

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

**DAO2702/DAO2702X Programming for Business**

**Analytics Session:** Semester 1, 2023/2024

**Instructor:** Xiong Peng [bizxio@nus.edu.sg](mailto:bizxio@nus.edu.sg)

**Description:**

This 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, lectures and tutorials 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. Regression analysis

**Learning Content:**

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

|         |  |
|---------|--|
| Week 7  | <b>Lovely Pandas</b>                               |
| Week 8  | <b>Storytelling with Data</b>                      |
| Week 9  | <b>Sweet NumPy</b>                                 |
| Week 10 | <b>Review of Probability</b>                       |
| Week 11 | <b>Random Sampling</b>                             |
| Week 12 | <b>Confidence Intervals and Hypothesis Testing</b> |
| Week 13 | <b>Regression Analysis (Not Tested)</b>            |

### **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 course, 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

### **Assessment:**

#### **Continuous Assessment:**

Class Participation                      10%

- Participation in online discussions

Group Project                              35%

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

**Final Examination:**                      55%

- 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

### **Unit: 4**

**Study Level: Basic**