2022 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

Thursdays 9AM-12 PM, Feb 17 ~ June 16

Location: S5-602-3

Instructor: Dr. Erik C. Chang

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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/13986
Practical Data Science with Python 3: Synthesizing Actionable Insights from Data	https://is.gd/B1hB3u (Downloadable from NCU Library)
Learn Python 3 the Hard Way	https://learn codethehardway.org/python/

Learn More Python 3 the Hard Way	https://learncodethehardway.org/more-python/

*required reading

Grades

Requirements	Dates	Weighting
Homework	Throughout the semester	50%
Project 1	21-April	25%
Project 2	19-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 21 (25%) and June 19 (25%), all at 11:30PM.

Tentative Schedule

Lecture ID	Date	Topic
1	2/17	Orientation; basic concepts of programming
2	3/24	Python environment; data types; scripting
3	3/03	Conditionals, loops, and Functions
4	3/10	Psychopy I
5	3/17	Psychopy II
6	3/24	Interaction with hardware
7	3/31	Advanced data manipulation (numpy, pandas) I
8	4/07	Advanced data manipulation (numpy, pandas) II
9	4/14	Statistics & Prediction I
10	4/21	Statistics & Prediction II; **project #1 Showcase**
11	4/28	Visualization (matplotlib) II
	5/05	No class
12	5/12	Visualization (matplotlib) II
13	5/19	Concepts and resources in Big Data Analysis
14	5/26	Census and Institutional Data
15	6/2	Recommender Systems
16	6/9	Natural Language Processing (NLP) and High-dimensional Semantic Space
17	6/16	NLP and sentiment analysis; **project #2 Show case**