

Syllabus for Computing for Economics 21:220:350 & 550

Professor Jason Barr

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Office Hours: Via Xoom, Wednesday and Friday, 2:00 pm-3:00 pm (or by appointment—just shoot me an email and we can pick a time to Zoom).

Course website: Canvas

Meeting Time: Tuesday and Thursday, 2:30 pm – 3:50 pm

Location: Engelhard 311

Please note: This course is not open to computer science or math majors or minors—you CANNOT use this course for either one of those majors. The course is designed for economics and related majors. If you are a [data science minor](#), you CAN use it for the minor.

Course Overview: This course will give you the basic foundations of computer programming for economic applications. **The course assumes no programming skills whatsoever** and will start from the very beginning.

This semester we will be learning programming using the Python programming language (<https://www.python.org/>), which is a commonly used high-level, general-use language. It allows for a wide range of applications, including economic, financial, and statistical modeling. Python is open-source and free. Documentation on how to use Python is widespread. Python is used commonly in academic, scientific, and business environments. The point of the class is to learn to use Python for economic applications.

Note: If you have some familiarity with Python, you are welcome to take the course, but since I will start at the most basic level, there may be some material with which you are already familiar, and you need to consider if this course is the best use of your (and my) time.

For this course, we will be using the free Python software suite (or integrated development environment (IDE)) known as Anaconda and which includes Spyder, a user-friendly text editor in which to write your programs. To get the software for personal use go to <https://www.anaconda.com/products/individual>, and scroll down to the bottom and choose Windows or Mac (assuming your computer is not too old, choose the 64-bit version). You are welcome to use the labs to do all your programming.

COVID Policies: Masks: In order to protect the health and well-being of all members of the Rutgers-Newark community, **masks must be worn by all persons inside campus buildings** when in the presence of others, and in buildings in non-private enclosed settings (e.g., common workspaces, workstations, meeting rooms, classrooms, etc.). Masks should securely cover the nose and mouth. **Masks must be worn during class meetings.**

Each day before you arrive on campus or leave your residence hall, you must complete the brief survey on the My Campus Pass symptom checker self-screening app found at: [myRutgers Portal](#)

Course Pre-reqs.: Ideally all students should have at least Intro. to Microeconomics, Intro. to Macroeconomics, and Intro. to Statistics. **Having Intro. to Statistics is a must**, since a large part of the course will be about using Python to analyze data. I will review the relevant economic concepts as we need them, but I will assume some basic familiarity with Intro. Micro topics.

Course Readings: The readings will be comprised of book chapters, articles or online pdf documents about computer programming and economics that I will post on Canvas. The readings will assist you in learning more about the programming concepts and languages. I will also be posting readings on economic topics as we get to them later on in the semester.

Learning Goals: By the end of this course, you will have a strong foundation in the basics of programming using the Python programming language. You will learn standard programming methods such as using loops, conditional statements, and working with lists. You will learn how to install and run the various packages and libraries that are an integral part of Python. You will also learn how to do programming for basic economic analysis, including supply and demand and modeling of economic behavior. Lastly, you will learn how to perform basic statistical analysis and data graphing in Python. The goal is to give you a set of tools so that you may use Python and computer programming in new settings, such as for research or in the workplace, as it relates to economic and data analysis. This course is designed to give you a basic foundation in data science for economics and to help get you started in this area.

Requirements and Grading:

Class Attendance	20%
Regular homework programming assignments	40%
Online quizzes	15%
Final Project (& presentation)	25%
Total:	100%

Class Attendance: Starting September 13, I will be taking attendance.

- Two or fewer unexcused absences: No impact on your class attendance grade (score for class attendance score will be 100 points)
- Three to four unexcused absences: Your class attendance score falls from 100 to 70 points.
- Five or more unexcused absences: You will get 0 for your class attendance grade score (so after four unexcused absences your grade falls to a B automatically—and that’s the best you can do, assuming you get 100% for every other section).

An absence is “excused” if (a) you inform me of the reason **ahead of time**, (c) you have a reasonable excuse (e.g., illness) and (c) you provide proof (within a week of the absence). Failure to obey these rules will mean the absence is unexcused.

Quizzes: Throughout the semester, I will post several short multiple-choice quizzes to test your understanding of the material. You will have ample time to complete each one.

Assignments: There will be several programming assignments to learn the code and methods discussed in class. You will upload your code and I will run it. You will be graded on two dimensions: (1) Does it run properly and give the correct output, and (2) is the code well-formatted, readable, and neat? If I run your code, and it fails to complete or it gives bad output, **you will get marked down significantly.**

You can **resubmit homeworks multiple times** until it runs properly (with small penalty). **I will not tell you what was wrong—that is your job, but I am happy to Zoom with you to help,** if you need it). If you get a low grade for the first submission do not get discouraged—your effort to improve the code will reap rewards.

Project: The final project is for you to demonstrate your ability write a program in Python with an economic application. The project will include: a brief write-up of the problem you aim to model or study; the motivation and related literature; sources and other necessary information., and all of the output created by your program. Finally, you will also have to submit your code. I will discuss the project guidelines during the second or third week of the semester.

Presentations: All graduate students must give an oral presentation about their final project toward the end of the semester (and which will be part of the final project grade). If time permits, I may give undergraduates the (optional) opportunity for an oral presentation of their final project and which they can earn bonus points toward the final project score.

Python: I will be teaching from the Anaconda version of Python, which is the programming language and a suite of related applications. Here is the download website: <https://www.anaconda.com/products/individual>. During the lectures I will refer you to various useful websites or readings.

Topics. Note that the course will be divided into three sections: (1) Intro. to Programming, (2) Economic Applications, and (3) Working with data. The following is a general roadmap, which is subject to change.

Part I: Introduction to Python and Programming

- Topic 1: What is Programming for Economics?
- Topic 2: Introduction to Python and Spyder, and how to get started
- Topic 3: Working with variables and lists
- Topic 4: Conditionals and loops
- Topic 5: Introduction to functions
- Topic 6: Introduction to Numpy, Scipy, and Matplotlib
- Topic 7: Creating Modules

Part II: Economics Modeling

- Topic 8: Review of Supply and Demand in Economics

Topic 9: Programming Supply and Demand Models

Part III: Working with Data

Topic 10: Introduction to Pandas

Topic 11: Introduction to Statistical Analyses in Python

Topic 12: Intro to APIs and Scraping

Topic 13: Additional topics if time permits (such as game theory)