

BUS-215F -2 and -3: Python and Applications to Business Analytics

Section 2: Monday/Wednesday, 2:00-3:20pm, Room Pollack Fine Arts 001

Section 3: Monday/Wednesday, 3:30-4:50pm, Room Pollack Fine Arts 001

Instructor:

Ahmad Namini, PhD, anamini@brandeis.edu

Office: Sachar 017

Office Hours: Tuesday, 1:00 – 4:00 pm or by appointment.

Teaching Assistant:

Lizzie Liang, yliang@brandeis.edu

Office: Sachar 017

Office Hours: Wednesday, 5:00 – 6:00 pm, Friday, 9:30 – 11:00 am or by appointment.

OVERVIEW

Python is a computer programming language that has gained wide popularity throughout the software development field. Python has achieved massive appeal due to its ease-of-use, its quick learning curve, and its robust library of modules available through a large community of developers. Whether a person or firm builds software for pleasure, computational automation, or basic computing support for business decisions, the need for people to properly design, code, test, and deploy Python computer solutions is mandatory within today's data driven business world.

This course is designed to be relevant to any business student that wishes to build a skillset that can harness the power of the computer, computer science, and data analysis to various applications in business analytics. A set of these applications in business analytics that are relevant is data analysis (statistics, machine learning), data visualization (charting), algorithms (optimization, numerical methods, linear algebra), and forecasting (time series analytics, stochastic methods).

LEARNING GOALS

Computer programming, much like a spoken language, can be mastered only through continuous, hands on repetition. Python is no different and this course stresses, above all, a need for students to code, code, and code. Only through constantly programming can a student gain a sufficient mastery of Python.

At the end of this course, the student should be able to:

- Understand the basic syntax and constructs of the Python computer programming language.

- Develop an intuitive feel of how to model a business process to a computer-recognizable, Python form.
- Implement Python applications in business analytics. All assignments will be tailored to applications in the field of business analytics.

Success in this course is based on the expectation that students will spend a minimum of nine hours of study time per week in preparation for class.

COURSE REQUIREMENTS

Recommended Book(s): There are recommended books for this course.

- Python for Data Analysis, Wes McKinney, O'Reilly Media, Inc., 2018.
- Learning Python, Mark Lutz, O'Reilly Media, Inc., 2013.

Tutorials found online

- <https://docs.python.org/3/tutorial/index.html>
- <https://www.w3schools.com/python/>
- <https://www.tutorialspoint.com/python/index.htm>
- <https://www.codecademy.com/learn/learn-python>
- <https://www.learnpython.org/>

Please note that there are numerous books and online resources to learn nearly everything about Python. However, please become familiar with the following sites:

- <https://www.python.org/> Portal to everything Python from the keepers of the technology.
- <https://stackoverflow.com/> Search for solutions when encountering

Prerequisite: No computer programming background is required, although all students should have access to a computer and obviously know how to use it.

Class Participation: Class participation is expected of **everyone** in this course, and **class attendance is required**. Each class will have new hands-on demonstrations and/or discussions of previous assignments.

Programming Assignments: Assignments must be done in groups of no more than two students. Grades on each assignment are assigned to all members of the team (although I reserve the right to alter individual grades in certain circumstances, e.g., when it is clear to me that an individual did not contribute to the assignment in a consistent and meaningful way). Students can choose their own partners and it is expected that all assignments are completed equally by both team members.

Special Accommodation. If you are a student with a documented disability on record at Brandeis and wish to have a reasonable accommodation made for you in this class, please see me immediately. Please keep in mind that reasonable accommodations are not provided retroactively.

Grading

- Class Participation 10%

Programming Assignments:

- Total of all assignments 50%

Final Examination:

- In-class 40%

Class Format. For the first class session, there will be an inspiring introduction to what Python is and is not. A thorough demonstration of Python through applications will be presented. Beyond the first class session, all sessions will follow a standard format. The first quarter of the class session will be open to students to ask questions regarding anything from the lectures, assignments, or just follow-up on previously taught topics. The remaining three quarters of the class is for the instructor to lecture and show examples of Python topics and its applications to business analytics.

Academic Honesty. You are expected to be honest in all of your academic work. Please consult Brandeis University [Rights and Responsibilities](#) for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. Allegations of alleged academic dishonesty will be forwarded to the Director of Academic Integrity. Sanctions for academic dishonesty can include failing grades and/or suspension from the university. Citation and research assistance can be found at [LTS - Library guides](#).

COURSE OUTLINE

CLASS 1 – Wednesday, October 24, 2018 About Me and Python Installation

In this introductory lecture we will install Python and run some rudimentary programs that will provide the foundation for our remaining sessions.

CLASS 2 – Wednesday, October 31, 2018 Data Types and Variables

We look to understand the basic constructs of variable types and how variable assignment is used to create a working Python application.

CLASS 3 – Monday, November 5, 2018 Strings, Lists, and Tuples

Python has built-in data structures which are used to store and manipulate data. I will demonstrate the use of strings, lists (equivalent to a mutable array) and tuples (equivalent to an immutable array) and how to model data structures within your application.

CLASS 4 – Wednesday, November 7, 2018
List Manipulations

As a follow-up to the previous class, we will extend the concept of lists to what can be done with lists.

CLASS 5 – Monday, November 12, 2018
Dictionaries

A dictionary is a Python data structure to associate key-value pairs. We will demonstrate the specifics of how a dictionary works and what can be done to model data.

CLASS 6 – Wednesday, November 14, 2018
Indenting Code, Conditional Statements, and Loops

Python has specific syntax regarding how to block code (indentation), make a decision (conditional statements) and iteration (loops). Each will be discussed and shown within a Python application.

CLASS 7 – Monday, November 19, 2018
Functions and Modules

To modularize code and manage the complexity of software development, functions and modules will be introduced on how code functionality should be partitioned into a simple, reusable form and then packaged into a module for deployment.

CLASS 8 – Wednesday, November 21, 2018
Classes and Object Oriented Programming

We will learn to understand the underlying principles of Object Oriented Programming (OOP). The ability to design and model classes with both attributes (state) and methods (behavior).

CLASS 9 – Monday, November 26, 2018
Classes and Object Oriented Programming

Continuation of the previous class.

CLASS 10 - Wednesday, November 28, 2018
Exception Handling

To understand the use of exceptions to handle errors within Python code. Errors will always occur, with the majority being user error. Error types will be discussed, and exception handling will be coded to gracefully manage the exception.

CLASS 11 - Monday, December 3, 2018
Python for Data Science

The Python community has developed wonderful modules that can be used for simple or robust Data Analysis. We will look at NumPy, SciPy, and Pandas and how these modules can be used.

CLASS 12 - Wednesday, December 5, 2018
Data Analysis and Visualization

Utilizing the Pandas module, we will perform data analysis and visualize the resulting metrics within Matplotlib, a Python module for plotting and general data visualization.

CLASS 13 - Monday, December 10, 2018
Final Examination