Programming for Data Analytics (Fall 2024)

CDA 250 (PHY 351)

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Class Meetings	Student Hours
Tues. / Thur.	Mon. / Wed. |
9:55 AM - 11:40 AM	12 noon - 2 pm
Sykes 312	Watkins 207

Course Description

This is a high-impact course introducing computer programming as a critical 21st-century technical literacy and as the "glue" that connects powerful data-driven technologies to form solutions for real-world challenges in finance, biotech, political science, and robotics. The course will adopt the open-source Python programming language and provide an overview of machine learning and its algorithms. No experience is needed. Prerequisite: None. (Offered every term.) Credits: 4

Course Outcomes

Our goals for this course:

- Understand the fundamentals of computer programming and Python,
- Be able to answer questions about the world using data.

We will get there by:

- understanding the data types and structures in Python,
- executing loop and conditional statements in Python,
- reading documentation to learn how to use Python libraries,
- loading, analyzing, and exporting data using Python,
- identifying and fixing errors in raw datasets before beginning analysis,
- writing Python scripts to represent numerical and categorical data visually in a way that is easy to understand.

Required Texts

This class uses a MyEducator textbook. It is available on Canvas. You must purchase it. All assignments and reading quizzes will be submitted through the MyEducator platform. MyEducator will submit your grades to Canvas automatically. So if you are curious about your grade, check Canvas.

You can access the textbook via the main page of Canvas.

Assignments

Assignment

	Weigth (%)
Engagement	15%
Reading Quizzes	10%
Code Assessments	25%
Project (Total)	51%
Hello World	(1%)
Dataset & Question	(5%)
Basic Statistics	(5%)
Vizualizations	(5%)
Variable Analysis	(10%)
Final Project	(20%)
Process Paper	(5%)

Links to related to Assignments

- [Connecting to GitHub Classroom](#)

General Information

Grading

Queens uses a plus/minus grade scale: B- receives less than 3 points, for instance. Grades in this class will follow the same pattern with one exception. Here are the numeric grades associated with each letter grade:

A = 90-100

B+ = 89-87

B = 86-83

B- = 82-80

C+ = 79-77

C = 76-73

C- = 72-70

D+ = 69-67

D = 66-60

F = 59-0

Notice a couple inconsistencies. One, I do not give an A-. In my experience, if you get an A, you deserved it without qualification. Also, there is not a D-. This difference is because Queens does not include a D-.

Honor Code

The Honor Code, which permeates all phases of university life, is based on three fundamental principles. It assumes that Queens students: a) are truthful at all times, b) respect the property of others, and c) are honest in tests, examinations, term papers, and all other academic assignments. Please contact the Instructor if you believe a violation of the Honor Code has occurred. It is a violation of the Honor Code for a student to be untruthful concerning the reason for a class absence. See The Honor Code Book for more information on the process in the event of a suspected violation.

Every student is expected to produce their own work based on their own ideas and cite anyone else's ideas or words appropriately. Certain material that an average person would consider common knowledge does not need to be cited. Such information would include that Christopher Columbus sailed across the Atlantic Ocean in 1492 or that the American Revolution began in 1776. Other information, however, needs to be cited if it did not originate in your mind. See the Queens Library's page on plagiarism: https://library.queens.edu/plagiarism/.

Queens AI Policy

The use of AI Tools is prohibited for coursework unless explicitly communicated by the course instructor.

If the instructor has given explicit direction(s) that AI Tools may be used (such as but not limited to ChatGPT, QuillBot, DALL-E, or Bard), the material produced must be acknowledged with a citation by the student for any assignment for which it was used. Their use should be limited so that they do not interfere with the student learning objectives for the assignment and the course.

Student Accessibility Services

Queens University of Charlotte is committed to making reasonable accommodations to assist students with disabilities. If you have a disability which may impact your performance, attendance or grades in this course and require accommodations, you must first contact Student Accessibility Services at sashelp@queens.edu. The steps for receiving accommodations must be completed before accommodations can be given. The steps are available on the Student Accessibility Homepage. SAS is responsible for coordinating classroom accommodations and other services for students with disabilities. Please note that students are responsible for sharing their letter of accommodation with their instructors to receive classroom accommodations.

Student Complaint Process

Queens University of Charlotte is committed to providing an educational climate that is conducive to the personal and professional development of each individual. To ensure that commitment, the university has developed procedures for students to pursue grievances within the university community should such action become necessary. A student who has an unresolved disagreement or dissatisfaction with a faculty or staff member, another student, a student group, or an administrator has the right to file a written complaint without prejudicing his or her status with the university. For more information, please visit the Student Complaint Process page. For information regarding the online student complaint process, please visit the online student complaint process page.

QAlert

QAlert is the emergency notification system Queens uses to notify the campus community of an emergency, inclement weather, or class cancellations. It sends messages about the status of a given situation, as well as other details the campus needs to know. Students, faculty, and staff are automatically registered for QAlert through the university's enterprise resource.

Religious Holidays

If any assignments or due dates interfere with your personal religious observation, I will be happy to make accommodations. Remember, within the first two weeks of the semester, the student must let me know the dates of major religious holidays on which the student will be absent or unavailable due to religious observances. Please, see the Queens Office for Equity, Diversity, and Inclusion religious holiday calendar:

E-mail Communication

When writing emails to me, be sure to include a subject line, address me properly by my title and last name, and sign off with your name. Proper email formatting skills are required in post-university life.

Each student is issued a University e-mail address (username@queens.edu) upon admittance. The University uses this e-mail address for official communication with students. Students are expected to read e-mails sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications.

Course Topics by Week

Week (Week of)	Tuesday	Thursday	Due This Week
1 (Aug. 28)	Ch. 1 Intro	Ch. 2 Variables	Intro Quiz & Variables Assessment (8/30)
2 (Sept. 2)	Ch. 3 Flow Control	Ch. 3 Python Flow Control	Flow Control Assessment (9/6) & **Project:Hello World (9/6)**

Week (Week of)	Tuesday	Thursday	Due This Week
3 (Sept. 9)	Ch. 4 Input, Processing, Outputs	Ch. 5 Collections	IPO & Collections Assessments (9/13)
4 (Sept. 16)	Ch. 6 Iterations	Ch. 7 Packages	Iterations & Packages Assessments (9/20)
5 (Sept. 23)	Ch. 8 Dataframes	Ch. 9 Reading/Writing files	Dataframes & Reading/Writing Assessments (9/27)
6 (Sept. 30)	Ch. 10 Advanced Dataframes	Ch. 11 Debugging	Advanced Dataframes & Debugging Assessments (10/4) **Project: Dataset Question (10/6)**
7 (Oct. 7)	Ch. 12 Functions	Ch. 12 Functions	Functions Assessment (10/11)
8 (Oct. 14)	**Fall Break Tuesday**	Ch. 13 Univariate Statistics	
9 (Oct. 21)	Ch. 13 Univariate Statistics	Ch. 14 Univariate Visualization	Univariate Quiz & Assessment (10/25) & **Project: Basic Statistics due Sun (10/27)**
10 (Oct. 28)	Ch. 15: Bivariate Statistics (up to reading Quiz)	Ch. 15 Bivariate Statistics	r-/p-value quiz & bivariate N2N stats assessment (11/1)
11 (Nov. 4)	Ch. 16.1-4 Bivariate Visualization	Ch. 16.4-8 Bivariate Visualization	Bivariate N2N Visualization Assessment (11/8)

Week (Week of)	Tuesday	Thursday	Due This Week
12 (Nov. 11)	Ch. 17.1-4 Bivariate Statistics (up to reading quiz)	Ch. 17.5-9 Bivariate Statistics	ANOVA/t-tests quiz & Bivariate N2C stats assessment (11/15)
13 (Nov. 18)	Ch. 18 Bivariate C2N Visualization	Ch. 18 Bivariate C2N Visualization	Bivariate C2N Visualization Assessment (11/22)
14 (Nov. 25)	**Thanksgiving**	**Thanksgiving**	**Project:Variable Analysis and Visualizations due Tuesday (11/26)**
15 (12/2)	Ch. 22 (Data Wrangling)	Solving problems	Work On Your Project
16 (12/10)	N/A	**Final Project Due Dec. 12**	

Other Resources for this Course

- Python Documentation
- Beginner's Guide to Python Documentation
- W3 Schools Python Tutorial
- Data analysis for Python course on YouTube
- Python for Everybody course on YouTube
- Panda's Documentation
- Numpy Documentation