COMP 3006 Python Software Development

Course Overview

This course, Python Software Development, is a fast-paced tour through advanced Python programming for data science tasks. It refreshes basic Python language features and introduces advanced features. Core Python modules that are commonly utilized for data science tasks are studied. The course introduces both functional and object-oriented programming paradigms and emphasizes software testing throughout.

Learning Outcomes

At course end, students should be able to

- **Name** and **demonstrate proficiency** using advanced Python programming techniques for data science
- **Analyze** a programming task, and create a development plan and high-level software design that accomplishes the task
- **Relate** common portions of the Python standard library to specific programming tasks
- **Understand** and **apply** aspects of the Python scientific programming ecosystem to achieve a data science analysis goal
- **Collaborate** with another data scientist to develop a software program that completes a given data science task

Textbooks and Materials

There are no required textbooks for this course. Hyperlinks to external, online content are provided in the weekly schedule later in this syllabus.

Grading

Assignment/Assessment	Points	Weight on Final Grade
Week 1 Programming Assignment	100	10%
Week 2 Programming Assignment	100	10%
Week 3 Programming Assignment	100	10%
Week 4 Programming Assignment	100	10%
Week 5 Programming Assignment	100	10%

Week 6 Programming Assignment	100	10%
Week 7 Programming Assignment	100	10%
Week 8 Programming Assignment	100	10%
Week 9 Programming Assignment	100	10%
Week 10 Programming Assignment	100	10%

Grading Scale

Letter Grade	**Percentage**
A	93–100%
A–	90–92%
B+	87–89%
B	83–86%
B–	80–82%
C+	77–79%
C	73–76%
C–	70–72%
D+	67–69%
D	63–66%
D–	60–62%
F	59–0%

Assignment and Assessment Information

Detailed instructions for the weekly programming assignments are available in the Online Campus. For Week 1 through Week 10, programming assignments will be due 24 hours after the live session.

Weekly Schedule

Readings should be completed before the live session of the week in which they are assigned. Ideally, readings should be completed before other asynchronous content is started.

Week 1

Readings:

- Bash Reference Manual, Chapters 1 and 3
- Python Tutorial, Chapters 1–5

Week 1 Programming Assignment due 24 hours after Live Session 1.

Week 2

Readings:

- Python Tutorial, Chapters 6–8
- CSV Module
- unittest Module

Week 2 Programming Assignment due 24 hours after Live Session 2.

Week 3

Readings:

- N/A

Week 3 Programming Assignment due 24 hours after Live Session 3.

Week 4

Readings:

- collections Module
- filter Function
- map Function
- Python Tutorial, Sections 9.8–9.10

Week 4 Programming Assignment due 24 hours after Live Session 4.

Week 5

Readings:

- zip Function
- itertools Module
- functools Module
- Python Tutorial, Chapter 9

Week 5 Programming Assignment due 24 hours after Live Session 5.

Week 6

Readings:

- Python Language Reference, Section 3.3, Special method names

Week 6 Programming Assignment due 24 hours after Live Session 6.

Week 7

Readings:

- string Module
- re Module
- argparse Module
- logging Module
- os Module
- os.path Module
- requests Quickstart

Week 7 Programming Assignment due 24 hours after Live Session 7.

Week 8

Readings:

- math Module
- array Module
- NumPy Quickstart
- Matplotlib Introductory Tutorials

Week 8 Programming Assignment due 24 hours after Live Session 8.

Weeks 9 and 10

Readings:

- N/A

Weeks 9 and 10 Programming Assignments due 24 hours after their respective live sessions.

Attendance Policy

Attendance at all live session meetings is mandatory.

Program Mission

The MS in Data Science program provides students with a broad course of study in programming, algorithms, statistics, and data management, as well as a depth of understanding in specific fields such as data mining, machine learning, and parallel systems. Graduates of the Data Science program go on to work in a wide variety of careers, including business, government, education, and the natural sciences.

Late Assignment Policy

Assignments are due before the due date/time specified. Late assignments will not be accepted (i.e., a grade of zero will be assigned). Exceptions to this policy must be requested *ahead of time*. In the case of an emergency, you will be asked to provide appropriate documentation.

Honor Code and Academic Integrity

Assignments and exercises may be discussed in a general fashion with other students. You should not discuss specific solutions or code. You should never copy assignments that have been written by someone else nor allow another student to copy your assignments. If any of your work includes ideas or quotes from a book, paper, website, or other source, you must clearly cite the original source.

Violations of this policy will result in a grade of zero on the assignment/lab/exam for the first occurrence. A second occurrence will result in a failing grade in the course. All violations will be reported to the University Student Affairs Office.

All students are responsible for knowing and adhering to the academic integrity policy of the University of Denver.

Accommodations for Students With Disabilities

Any student who needs an accommodation based on the impact of a disability should contact the instructor privately to discuss your specific needs.