Lesson Calendar

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| Week 1: NO CLASS (Aug. 28 & Aug. 30) | | Assignments & Projects |
| NO CLASS | NO CLASS | NONE |
| Week 2: Ice Breakers, Terminal, and Python Editors (Sep. 4 & Sep. 6) | | Assignments & Projects |
| **Date:** 09/04/2019  **Objectives:**  - Introduce ourselves, syllabus, and class guidelines  - Everyone gets introduced to each other  - Assessing student experience with programming up until this point  - Terminal Controls | **Date**: 09/06/2019  **Objectives:**  - Download Python  - Create a Python Environment  - conda install numpy, scipy, matplotlib, astropy  - Terminal | Homework to Turn-In:   * None   New Homework   * Get-To-Know-You Posts (Due Sep. 11) |
| Week 3: Data Types (Sep. 11 & Sep. 13) | | Assignments & Projects |
| **Date:** 09/11/2019  **Objectives:** I will be able to…  - construct expressions using Python values and operators  - classify different data types, namely functions, floats, ints, strings  - use a repertoire of different operators built-in to Python, taking note of what data types they can and cannot act upon  - bind values to names  - create names that are meaningful | **Date:** 09/13/2019  **Objectives:** I will be able to…  -recognize that all expressions in programming can be represented in the form of f(x).  - recognize that these functions can be nested within each other (i.e f(g(x)))  - write user-defined functions by binding expressions to names  - distinguish between variables declared in local and global frames  - construct an environment diagram | Homework to Turn-In   * (Wed.) Get-To-Know-You Posts   New Homework   * (Fri.) Problem Set #1 |
| Week 4: Conditionals/Lists/Loops (Sep. 18 & Sep. 20) | | Assignments & Projects |
| **Date:** 09/18/2019  **Conditionals and while loops**  **Objectives:**  I will be able to…  - Understand Booleans and operations between Boolean values  - Understand other operations that can produce Booleans  - Construct ‘if’, ‘elif’, and ‘else’ statements  - Understand iterative operations and basic loop structures  - Construct while loops  - Use the ‘break’ command within a loop | **Date:** 09/20/2019  **Objectives:** I will be able to...  - create a list (understanding that it can hold different data types within a single list)  - do operations on lists   * select a range of elements in a list using the colon notation * select an element in a list, as well as within nested lists * Concatenate lists together * Append elements to the ends of lists * Use pop(), remove(), and del to remove elements from a list * check whether an element is or is not in a list   - distinguish between mutable and immutable objects, including the recognition of their benefits and drawbacks in different scenarios  - create tuples | Homework to Turn-In   * (Fri.) P-Set #1   New Homework   * (Fri.) P-Set #2 |
| Week 5: Iteratives, Dictionaries | | Assignments & Projects |
| **Date:** 09/25/2019  **Objectives:** I will be able to…  - use for loops to iterate over ranges, lists, and strings  - write nested for loops  - write list comprehensions  - provide conditions inside list comprehensions | **Date:** 09/27/2019  **Objectives:** I will be able to...  - define a dictionary (understanding that keys are not associated with each other)  - pass in the key as a string to select a dictionary element  - use .keys() to check what keys exist in the dictionary  - delete and add entries to dictionaries  - using for loops to build dictionaries | Homework to Turn-In   * (Fri.) P-Set #2   New Homework   * (Wed.) Project 1 * (Fri.) P-Set #3 |
| Week 6: Object-Oriented Programming (Oct. 2 & Oct. 4) | | Assignments & Projects |
| **Date:** 10/02/2019  **Objectives:** I will be able to…  -write classes to fulfill specific program objectives  -instantiate an object from a class  -access methods and attributes  -understand the properties and purpose of object-oriented programming | **Date:** 10/04/2019  **Objectives:** I will be able to…  -construct classes that inherit from other classes  -predict the behavior of attributes between parent and children, and between objects and classes | Homework to Turn-In   * (Fri.) P-Set #3   New Homework   * (Fri.) P-Set #4 |
| Week 7: 1-D Arrays/1-D Plotting (Oct. 9 & Oct. 11) | | Assignments & Projects |
| **Date:** 10/09/2019  **Objectives:** I will be able to…   * Understand the purpose of libraries and how to import them * Read and understand documentation when using libraries * Construct a numpy array * Find and use numpy functions on numpy arrays to perform specific tasks * How to read in/out data from text files from/into numpy arrays | **Date:** 10/11/2019  **Objectives:** I will be able to…   * Understand how to import sub-libraries * Construct basic plots of functions * Customize basic plots using pyplot’s extensive range of options * Construct a range of basic plot types using pyplot’s built-in functions * Construct Subplots | Homework to Turn-In   * (Fri.) P-Set #4 * (Fri.) Project 1   New Homework   * (Fri.) P-Set #5 |
| Week 8: File.io/Tables (Oct. 16 & Oct. 18) | | Assignments & Projects |
| **Date:** 10/16/2019  **Objectives:** I will be able to…  - By the end of this lesson I will have learned about astropy and how it relates to implementing file-io.  - How to read in files mainly text and FITS files.  - How to work with and read Fits headers and gather Fits data  - Proper file-io practices (closing a file once it's no longer in use, good naming convention for the data) | **Date:** 10/18/2019  **Objectives:** I will be able to…   * Perform some basic data analysis on data from Fits file.   - Data analysis on finding the mean, max and min values.  - The basics of Curve Fitting and Data Reduction, ie np.polyfit, scipy.curve\_fit, errors(?) | Homework to Turn-In   * (Fri.) P-Set #5   New Homework   * (Wed.) Project 2 * (Fri.) P-Set #6 |
| Week 9: 2-D Arrays/2-D Plotting (Oct. 23 & Oct. 25) | | Assignments & Projects |
| 2D-Arrays   * I will have learned how to create a 2D array. Ie, using reshape, np.ones((4,4)), np.array([[1,2,3],[4,5,6]]) * Extract data from 2D array using indexing, splicing, striding techniques. * Overall, how to work with 2D arrays. (lin alg) * Introduce meshgrid and its importance (ex: z = f(x,y)) | 2D-Plotting   * I will have learned how to take what i learned from 2D arrays from previous lecture and how to plot them. * Using imshow and its different caveats. Like changing the origin location, extent of imshow, colormap and maybe introduce them to RGB color scheme * Contour plots and how to use it. * Projections for the data, ie melweibe, attoif, etc. | Homework to Turn-In   * (Fri.) P-Set #6 * (Fri.) Project 2   New Homework   * (Fri.) P-Set #7 |
| Week 10: Latex/Github (Oct. 30 & Nov. 1) | | Assignments & Projects |
| **Date:** 10/30/2019  **Objectives:** | **Date:** 11/01/2019  **Objectives:** | Homework to Turn-In   * (Fri.) P-Set #7 * (Fri.) Project 2   New Homework   * (Fri.) Final Project * (Fri.) Latex Write-Up |
| Week 11: Unittesting/Workshop/Special Topic (Nov. 6 & Nov. 8) | | Assignments & Projects |
| **Date:** 11/06/2019  **Objectives:** I will be able to…  - produce pros and cons for implementing unit-testing  - distinguish between unit-testing and integration testing  - import the .py file being tested and the unittest library  - apply unittest functions | **Date:** 11/08/2019  **Objectives:** I will be able to... | Homework to Turn-In   * (Fri.) Latex Write-Up   New Homework   * None |
| Week 12: Dope Plots & Astropy (Nov. 13 & Nov. 15) | | Assignments & Projects |
| **Date:** 11/13/2019  **Objectives:** I will be able to...   * Make a publish worthy plot for a paper or poster * Use object oriented plotting techniques * Use SpecGrid * Use Insets | **Date:** 11/15/2019  **Objectives:** I will be able to...   * Use astropy units   + Convert to different units   + How to use them in expressions   + Values and constant * Use astropy modeling   + Model Fitting     - Gaussian     - Voigt     - Lorentz   + Use astronomy functions     - Blackbody     - Weins laws     - Rayleigh | NONE |
| Week 13: NO CLASS (Nov. 20 & Nov. 22) | | Assignments & Projects |
| Thanksgiving Break! | Thanksgiving Break! | NONE |
| Week 14: Final Project Presentations! (Nov. 27 & Nov. 29) | | Assignments & Projects |
|  |  | Homework to Turn-In   * (Wed. & Fri.) Final Project Presentations!   New Homework   * None |
| Week 15: Final Project Presentations! (Dec. 4 & Dec. 6) | | Assignments & Projects |
|  |  | Homework to Turn-In   * (Wed. & Fri.) Final Project Presentations!   New Homework   * None |