ECON 220 - Data Science for Economists (Lab)

Course Syllabus - Fall 2025

Course description

Data analysis is a highly valued skill in the job market. In this class, you will learn how to organize and analyze data using a widely used programming language, Python, which has powerful tools to manage and analyze data. We will develop the skills to apply the concepts you learn in class and present and analyze data in an organized manner. We will also learn how to think algorithmically within the Python environment, with the aim to prepare you for more advanced data analysis tasks in your future classes or in other endeavors. Your programming skills will only improve when you struggle to figure things out on your own. This class will provide guidance to develop the basics of Python for statistical analysis and, hopefully, the desire to keep practicing and challenging yourself with new and different quantitative problems and questions.

Course delivery

We will meet in person every Friday from 10:00-10:50 at **Candler Library 114**.

Instructor

Instructor's name. Jafet Baca-Obando
Email. jbacaob@emory.edu
Website. Jafet's website
Office Hours. There will be one (1) in person office hour from 11:00-12:00 on Friday at the R. Randall Rollins Building 4th floor. Alternative schedules may be accommodated on a case by case basis. Merely email me if you have any questions.

Course Assessments

There will be three broad types of assessment for this course.

1. DataCamp Courses (2 in total) - 4%
2. Random Attendance Checks (6 in total) - 3%
3. Data exercises (9 in total) - 18%

These sum up to 25%, which is the lab percentage of the total ECON 220 grade. In other words, your grade for ECON 220 will be 75% from the lecture component, and 25% from the lab component.

DataCamp

DataCamp is an online learning platform that has been used by many people to learn the basics of coding. They also offer certain certificate courses which may be looked after in the job market. For this course, you will be required to complete two DataCamp courses

- DC1: Introduction to Python

- DC2: Intermediate Python

At the end of each course, you will be required to submit a DataCamp certificate. This certificate is generated after course completion in DataCamp. You will upload the certificate in a submission portal on Canvas. The deadlines are as follows. DC1 is due the Monday of Week 2 and DC2 is due the Monday of Week 4. Each DataCamp Certificate will constitute 2% of your final grade. I highly recommend to do both in quick succession and to not wait for the formal deadlines. This is because doing these back to back will reinforce your knowledge on past topics and will allow you to code more confidently throughout the semester. It is not uncommon to submit all certificates within Week 2. Note: Mere submission of the certificate rewards the full credit. I will not check whether you made many mistakes in the course, simply earning your certificate is enough.

Data exercises

Data exercises consist of questions based on the discussion in the past laboratory class as well as some concepts discussed in the lecture. They are meant to test how you can apply concepts learned in the lecture class practically using Python. There will be 9 Data exercises in total, which are always due one week after they are assigned. For full credit to be received, the submission must include two files:

1. The Jupyter Notebook File (.ipynb)
2. An HTML file for the Jupyter Notebook (.html)

Have a habit of adding comments to the script as this will help you in reviewing. I will post a suggested solution code after the deadline but bear in mind that there are many ways for us to get to the same conclusion. No one way is the "most" correct, just some that are probably more efficient. Each Data exercise is worth 2% of your final grade.

Late policy: Data exercises that are submitted after the due date will be deducted 0.5% (out of 2% per exercise) per day. Hence, if you will be more than 4 days late, there is no point in submitting further. Because Canvas locks assignments that are past due, in order to submit late work, you need to send your solution to me over email.

Random attendance checks

I will check attendance on 6 random dates throughout the semester. If you are present, you will get credit equivalent to 0.5%. In total, this sums up to 3%. Any absence that is deemed excused shall be rewarded the same amount for as long as adequate documentation is presented.

Use of generative AI

While other courses may discourage it, it is important for you to also know how to use generative AI. One of the best uses for it currently is coding. However, even if you are free to use it in any assessment, I want you to be able to know what is going on in the code. As such, be sure to know what is going on line by line and be able to comment and explain it should I ask for it. In this class, we will make good use of Github Copilot and ChatGPT to aide in our coding.

Academic honesty policy

The Emory Honor Code defines academic misconduct, which includes plagiarism and seeking, using, giving, or obtaining unauthorized assistance or information in any academic assignment or examination. All suspected violations of the Honor Code will be reported to the Honor Council. If you have questions about the Honor Code, you will find more information here

ADA and students with disabilities

If you have a documented disability and have anticipated barriers related to the format or requirements of this course, or presume having a disability (e.g., mental health, attention, learning, vision, hearing, physical or systemic), and need accommodations for this semester, I encourage you to contact the Office of Accessibility Services (OAS) to learn more about the registration process and steps for requesting accommodations. If you are a student that is currently registered with OAS and have not received a copy of your accommodation notification letter within the first week of class, please notify OAS immediately. Students who have accommodations in place are encouraged to coordinate with your professor in the first week of the semester to communicate your specific needs for the course as it relates to your approved accommodations. All discussions with OAS and faculty concerning the nature of your disability remain confidential. For additional information regarding OAS, please visit the website here

Lesson plan

The plan below corresponds to a rough overview of the concepts we will be tackling throughout the course.

1. Introduction to Python and Jupyter Notebook

Overview of Python programming and its ecosystem. Introduction to Jupyter Notebook as an interactive environment for coding, documentation, and visualization.

2. Data import

Methods to load and work with datasets in Python using libraries such as pandas and numpy. Covers formats like CSV, Excel, and SQL databases.

3. Numpy and Pandas

Introduction to numpy for numerical operations and pandas for data manipulation. Discusses arrays, DataFrames, and common operations.

4. Data inspection

Techniques for understanding data, including examining structure, identifying missing values, and exploring descriptive statistics.

5. Data cleaning

Strategies to handle missing values, outliers, duplicates, and inconsistent data for a clean dataset ready for analysis.

6. Data visualization

Creating visualizations to explore and communicate insights using libraries like matplotlib, seaborn, and plotly.

7. Probability functions

Understanding probability distributions and their functions in Python for modeling and simulations.

8. Summary statistics

Measures like mean, median, variance, and standard deviation for understanding data trends and variability.

9. Central limit theorem

Explanation of the theorem and its applications in sampling distributions and hypothesis testing.

10. Lambda expression

Use of lambda functions in Python for concise, anonymous functions within data transformations.

11. Hypothesis testing

Methods for testing hypotheses using statistical tests (e.g., t-tests, chi-squared tests) in Python.

Class policies

Communication

The best way to reach the instructor is via email. Include "[ECON 220 Lab]" in the subject of the email (so it can be forwarded to the right inbox). You should receive a reply within 24 hours. While most announcements will also be made in class, you should check your Emory email often and it is assumed you will do so.

Attendance

Unless you have a legitimate excuse (e.g. family or health-related emergency, NCAA athletic competition away, and job interview), you are expected to attend class, arrive on time, and not leave early. If for some reason you have to come late or leave early you need to contact the instructor before class. When you must miss a class it is your responsibility to get the assignments from me or a classmate. Poor attendance will surely contribute to a low grade. The instructor will be more than happy to help you with course material on a 1-to-1 basis as long as you attend class and put forth the proper effort.

Make-up exam policy

There will be no makeup exams/quizzes. If you have a valid excuse (family or health related emergency, NCAA athletic competition away, and final exam conflict), let the instructor know as soon as possible. In case of a health related emergency, a doctors letter of excuse; in the other situations, you will need to get a letter of excuse from the relevant office.

Re-grades

If you feel that your quiz/homework was incorrectly or unfairly graded, you have one week after the class in which it is returned to submit it for a re-grade. However, when an exam is turned in for a re-grade, the entire exam will be re-graded and the scores for individual questions can be either increased or decreased.

Disclaimer

As with any syllabus, always keep in mind that the syllabus is a general plan for the course and any deviations announced to the class depending on timing may be necessary.