Course Syllabus for DS 710: Programming for Data Science

NOTE: This syllabus document contains the basic information of this course. The most current syllabus is available in the full course.

Course Description

Computer programming is an essential part of data science. When working with large data sets, it's especially important to be able to write effective, efficient code to help you organize and understand the data.

In this course, we'll introduce you to one of the most widely-used programming languages for data science: Python. You'll gain experience working with real-world data, and leave the course with skills you can apply in other courses in the MS Data Science Program as well as on the job!

Course Objectives

By the end of this course, you will be able to:

- Use the fundamentals of Python: control flow, strings, lists, and tuples.
- Apply debugging techniques to problematic code.
- Use libraries in Python to solve more complicated problems easier than with standard Python.
- Use official documentation for Python and libraries to learn how to use new functions and data types.
- Create impactful visualizations using Matplotlib and Seaborn.
- Create readable functions for efficient task management.
- Gather real-world data that can be analyzed to address a modeling question.

Course Components

Homework

To give you a chance to practice the programming skills you're learning, a homework assignment will be due each week. Several lessons have two homeworks.

All homeworks are assigned through Canvas. You will submit your homework, generally as a .py file and a written component, through a Canvas assignment. Each homework assignment will involve programming in Python, and writing short statements interpreting your results.

You are encouraged to communicate about homework problems with your classmates via the discussion board. However, all work that you turn in must be your own and you must fully understand what you write. In particular, you must type your own code.

There will be 11 total homework assignments. They're all weighted the same.

Quizzes

Each week during the 8 lessons, you will receive a Python notebook with introductory content for the week's material. This notebook will be accompanied by a Canvas quiz. You may take the quizzes as many times as you need to demonstrate mastery of the content.

Project

The project will be completed in three parts, and will provide you with the opportunity to use the skills you have learned to answer a real-world question that interests you using data that you select. The three parts will lead you through the steps of proposing a question, collecting and processing data from the internet, writing reusable code, and interpreting and presenting results.

Part 1: Proposal 30 points (Completed after lesson 8)
Part 2: Exploration 100 points (Completed after Project Part 1)
Part 3: Report 100 points (Completed after Project Part 2)

Grading

Your mastery of course content is assessed using a variety of methods:

Activity	Percentage
Homework	60%
Quizzes	15%
Project	25%

Final grades are assigned using the following scale:

90–100%	A
80–89%	B
60–79%	C
0–59%	F