

ISOM3400: Python Programming for Business Analytics [3-0-1:3]

Course goals

This course will provide students with skills and knowledge of Python programming and experience in designing and developing business analytics applications.

Learning outcomes

By the end of this course, students will be able to:

- (1) Acquire general programming knowledge with Python language
- (2) Able to process data with Python language
- (3) Build some statistical and machine learning models with Python language
- (4) Conduct programming with team members effectively

Course description

Python has recently becoming the most popular general-purpose programming language according to many polls among programmers. The scripting nature of Python allows fast development and easy maintenance of applications. More importantly, the unparalleled community support makes Python increasingly powerful. In this course, students will learn Python programming language in the context of business data analytics. With the explosion of electronic data available to organizations and the demand for better and faster decisions, data driven intelligence becomes a key source of competitive advantage for business organizations. We believe that the combination of Python programming skills and business data analysis will provide high practical value to students majoring in Information Systems as well as other related fields.

Teaching approach

In general, the teaching approach of this course is based on the notion of sustained, deep learning by applying knowledge through programming, hands-on practices, and assignments. Lecture sessions are also structured to engage the students in learning proactively (pre-readings, pre-class assignments, and pre-class video lectures), actively (in-class exercises of programming and in-class discussion of business applications) and reflectively (in-class discussion of personal views through the answers of in-class exercises). The individual assignment and the group assignment are there to deepen student's learning through knowledge application while at the same time providing students with opportunities to develop essential workplace skills such as critical thinking, written and oral communications, team work, and lifelong learning.

For both lecture and lab sessions, **no printout** will be given. Students are **required** to bring their own laptops for running and testing their programs in class.

Teaching & Learning Activities	Roles in the Course	Learning Outcomes addressed
Lecture	Explain key concepts to students using an active learning approach, in-class exercise, and after-class discussion of questions.	1, 2, 3
Laboratory	Apply concepts presented in lectures to hands-on exercises.	1, 2, 3
Assignment	It requires students to apply their knowledge and understanding in programming to solve business analytics problems.	2, 3, 4

Assessment scheme

An inevitable part of this end of any university course is the evaluation, and the grade. Actually, in any course, the most important evaluation is a student's self-evaluation. How many new and useful ideas and skills did students learn from the course? Has the course changed student views about themselves, work groups and organizations? If so, student efforts here will have paid off. The student's course goals will be assessed in the following manner, and the percentage of grade may be broken down as below:

Components	Learning goals assessed	Percentage of the grade
A. In-class Exercise (best 8)	1, 2, 3, 4	16%
B. Assignment	1, 2, 3, 4	44%
C. Final Exam	1, 2, 3	40%
TOTAL:		100%

A. In-class Exercise (16%)

There are **10** in-class exercises throughout the semester. Students, who may work as groups are expected to apply the programming skills and knowledge to practice python programming and/or solve business problems in the class. By the end of the class, student's answers will be collected and graded. Students may score 2% (max), 1.5% (very good), 1% (good), or 0% (no good or no submission) per in-class exercise. So each student will eventually have 10 individual in-class exercise scores, but only the **BEST EIGHT scores** will be counted toward the final grade. **There will be NO makeup in-class exercises for whatever reasons.**

B. Assignment (44%)

There are THREE assignments, namely assignment 1 (individual), assignment 2 (individual) and assignment 3 (group). They are business analytics assignments in Python. Students are expected to apply Python programming skills to solve practical business analytics problems.

Assignment 1 (individual) - (14%)

This is an individual assignment. Each student needs to submit his/her program by the deadline. A sample program is given. Students are required to modify the given program in order to make it work. The detailed grading criteria will be stated clearly in the assignment document.

Assignment 2 (individual) - (10%)

This is an individual assignment. Each student needs to submit his/her program by the deadline. A sample dataset is given. Students need to study the dataset and use the data visualization techniques to show their findings. An assignment score is mainly determined based on how well a submitted program performs over other submitted programs. Other grading criteria will be stated clearly in the assignment document.

Assignment 3 (group) - (20%)

This is a group assignment. Students will work in pre-assigned groups. A sample dataset is given. Students are required to modify the given program and use the most appropriate dataset(s) in order to achieve the given tasks (e.g., a higher accuracy). The detailed grading criteria will be stated clearly in the assignment document.

C. Final Exam (40%)

The final exam covers all lecture, lab, in-class exercise materials, together with other materials used in this course.

There will be **no make-up exams** except due to extraordinary circumstances beyond student's control such as medical emergencies. In case of absence due to medical emergencies, students have to submit appropriate documentation issued by a registered medical practitioner to the course instructor by email in order to be considered for a possible make-up exam. The make-up exam will be in essay format.

(Warning: Students who are allowed to take the make-up exam need to write up a research article that is composed of introduction, references, proper citation, and other sections. The article needs to be completed **within 48 hours after it has been assigned. There is **NO SECOND CHANCE** for make-up exam for whatever reasons provided by the students. Fail to submit the research article for whatever any reasons, including email problems, and no internet problems will result in a **ZERO** mark for the exam.)**

Grade appeal

All scores will be uploaded to Canvas when ready. It is the student's responsibility to check their scores and make sure they are correct. Any appeal to score has to be filed through email to jkwok@ust.hk. No appeal to a particular score shall be allowed after a checking period (e.g., 72 hours after a score is released) if applicable.

[If a student cannot come to check his/her paper during the checking period, the student's score will be finalized by default. I am afraid we will not change/correct his/her score after the appeal period.]

Student learning resourcesCourse Website

Updates of the course contents and other information will be posted on the course website - <http://canvas.ust.hk/>. Students are advised to check this site regularly throughout the semester.

Software required

- Anaconda Navigator (for Win-64, OSX-64, or Linux-64)
 - o Jupyter notebook
 - o Python 3
- Google Colaboratory

Course schedule

The course is offered in lecture session and laboratory session.

L1	Mon 13:30-14:50;	Fri 09:00-10:20	RM2503
LA1	Fri 13:30-14:20		LSK G021
LA2	Fri 15:00-15:50		LSK G021
LA3	Fri 16:30-17:20		LSK G021

Tentative Course Schedule. Please visit Canvas for updated schedule, readings, and assignments.

Schedule of Lecture (Tentative)

Wk.	Date	Topics	Assignment Release/Due
1	2-Sep	Introduction to Programming	
	6-Sep	Introduction to Python and Business Analytics	
2	9-Sep	Data, data types and operators	
	13-Sep	Practice	
3	16-Sep	Strings	
	20-Sep	In-class exercise	
4	23-Sep	Data structures: Lists and Tuples	
	27-Sep	In-class exercise	
5	30-Sep	Data structures: Dictionaries	
	4-Oct	In-class exercise	
6	7-Oct	Chung Yeung Festival	
	11-Oct	Control statements: if	
7	14-Oct	In-class exercise	
	18-Oct	Control statements: for, while, try statements	Asg. 1 Release (18 Oct)
8	21-Oct	In-class exercise	
	25-Oct	Functions and Classes	
9	28-Oct	In-class exercise	
	1-Nov	Data Visualization	Asg. 1 Due (31 Oct)
10	4-Nov	In-class exercise	Asg. 2 Release (4 Nov)
	8-Nov	Business Analytics Example 1	
11	11-Nov	In-class exercise	Asg. 2 Due (10 Nov)
	15-Nov	Business Analytics Example 2	Asg. 3 Release (15 Nov)
12	18-Nov	In-class exercise	
	22-Nov	Business Analytics Example 3	
13	25-Nov	In-class exercise	Asg. 3 Due (28 Nov)
	29-Nov	Revision	

Schedule of Laboratory (Tentative)

Wk.	Date	No.	Topics
1	6-Sep	LA1	Software installation and programming environment
2	13-Sep	LA2	Data, data types and operators
3	20-Sep	LA 3	Strings
4	27-Sep	LA 4	Data structures: Lists and Tuples
5	4-Oct	LA 5	Data structures: Dictionaries
6	11-Oct	LA 6	Control statements: if
7	18-Oct	LA 7	Control statements: for, while, try statements
8	25-Oct	LA 8	Functions and Classes
9	1-Nov	LA 9	Data Visualization with Pandas and Matplotlib
10	8-Nov	LA 10	Business Analytics Example 1
11	15-Nov	LA 11	Business Analytics Example 2
12	22-Nov	LA 12	Business Analytics Example 3
13	29-Nov	LA 13	Summary

Teaching staff contact details

Prof. Kwok's office is in LSK 4080, 4th floor. Students are more than welcome to drop by any time with any of their questions. For any urgent matters, students may contact Prof. Kwok by phone (2358-7652), but the best way is email. Prof. Kwok will check email frequently. Teaching Assistant (TA) for this course is Charles Wong (imcharles@ust.hk), he will be available for any questions regarding subject materials. He is also responsible for grading and other administrative formalities.

Academic honesty

Academic integrity is a critical value of the university community. Integrity violations destroy the fabric of a learning community and the spirit of inquiry that is vital to the effectiveness of the University. Prof. Kwok has absolutely no tolerance for cheating and there are no acceptable excuses. Anyone caught cheating, plagiarizing, and any other form of academic dishonesty will have their course grade lowered by at least one letter grade. In addition, Prof. Kwok is bound to report any unethical behavior or evidence of dishonesty in this course to the University. Please remember the current university rule: "If a student is discovered cheating however minor the offence, the course grade will appear on the student's record with an X, to show that the grade resulted from cheating. This X grade stays on the record until graduation. If the student cheats again and "earns" another X grade, the student will be dismissed from the University." Plagiarism is copying anything (text or ideas) from another source without citing that source. If students use another person's idea, students must cite it, even if students rewrite the idea in their own words. Extreme care must be taken to avoid passing of other's work as one's own. Students are required to provide appropriate citations when students use ideas and arguments or otherwise draw on others' work. If students use research from another source or from the Web students MUST cite the source. This is true even if students use only the general idea and not the exact words.

Learning environment

Prof. Kwok welcomes feedbacks on his teaching throughout the semester. Students are encouraged to contact Prof. Kwok or our TA any time students have any questions, suggestions, concerns, or would like to ask for advice. After student groups are formed, Prof. Kwok will ask for one volunteer from each group (optional) to serve on the student feedback committee. The purpose of this committee is to act as a feedback channel for Prof. Kwok to improve his teaching and enhance student's learning experience. Prof. Kwok will meet with this committee to gather their feedback periodically. It would be a good opportunity if students wish to take a more active role in class management rather than waiting to submit their comments after the course is over.