

2023 Spring

NS 5116

The applications of computer hardware and programming languages in behavioral experiments and big data analysis

電腦硬體與程式語言在行為科學實驗與大數據分析之應用

Time: Thursdays 9AM-12 PM, Feb 16 ~ June 15; **Location:** S5-607-1

Instructor: Dr. Erik C. Chang

Office: S5-601

Phone: 03-4227151-65209

Email: audachang@gmail.com

Office Hours: By appointment

Course Aims

This course aims to familiarize the students with the basics and applications of the Python, with a focus on creating experiments in behavioral sciences and analyzing big dataset from open government or institutional database. Through lectures and hands-on practices, the students should be able to independently write Python scripts for the experiments or applications of their research projects.

Course Materials

*Get Programming: Learn to Code with Python 用 Python 學運算思維	https://www.manning.com/books/get-programming https://www.books.com.tw/products/0010818670
*Supplementary materials	https://ncueeclass.ncu.edu.tw/course/20175
Learn Python 3 the Hard Way	https://learncodethehardway.org/python/
Learn More Python 3 the Hard Way	https://learncodethehardway.org/more-python/

*required reading

Grades

<u>Requirements</u>	<u>Dates</u>	<u>Weighting</u>
Homework	Throughout the semester	50%
Project 1	13-April	25%
Project 2	15-June	25%

Homework (50% [5% per homework])

There will be homework assignment for every lecture. The majority of them will be a programming quiz that you need to submit codes and the output file/graphics. The quiz will be announced after each lecture, and the answer is due by 11:30PM on the next Tuesday. Each day of delay will result in 10% deduction in grades of that homework. You should try first to solve the quiz independently. Looking for online resources or discussion with classmates is encouraged, but asking experts to write the codes for you to solve the quiz directly is NOT. One can only learn how to program or use software through sufficient hands-on practice. Therefore this course places huge weights on homework. **The top 10 scores of the weekly homework will be tallied into the final grades.**

Projects (50%)

Every student will have to complete three different programming projects throughout the semester, each reflecting what you have learned from the course by each due time. The student can either comes up with their own task to resolve, or consult the lecturer about suitable programming tasks. The due dates are April 13 (25%) and June 15 (25%), all at 11:30PM.

Tentative Schedule

<u>Week</u>	<u>Date</u>	<u>Topic</u>	<u>Week</u>	<u>Date</u>	<u>Topic</u>
1	2/16	Orientation; basic concepts of programming	10	4/20	project #1 Showcase
2	2/23	Python environment; data types; scripting	11	4/27	Visualization (matplotlib) II
3	3/02	Conditionals, loops, and Functions	12	5/04	Visualization (matplotlib) II
4	3/09	Psychopy I	13	5/11	Statistics in python
5	3/16	Psychopy II	14	5/18	Fundamental Concepts in machine learning
6	3/23	Psychopy Builder	15	5/25	Regression & Classification
7	3/30	Advanced data manipulation (numpy, pandas) I (Pre-recorded)	16	6/01	Classic algorithms in ML
8	4/06	<i>No Class (校際活動週)</i>	17	6/08	Neural networks
9	4/13	Advanced data manipulation (numpy, pandas) II	18	6/15	project #2 Show case