

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

DAO2702/DSC2008 Programming for Business Analytics

Session: Semester 2, 2021/2022

Instructor: Xiong Peng bizxio@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, 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

Syllabus:

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
 1. Model assumptions and interpretations
 2. Categorical variables and modelling nonlinearity
 3. Package Statsmodels for regression analysis

Software:

Anaconda: [installation](#)

E-learning Mode:

- Lectures will be given as offline recorded videos, and the lecture time is used for discussing exercise questions and online consultation.
- Tutorial sessions will be face-to-face and broadcasted via Zoom.
- Limited face-to-face meetings can be arranged.

Reference Books:

Python programming:

- Python data science handbook, by Jake VanderPlas

Statistics and data analysis:

- Introductory econometrics, by Jeffrey M. Wooldridge
- An introduction to statistical learning, by Trevor Hastie et al.
- Storytelling with data, by Cole Nussbaumer Knaflic

Assessments:

Continuous Assessment:

Class Participation 10%

- Answering questions posted by the instructor on the forum.
- Posting questions and answering questions post by other students will also be considered
- The class participation will be given according to 1) the quality of the posts; 2) the time of the posts.
- A question may be closed if it is answered by many students.

Group Project 20% for report and 15% for presentation

- Team work. Each team has five to six members.
- An eight-page (4 pieces of double-sided paper) report and a formal 10 to 15-minute presentation.
- In the video, please provide the name of the current presenter, **otherwise there will be a 20% penalty on your presentation.**
- Your grade of the project would also be affect by the peer evaluation of your teammates. **Zero mark for zero contribution!**
- **Zero mark for plagiarism.**

Final Examination: 55%

- Paper-based close-book examination: a number of multiple-choice questions and a written question.
- You are allowed to take a double-sided A4 cheat-sheet and a calculator with you. Other notes or electronic devices are prohibited.
- All topics covered in lectures/exercises/tutorials could be tested.

Prerequisite:

DAO1704/DAO1704X

Schedule:

Week 1.

Course overview

Introduction to programming and business Analytics

Week 2.

Basics of Jupyter Notebook and Python

Week 3.

Control flows

Week 4.

Built-in compound data types: strings and lists

Week 5.

Built-in compound data types: tuples and dictionaries

Week 6.

Functions, modules, and packages

Week 7.

Basics of Pandas

Week 8.

Storytelling with data

Week 8.

NumPy and SciPy

Week 10.

Confidence intervals and hypothesis testing

Week 11.

Introduction to regression analysis

Week 12.

Regression analysis for explanatory modeling

Week 13.

Nonlinearity and categorical variables