CSC 2611 Weekly Learning Objectives

# Week 1

After completing Week 1 of the study, you should be able to understand:

* How to connect to Rosie and launch Jupyter Notebook there
* How to set up and run Python code in an Anaconda environment
* How to formulate a hypothesis
* Python data types
  + Integer numbers
  + Floating-point numbers
  + Strings
  + Booleans
  + None Type
* Python data structures:
  + Lists
  + Dictionaries
  + Tuples
  + Sets

# Week 2

* Python Statements
  + If, Elif, and Else Statements
  + For Loops and While Loops in Python
  + Useful Operators in Python
    - range
    - enumerate
    - zip
    - in
    - not in
    - random
    - input
  + List Comprehensions
* Python Methods and Functions
  + Differences between Python Methods and Functions
  + def keyword
  + return vs. print
  + docstrings
  + Lambda Expressions
    - Map and Filter functions

# Week 3

* Lambda Expressions *– Continued*
* Nested Statements and Scope
* \*args and \*\*kwargs
* Errors and Exceptions Handling
* Object Oriented Programming in Python
  + Attributes and Class Keyword
  + Class Object Attributes and Methods

# Week 4

* Understand the core components of pandas: Series and DataFrames.
* Learn how to create DataFrames from scratch using dictionaries.
* Practice accessing DataFrame elements by index and column names.
* Learn to read data from CSV files into pandas DataFrames.
* Understand how to view and inspect data using methods like .head(), .tail(), .info(), and .shape().
* Practice renaming columns and cleaning up DataFrame column names.
* Learn to handle missing data and explore methods to fill or drop missing values.
* Understand how to select and slice data using .loc and .iloc.
* Learn to apply conditional selections and filter data based on specific criteria.
* Practice extracting subsets of data based on logical conditions.
* Explore the use of the .apply() method to transform data within a DataFrame.
* Learn to create new columns based on existing data using custom functions and lambda functions.
* Practice applying functions across Series and DataFrame columns to perform data transformations.
* Learn to explore relationships between continuous variables using correlation and scatterplots.
* Learn to create basic plots using pandas and Matplotlib.