</li> <li>○ JSON files</li> </ul> </li> <li>• <b>Plotting Data</b></li> <li>• <b>SciPi and NumPi</b></li> </ul>		Quiz 2
8	• <b>Pandas</b>		
9	• <b>Dash</b>		
10	<ul style="list-style-type: none"> <li>• <b>Testing</b> <ul style="list-style-type: none"> <li>○ Test driven development</li> <li>○ Test cases</li> </ul> </li> </ul>	Assignment 2 Due	
POST			Quiz 3

## Rights and Responsibilities

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### Plagiarism

The most common offense under the Academic Code of Conduct is plagiarism which the Code defines as “the presentation of the work of another person as one’s own or without proper acknowledgement.”

This could be material copied word for word from books, journals, internet sites, professor’s course notes, etc. It could be material that is paraphrased but closely resembles the original source. It could be the work of a fellow student, for example, an answer on a quiz, data for a lab report, a paper or assignment completed by another student. It might be a paper purchased through one of the many available sources. Plagiarism does not refer to words alone - it can also refer to copying images, graphs, tables, and ideas. “Presentation” is not limited to written work. It also includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English and do not cite the source, this is also plagiarism.

In Simple Words, do not copy, paraphrase, or translate anything from anywhere without saying from where you obtained it!

Source: <http://www.concordia.ca/students/academic-integrity.html>

### Intellectual Property

Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published, or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities. As specified in the Policy on Intellectual Property, the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

### Use of Third-Party Software

Please refer to the <https://www.concordia.ca/ctl/technology-guidelines.html> website to learn more about the guidelines relating to technology use within Concordia.

Please refer to the license conditions bundled with any software acquired to use within this course. For licensing questions, please contact the manufacturer of the software whenever in doubt.

### Social Media Sites

Please note that the Copyright Act applies to course material (coursepacks, handouts, original or manipulated images etc.). As such, students should be aware that it is illegal to post such material on any website or social media site such as Facebook or YouTube, to sell it, to share it, or to include it in a personal portfolio, as this will constitute copyright infringement and is punishable by law. For more information about the University’s policy on social media: <http://www.concordia.ca/social/handbook.html>

### IMPORTANT MESSAGE FROM CONCORDIA UNIVERSITY

#### Support and online training – Sexual violence policy

Concordia University is committed to creating a safe and respectful learning environment. Over the last six years, Concordia has been increasing opportunities for training and making all members aware of expectations and support available. As part of this commitment we are informing all members of the community of university resources and policies related to preventing any form of sexual violence on campus.

The **Sexual Assault Resource Centre (SARC)** is Concordia's on campus resource for any university member who has been impacted by, or experienced, any form of sexual violence. At Concordia, we define sexual violence as:

- Sexual harassment
- Sexual assault
- Stalking
- Intimate partner violence
- Sexual violence that takes place online

The SARC services are for students, staff and faculty of all genders and orientations and it's a confidential and non-judgmental resource that works from a survivor centered and trauma informed perspective. It includes:

- Crisis intervention
- Short and long-term individual and group counselling
- Referrals and accompaniment to on and off-campus resources for support and/or redress

You can find out more about SARC services, prevention education and Concordia's policy on sexual violence by following the links below:

[www.concordia.ca/sarc/](http://www.concordia.ca/sarc/) / <https://www.facebook.com/SARCConcordia/>  
<http://www.concordia.ca/content/dam/common/docs/policies/official-policies/PRVPA-3.pdf>

As a member of the Concordia community, we are offering you an opportunity to access a complimentary online training module that addresses sexual violence and campus supports. **We encourage you to inform yourself by participating in the training, which takes 30-45 minutes to complete.** The training includes information on:

- Defining sexual violence
- Common myths
- Consent
- Bystander intervention
- How to support someone who has had an experience of sexual violence

The training will also provide additional information about important resources, on and off campus, for support. Any questions or concerns about this training can be directed to: [sexual-violence-training@concordia.ca](mailto:sexual-violence-training@concordia.ca)

For additional information, or questions, about Concordia University's commitment to preventing and responding to sexual violence you may contact:

Lisa Ostiguy, PhD  
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Office of the Provost and Vice-President Academic  
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**Please note**

**In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.**