QTM (DSci) 151 Introduction to Statistical Computing II, Fall 2025

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Communications:

Please use the "Discussions" feature to ask questions about course content outside of class time and office hours. This will be monitored by myself and the TA's, and you have the option of asking questions anonymously. I prefer this, because multiple students often have the same question, and private emailing limits the number of people helped by an answer. Emails to me should be limited to topics pertaining only to you (accomadations, grading questions, etc.)

Overview

This course is an introduction to the Python programming language and SQL for students without prior programming experience. The purpose of this course is to prepare students for upper-level electives in data analysis related courses. It will cover the programming basics of Python which include understanding data types, controlling flow using loops and conditional statements, and writing functions. In addition to these basics, this course will put emphasis on skills that are relevant for data analysis which include 1) data manipulation such as merging, appending, and reshaping using SQL and Python, 2) making various plots for descriptive analysis using Python, and 3) using cloud-based services such as version control and cloud computing.

Learning objectives

1. Understand the version control workflow using GitHub
2. Understand Python data types such as int, float, string, list, and dictionary, NumPy array and Pandas data frame
3. Control flow with if statements and loops (for loop, while loop)
4. Write custom functions
5. Design and write programs to solve problems
6. Data manipulation such as merging, appending, and reshaping using SQL and Python pandas
7. Plot various graphs for descriptive analysis using matplotlib and seaborn.

Materials

The class will be entirely based off lectures provided by the instructor for each class and stored in the following Github repository:

https://github.com/sentz2/qtm151fall2025

Optional Materials

The following readings are not required, but are suggested for students interested in further readings:

- Elements of Data Science: https://allendowney.github.io/ElementsOfDataScience/README.html
- Think Python: https://greenteapress.com/thinkpython/html/index.html
- SQL: https://runestone.academy/ns/books/published/ac1/sql/toctree.html

Course Schedule

The following table outlines the proposed schedule for the semester. While I intend to follow this, it is subject to change. Check Canvas regularly for updates to deadlines and any changes to the assigned material. All homework due dates are in blue.

Week	Date	Title	Lecture	Percentage
Module 1: Introduction to GitHub, Python and Jupyter Notebooks				
Week 1	27-Aug	Introduction to Computing Environment	0	
Week 2	1-Sep	Labor Day (No Class)		
	3-Sep	Introduction to Jupyter Notebooks	1	
	4-Sep	Assignment 1 due (10 p.m.)		5%
Week 3	8-Sep	Variables and Lists	2	
Module 2: Python data types and controlling flows				
	10-Sep	Mathematical Operations, Arrays, and Random Numbers	3	
	10-Sep	Schedule Change Ends		
	11-Sep	Assignment 2 due (10 p.m.)		5%
Week 4	15-Sep	Boolean variables and if/else statements	4	
	17-Sep	Loops – while, for, break, continue	5	
	18-Sep	Assignment 3 due (10 p.m.)		5%
Week 5	22-Sep	Applications 1: Simulation Studies	6	
Module 3: Writing and Running Functions				
	24-Sep	User defined functions, lambda, apply	7	
Week 6	29-Sep	Local/global variables	8	
	30-Sep	Assignment 4 due (10 p.m.)		5%
	1-Oct	Applications 2: Operations over multiple datasets	9	Quiz 1: 6%
Week 7	6-Oct	Subsetting Data	10	
	7-Oct	Assignment 5 due (10 p.m.)		5%
	8-Oct	Applications 3: Linear Regression in Python	11	
Module 4: Data Manipulation with Pandas				
Week 8	13-Oct	No Class (Fall Break)		
	15-Oct	Creating and replacing variables	12	
Week 9	20-Oct	Application 4: Random assignment	13	Quiz 2: 6%

	22-Oct	Aggregating Data	14	
	22-Oct	Instructions for final project released		
	23-Oct	Assignment 6 due (10 p.m.)		5%
Week 10	27-Oct	Merging Data	15	
	27-Oct	**Mid-semester Student Survey**		*0.50%*
		Module 6: Time Data		
	29-Oct	Time and Panel Data	16	
	29-Oct	Partial Withdrawal Deadline		
	30-Oct	Assignment 7 due (10 p.m.)		5%
Week 11	3-Nov	Application 6: Practicing Chaining	17	*Quiz 3: 6%*
	5-Nov	Time Subsetting and Pivoting	18	
	5-Nov	Submit Groups for Final Project		
		Module 7: Advanced Plots and Formatting		
Week 12	10-Nov	Advanced Plots I	19	
	11-Nov	Assignment 8 due (10 p.m.)		5%
	12-Nov	Practicing Time, Panel, and Plots	20	*Quiz 4: 6%*
Week 13	17-Nov	Manipulating Text Data	21	
	18-Nov	Assignment 9 due (10 p.m.)		5%
	19-Nov	Advanced Plots II	22	
		Module 8: Introduction to SQL		
Week 14	24-Nov	Introduction to SQL notebooks	23	
	26-Nov	No Class (Thanksgiving Recess)		
Week 15	1-Dec	Merging Tables in SQL	24	
	3-Dec	Application 7: Practice SQL Queries	25	Quiz 5: 6%
	4-Dec	Assignment 10 due (10 p.m.)		5%
Week 16	8-Dec	Import SQL Data into Python	26	
	8-Dec	Final Project Due		*20%*

Course Assignments

Your grade comprises homework (50%), class quizzes (30%), and the final project (20%). The assignments correspond to the structure outlined in the schedule above.

Course Assignments Description

Assignments

Working together on the homework assignments is encouraged, but you must write your own solutions. It is highly recommended that you make your solo effort on all the problems before consulting others. Each assignment has its due date indicated in this Syllabus and on Canvas. **Any assignment submitted after the due date/time will automatically be graded for half points**. To accommodate unexpected

circumstances, your lowest homework grade will be automatically dropped at the end of the semester. **The same applies to in-class quizzes.**

Final Project
The final term project is group-based, in teams of 3-4 students. The details of the project will be discussed in class.

Participation (extra credit) + 1%
- Your participation will consist of a midsemester in-class survey. This will include teaching feedback and knowledge assessment questions that I will use for up to 0.5% extra credit.
- You will also be granted 0.5% if you fill out the final course evaluations.

Grading Scale
Your final grade will be assigned based on this grading scale: Grades will generally follow the standard scale, but the professor may curve up:

A	A-	B+	B	B-	C+	C	C-	D	F
93+	87-92	83-86	80-82	75-79	70-74	65-69	60-64	55-59	0-54

Throughout the semester, I will keep the Canvas gradebook up to date so that you have an ongoing understanding of where your grades fall in this scale.

Policies

General: Students are expected to adhere to the Emory College Honor Code as well as its Conduct Code, see https://catalog.college.emory.edu/policies/honor-code.html. Specifically, the honor code is in effect throughout the semester. By taking this course, you affirm that it is a violation of the code to cheat on assignments, end-of-chapter assessments, to plagiarize, to deviate from the teacher's instructions about collaboration on work that is submitted for grades, to give false information to a faculty member, and to undertake any other form of academic misconduct. You also affirm that if you witness others violating the code you have a duty to report them to the honor council.

Special circumstances: Students requiring any type of special classroom/testing accommodation for a disability, religious belief, scheduling conflict, or other impairment that might affect his or her successful completion of this course must personally present the requested remedy or other adjustment in written form (signed and dated) to the instructor, i.e., supporting memorandum of accommodation from the Department of Accessibility Services, https://accessibility.emory.edu/index.html. Requests for accommodations must be received and authorized by the instructor in written form no less than two weeks in advance of need. No accommodation should be assumed unless so authorized. In the event of needs identified later in the course, or for which an adjustment cannot be made on a timely basis, a grade of "I" Incomplete for the course, will be given to accommodate the unanticipated request.

Attendance:

- There is no separate grade for attendance. However, attendance will be monitored through quizzes which will take place during class.
- The OUE student self-service absence form must be submitted if you would like to have your absence excused due to the reasons recognized by the university (See the top of the form). Be sure to complete this form in advance, and you must include all classes you are currently enrolled at the time of completing the form so that all your instructors will be notified all at once. If you wish to explain your situation further, you may also email your instructor in advance, and if necessary, submit official documentations.
- Check our Canvas page regularly! All course materials including lecture materials, quizzes, assignments, due dates, and important announcements will be posted on Canvas throughout the semester.

In/Out of classroom conduct: Students are expected to adhere to the Emory University Code of Conduct, see https://conduct.emory.edu/policies/codes.html