

## 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 |
|--------------------------------|---|-----------------------------|
| <b>Lecture</b>                 | Explain key concepts to students using an active learning approach, in-class exercise, and after-class discussion of questions. | 1, 2, 3                     |
| <b>Laboratory</b>              | Apply concepts presented in lectures to hands-on exercises.   | 1, 2, 3                     |
| <b>Assignment</b>              | 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 | 1, 2, 3, 4              | 14%                     |
| B. Assignment        | 1, 2, 3, 4              | 40%                     |
| C. Final Exam        | 1, 2, 3, 4              | 46%                     |
| <b>TOTAL:</b>        |                         | <b>100%</b>             |

#### A. In-class Exercise (14%) (Individual and Group)

There are **9** in-class exercises throughout the semester (Individual and Group). Students 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 9 individual in-class exercise scores, but only the **BEST SEVEN scores** will be counted toward the final grade. **There will be NO makeup in-class exercises for whatever reasons.**

#### B. Assignment (40%) (Individual)

There are **TWO** assignments, namely assignment 1, and assignment 2. They are business analytics assignments in Python. Students are expected to apply Python programming skills to solve practical business analytics problems.

**Assignment 1 (individual) - (20%)**

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) - (20%)**

This assignment is about data collection from Web sites. Students need to design and develop a Python program to crawl data from websites and store data in data files. The details will be announced later.

**C. Final Exam (46%) (Individual)**

All course materials, including assigned readings, lecture notes, and exercises are subject to the examination.

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](mailto: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 resources

#### Course 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

- Google Colaboratory
- Anaconda Navigator (for Win-64, OSX-64, or Linux-64)
  - o Jupyter notebook
  - o Python 3.7
- Visual Studio Code (VS code)

**Course schedule**

The course is offered in lecture session and laboratory session.

|     |                                  |                      |
|-----|----------------------------------|----------------------|
| L1  | Mon 15:00-16:20, Fri 10:30-11:50 | Zoom (996 1264 9187) |
| LA1 | Thurs 15:00-15:50                | Zoom (941 8304 5433) |
| LA2 | Thurs 09:00-09:50                | Zoom (978 4353 6973) |
| LA2 | Thurs 12:00-12:50                | Zoom (913 3936 1836) |
| LA3 | Thurs 10:30-11:20                | Zoom (925 6108 6964) |

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

**Schedule of Lecture (Tentative)**

| Wk. | Date   | Topics   | Assignment Release/Due   |
|-----|--------|--|--------------------------|
| 1   | 7-Sep  | Introduction to Course and Programming                   |                          |
|     | 11-Sep | Introduction to Python and Business Analytics            |                          |
| 2   | 14-Sep | Data, data types and operators                           |                          |
|     | 18-Sep | <b>Practice</b>  |                          |
| 3   | 21-Sep | Data structures: Lists and Tuples                        |                          |
|     | 25-Sep | <b>In-class exercise 1</b>                               |                          |
| 4   | 28-Sep | Data structures: Dictionaries                            |                          |
|     | 2-Oct  | <b>The day following the Chinese Mid-Autumn Festival</b> |                          |
| 5   | 5-Oct  | <b>In-class exercise 2</b>                               |                          |
|     | 9-Oct  | Control statements: if                                   |                          |
| 6   | 12-Oct | <b>In-class exercise 3</b>                               |                          |
|     | 16-Oct | Control statements: for, while, try statements           | Asg.1 Release (16 Oct)   |
| 7   | 19-Oct | <b>In-class exercise 4</b>                               |                          |
|     | 23-Oct | Functions and Classes 1                                  |                          |
| 8   | 26-Oct | <b>The day following the Chung Yeung Festival</b>        |                          |
|     | 30-Oct | Functions and Classes 2                                  | Asg.1 Due (31 Oct)       |
| 9   | 2-Nov  | <b>In-class exercise 5</b>                               |                          |
|     | 6-Nov  | Web automation – Selenium 1                              |                          |
| 10  | 9-Nov  | <b>In-class exercise 6</b>                               |                          |
|     | 13-Nov | Web automation – Selenium 2                              |                          |
| 11  | 16-Nov | <b>In-class exercise 7</b>                               | Asg. 2 Release (16 Nov)  |
|     | 20-Nov | Data Visualization 1 - pandas                            |                          |
| 12  | 23-Nov | <b>In-class exercise 8</b>                               |                          |
|     | 27-Nov | Data Visualization 2 - matplotlib                        |                          |
| 13  | 30-Nov | <b>In-class exercise 9</b>                               |                          |
|     | 4-Dec  | Revision   | Asg. 2 Due (9:00, 4 Dec) |

## Schedule of Laboratory (Tentative) – LA1 – LA4

| Wk. | Date   | No.   | Topics                                    |
|-----|--------|-------|---|
| 1   | 10-Sep | LA 1  | Use of Colab and VSCode                   |
| 2   | 17-Sep | LA 2  | Data, data types                          |
| 3   | 24-Sep | LA 3  | Data structures: Lists, Tuples            |
| 4   | 1-Oct  |       | <b>National Day</b>                       |
| 5   | 8-Oct  | LA 4  | Data structures: Dictionaries             |
| 6   | 15-Oct | LA 5  | Control statements: if                    |
| 7   | 22-Oct | LA 6  | Control statements: for, while statements |
| 8   | 29-Oct | LA 7  | Functions and Classes 1                   |
| 9   | 5-Nov  | LA 8  | Functions and Classes 2                   |
| 10  | 12-Nov | LA 9  | Web automation: Selenium 1                |
| 11  | 19-Nov | LA 10 | Web automation: Selenium 2                |
| 12  | 26-Nov | LA 11 | Data Visualization 1: pandas              |
| 13  | 3-Dec  | LA 12 | Data Visualization 2: matplotlib          |

**Policies for using ZOOM**

This course provides online class via ZOOM. Here are the policies for using ZOOM.

- A Zoom meeting ID has already been released on Canvas
- Students are required to install Zoom before coming to the class
- Students are required to login Zoom with their ITSC accounts
- Students must enter their display names as first name, ITSC account name and student ID. (e.g., **James (jkwok-20202020)**). When groups are formed, students must also display their group number as well. (e.g. **James (jkwok-20202020), Group 1**)
- **Students must only attend their own assigned lecture and lab session. L1 students can only join L1 lecture, same goes to L2.**
- **Students will be given a unique meeting password. A separate email will be sent to individual students regarding the unique meeting password of the lectures**
- We will reserve the rights to remove you from meeting if the above rules are not complied by students.

**Teaching staff contact details**

My office is in room LSK4080, 4th floor. You are more than welcome to drop by during office hours or any time with any question you may have. For more urgent matters, you may contact me by email (jkwok@ust.hk) or by phone (2358-7652), but the best way is email. I check my email frequently. Teaching Assistant (TA) of this course is available for any questions regarding grading, attendance, case study 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.