

Introduction to Python for Data Analysis

I&C SCI X426.62

1.5 Units

# Course Description

Introduction to Python for Data Analysis is an introductory course aimed at students who want to learn python for the purposes of importing and analyzing data. Some programming experience is beneficial but not absolutely necessary. The goal of the course is to introduce enough python so that, after the course, the student can immediately use what they have learned to ingest data, produce plots and analysis, and fit models. Students should note that not everything with-in the python language will be covered (such as user interfaces, web services, and object oriented programming). The main python libraries introduced will be numpy, matplotlib, pandas, and scikit-learn. Along with the basics of the python language, students will learn how to import data and manipulate it efficiently using numpy, how to produce plots and data visualizations with matplotlib, and how to run statistical analysis using pandas. Students will also learn how to use eclipse, a very handy development environment!

# Prerequisite

I&C SCI X426.64 Introduction to Programming with Python

# Course Sequencing

This course is a required course in the Python for Data Science, Web and Core Programming specialized study program and is a prerequisite for the I&C SCI X426.54 Data Preparation, Modeling and Visualization with Python course.

# Course Objectives

At the end of this course, students will be able to:

* Load, explore, clean, analyze, and plot data using Python

# Course Material

The following software is required for the course (don’t worry, we install it together during week 1):

• Anaconda for Python 3.7.x

# Course Outline

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| **Week 1** | **Topics & Objectives** | **Key Topics**   * Installing the Anaconda Python Distribution * Introduction/Review of Python Variable Types   **Learning Objectives**  By the end of this lesson, you will be able to:   * Install Python * Navigate and search the Python documentation * Navigate and search Stack Overflow * Introduction/Review of Python Variable Types |
| **Learning Activities** | * Lecture Videos * Discussion Forum * Two Quizzes |
| **Assignments Due** | * Two Quizzes |
| **Week 2** | **Topics & Objectives** | **Key Topics**   * Introduction/Review of Python Variable Types * Introduction/Review of Python Flow Control * Introduction/Review of Python Functions   **Learning Objectives**  By the end of this lesson, you will be able to:   * Create, print, and type check the following variables:   + Strings, ints, floats, booleans, lists, tuple, and dictionaries. * Use if/else/for statements * Define, import, and use functions. |
| **Learning Activities** | * Lecture Videos * Discussion Forum * Two Quizzes * The Week 2 Assignment |
| **Assignments Due** | * Both Quizzes * The Week 2 Assignment |
| **Week 3** | **Topics & Objectives** | **Key Topics**   * Loading, Exploring and Cleaning Data with Python and Pandas   **Learning Objectives**  By the end of this lesson, you will be able to:   * Load data using the Pandas library * Describe data using the Pandas library * Clean data using the Pandas library |
| **Learning Activities** | * Lecture Videos * Discussion Forum * Quizzes * Week 3 Assignment |
| **Assignments Due** | * Quizzes * Week 3 Assignment |
| **Week 4** | **Topics & Objectives** | **Key Topics**   * Manipulating and Analyzing Data with Python and Pandas   **Learning Objectives**  By the end of this lesson, you will be able to:   * Students will be able to manipulate and analyze data using the Pandas library |
| **Learning Activities** | * Lecture Videos * Discussion Forum * Quizzes * The Week 4 Assignment |
| **Assignments Due** | * Quizzes * The Week 4 Assignment |
| **Week 5** | **Topics & Objectives** | **Key Topics**   * Visualizing Data with Python and Pandas   **Learning Objectives**  By the end of this lesson, you will be able to:   * Students will be able to visualize data with Pandas. |
| **Learning Activities** | * Lecture Videos * Discussion Forum * Quizzes |
| **Assignments Due** | * Quizzes |

# Evaluation and Grading

This course will be graded using the following weighted percentages for each of the assignments in the course. Feedback and grades are typically posted within one week of assignments due dates.

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| --- | --- |
| **Assignments** | **% of Grade** |
| Quizzes | 50% |
| Assignments | 40% |
| Discussions | 10% |
| **Total** | **100%** |

## Grading Scale

This course uses the following grading scale.

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| --- | --- |
| **Letter Grade** | **Percentage** |
| A | 90% - 100% |
| B | 80% - 89% |
| C | 70% - 79% |
| D | 60% - 69% |
| F | 59% or less |

# Assignment Descriptions

## Discussion Forums

Each week will contain an opportunity for you to engage your classmates in discussion. Participation in these discussion forums is required and counts as 10% of your final grade. Each week will contain an opportunity for you to engage your classmates in discussion. Participation in these discussion forums is required and counts as 10% of your final grade. To receive full participation points, you will need to post a substantive response to the prompt by 11:55 pm PST on the Saturday of each week and provide critical feedback to at least 1 of your peers by 11:55 pm PST on the Sunday of each week. I am not looking for long posts, but something with substance beyond just saying “great job”. You can ask a question, answer a question, or share how the lesson might be useful to your work/projects. DO NOT provide explicit solutions/answers to the homework, you can give hints though.

# UC Irvine Policies

## Code of Conduct

All participants in the course are bound by the University of California Code of Conduct, found at<http://www.ucop.edu/ethics-compliance-audit-services/_files/stmt-stds-ethics.pdf>

## Netiquette

In an online course, the majority of our communication takes place in the course forums. However, when we have a need for communication that is private, whether personal, interpersonal, or professional, we will use individual email or telephone. Our primary means of communication is written. The written language has many advantages: more opportunity for reasoned thought, more ability to go in-depth, and more time to think through an issue before posting a comment. However, written communication also has certain disadvantages, such a lack of face-to-face signaling that occurs through body language, intonation, pausing, facial expressions, and gestures. As a result, please be aware of the possibility of miscommunication and compose your comments in a positive, supportive, and constructive manner.

## Academic Honesty Policy

The University is an institution of learning, research, and scholarship predicated on the existence of an environment of honesty and integrity. As members of the academic community, faculty, students, and administrative officials share responsibility for maintaining this environment. It is essential that all members of the academic community subscribe to the ideal of academic honesty and integrity and accept individual responsibility for their work. Academic dishonesty is unacceptable and will not be tolerated at the University of California, Irvine. Cheating, forgery, dishonest conduct, plagiarism, and collusion in dishonest activities erode the University's educational, research, and social roles.

Students who knowingly or intentionally conduct or help another student engage in dishonest conduct, acts of cheating, or plagiarism will be subject to disciplinary action at the discretion of UCI Division of Continuing Education.

## Disability Services

If you need support or assistance because of a disability, you may be eligible for accommodations or services through the Disability Service Center at UC Irvine. Please contact the DSC directly at (949) 824-7494 or TDD (949) 824-6272. You can also visit the DSC’s website: http://www.disability.uci.edu/. The DSC will work with your instructor to

make any necessary accommodations. Please note that it is your responsibility to initiate this process with the DSC.