NATIONAL UNIVERSITY OF SINGAPORE
NUS Business School
Department of Analytics & Operations

DAO2702X Programming for Business Analytics

Session: Semester 2, AY2022/2023
Instructor: Ryan Tan run@nus.edu.sg

Description:
This module is an introductory course to business analytics and data science. It covers basic Python programming and preliminary statistics, with a great emphasis on addressing practical business problems and real datasets. Data science is an interdisciplinary field that requires business insights and expertise, proficiency in programming, as well as a strong background in mathematics and statistics. Therefore, seminars in this semester would focus on trainings in the following perspectives:

- Python programming and Pythonic coding styles
- Analytical and visualization packages
- Math and statistics
- Practical business insights and problem solving skills

Scopes:

1. Basics of Python programming
    1. Data structures and flow control
    2. Functions and packages
2. Data analysis with Python
    1. Analytical tools: NumPy, SciPy, Pandas
    2. Data visualization: Matplotlib
    3. Data collection and cleaning
3. Statistical inference
    1. Sampling and inference
    2. Confidence intervals
    3. Hypothesis testing
4. Linear regression (**not tested**)
    1. Model assumptions and interpretations
    2. Package Statsmodels for regression analysis

Software:
Anaconda: https://www.anaconda.com/products/distribution#Downloads

Learning Content:

Week 1	**Course Overview and Introduction to Programming and Jupyter Notebook**
Week 2	**Introduction to Python Programming**
Week 3	**Control Flows of Python Programs**
Week 4	**Built-in Data Structures I**
Week 5	**Built-in Data Structures II**
Week 6	**Functions, Modules, and Packages**

Recess	
Week 7	**Lovely Pandas**
Week 8	**Storytelling with Data**
Week 9	**Sweet NumPy**
Week 10	**Review of Probability**
Week 11	**Random Sampling**
Week 12	**Confidence Intervals and Hypothesis Testing**
Week 13	**Regression Analysis (Not Tested)**

Learning Outcomes

Through this course, students would strengthen their skills in

1. Programming in Python;
2. Basic statistics;
3. Practical business insights.

After learning this module, students should be able to apply Python in managing, visualizing data and drawing conclusions from real-world datasets via statistical models.

Prerequisites:

DAO1704 Decision Analytics using Spreadsheets

Assessments:

Continuous Assessment:

Class Participation (20%)

- Participation in seminars

Group Project (40%)

- Team work
- Analysing real-world dataset with Python
- An eight-page report
- A formal 15-minute presentation

Final Examination (40%)

- Close book
- One double-sided A4 cheat sheet
- Two hours

Reference Books:

Python programming:

- Python data science handbook, by Jake VanderPlas

Data visualization:

- Storytelling with data, by Cole Nussbaumer Knaflic

Modular Credit: **4**

Study Level: **Basic**