PSY 31170 – WSP Tech Skills for Psychology – Winter Session 2019 Syllabus
Dave Britton, instructor (dave@davebritton.com)

We will use the Python language to learn programming fundamentals. This course is intended for social science majors to prepare for the job market and/or graduate study. Topics include variables, branching, and loops, with applications using real life data.

Jan 2 – 23, Tu through Fri 1pm – 5pm 501 Shepard Hall
(3 weeks, 4 classes per week, 4 hours per class: 12 4-hr classes)
overnight homework assignments based on that day's material;
final exam taken online
Week 1:

A) 1/2 Wed: Introduction to the class, administrative details, mechanics
An overview of how computers work and the basic fundamentals of computer programming.

B) 1/3 Thu: Using github and Jupyter notebooks
Downloading assignments, uploading and committing work-in-progress. Using the web to find help and documentation. Introduction to Python syntax, commands, functions and data structures

C) 1/4 Fri: Python programming
indentation, keywords, special characters, where to find syntax instructions, more examples, writing simple programs with sequence, iteration and conditionals, user input and printed output

Week 2:

A) 1/8 Tue: Built-in data types: numbers: integer, floating point characters, text, types of text encoding (8-bit ASCII, 16-bit UCD unicode) lists and indexing, representing matrices, dictionaries, mixing text and numbers, queue and dequeue, mutable and immutable: sets vs. lists, constants vs variables. Writing example programs

B) 1/9 Wed
online resources: forums, tutorials, how to get help, information
functions: built in and programmed, in-class workshop: writing functions

C) 1/10 Thu
classes: functions plus data, variations on themes
modules: adding extensions to your programs
the python libraries; built-in and online, pip and setup.py, how to install additional capabilities, writing example modular programs using classes with interactive user interfaces for data input

in-class workshop: installing scipy and matplotlib, writing simple demonstration programs using functions and classes

D) 1/11 Fri

Writing more complex programs, documentation, structure, efficiency
Examples of real-life data sources, how to debug your programs
Creating program specifications. Begin discussion of individual and small group final projects. In-class workshop: downloading some data, designing a program to process it, writing documentation

Week 3: Applications, writing useful programs

A) 1/15 Tue

introduction to the scipy numeric libraries, statistics
introduction to graphing with python
data format conversions (input from and output to Excel format files)
continue discussion of final project (meet with instructor)
in-class workshop: writing downloaded data analysis program with an interactive user interface, which uses scipy/numpy to read in data and matplotlib to plot results

B) 1/16 Wed

graphing for data analysis, basic statistics for data analysis, accessing online data sources, in-class workshop: start designing specifications for individual projects, meetings with instructor, programming in small groups using git for version control

C) 1/17 Thu

more graphic presentation techniques with scipy and matplotlib, more about documentation, web-based python applications. reviewing projects with instructor, in-class workshop: how to program the final project

D) 1/18 Fri

in-class workshop: continuing final projects, meet with instructor debugging techniques, review project status

Week 4:

A) 1/22 Tue

completion of final project, documentation for it, review of the course

B) 1/23 Wed

online final exam opened

C) 1/25 Fri

online final exam closed

D) 1/28 Mon

grades due