HKUST BUSINESS SCHOOL 香港科大商學院
WORLD CLASS IN ASIA

COURSE OUTLINE

ISOM3000I
BUSINESS ALGORITHMS IN PYTHON: THEORY AND PRACTICE
FALL 2024

COURSE CODE: ISOM3000I, 3 Credits
COURSE NAME: Business Algorithms in Python: Theory and Practice
INSTRUCTOR: Jin Chen Ph.D.
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PREREQUISITES: ISOM 2020 or ISOM 3400
COURSE WEBSITE: https://canvas.ust.hk

CLASS SCHEDULE

Section	Day	Time	Venue
L1	Tu & Th	13:30~14:50	Rm 1005, LSK Bldg
LA1	Mon	09:00~09:50	Rm G005, LSK Bldg

COURSE DESCRIPTION

Welcome to the captivating realm of algorithmic thinking in the business domain with a focus on the popular programming language of Python!

This course provides a thorough introduction to algorithmic principles and their direct applications in business using Python, a popular programming language. Throughout the course, students will have the opportunity to develop expertise in essential data structures, delve into typical algorithms, and master problem-solving methodologies, tailored to address complex, real-world business challenges.

Key topics include crucial subjects, including various data structures, efficient sorting and searching algorithms, and their pivotal roles in operations across different business problems. By merging hands-on programming tasks with real-world problems, this course aims to fortify learning outcomes and elevate practical skills. Get ready to explore the synergy between algorithmic thinking and business acumen in a dynamic learning environment!

Intended Learning Outcomes

- ❑ **Understanding Fundamental Concepts**
  Grasp the foundational principles of data structures and algorithms, including their significance in computer science and business applications.
- ❑ **Proficiency in Data Structures**
  Identify, implement, and utilize various data structures such as arrays, linked lists, stacks, queues, trees, and graphs to solve real-world problems.
- ❑ **Hands-On Programming Experience**
  Gain practical skills in Python programming through exercises and projects that reinforce the concepts of data structures and algorithms.

Required Background and Prerequisite Knowledge

The course requires a strong understanding of Python. Students must remember and understand past concepts like variables and functions. Also, students must know the concept of object-oriented programming. These fundamentals are crucial for success in practical programming tasks.

Course Materials

- **Online Materials**
  Lecture slides, assignments, and lab handouts are available on Canvas course website.
- **Supplemental Materials (Optional)**
  Cormen T H, Leiserson C E, Rivest R L, et al. Introduction to algorithms[M]. MIT press, 2022.
- **Softwares**
  Anaconda and Jupyter Notebook
  Google Collaborator
  Visual Studio Code (VS code) (optional)

Evaluation Procedures

Course Component	Overall Weight
Lecture & Lab Participation	10%
Assignment 1&2	20%
Assignment 3&4	20%
Final Exam	50%

Lecture & Lab Participation (10%)

The fundamental data structure concepts and algorithm procedures will be covered during the lecture sessions. Attendance and active participation in class activities are expected. Furthermore, if you only listen to the lectures without engaging in any practical activities, you will be unable to comprehend the knowledge. As a result, you are required to actively participate in lab classes and carry out practical exercises.

Assignments (40%)

There are **FOUR** individual homework assignments, each with questions to answer and hands-on activity. Completed assignments must be submitted via Canvas **by 23:59** on the due date. The assignments will be graded.

If you are unsure if you will be able to turn in your assignments on time, submit them early. Assignments up to 24 hours late will have a 25% reduction in grade, while those up to one week late will have a 50% reduction. After one week, late assignments will not be credited.

Final Exam (50%)

There is a paper-based final exam (open note), which covers ALL topics taught in the semester. Details of the exam will be provided later in the semester.

There will be no make-up exams unless there are extreme circumstances beyond your control, such as a medical emergency. Students must provide sufficient documents issued by a licensed medical practitioner to be considered for a make-up exam.

Students at HKUST are required to adhere to the Academic Honor Code without exception (see http://acadreg.ust.hk/generalreg.html for more information). Any instances of cheating during quizzes or exams will not be tolerated. Those found cheating will receive a zero on the assessment in question, and their final course grade will be marked with an X denoting academic dishonesty. This X grade will remain on the student's record until graduation. A second instance of academic dishonesty resulting in an X grade will lead to dismissal from HKUST.

Tentative Lecture Course Content

Week	Date	Topics	Remarks
1	Sep. 3	Course Overview	
	Sep. 5	Basic Concepts	
2	Sep. 10	Algorithm Complexity	
	Sep. 12		Assignment 1 Release
3	Sep. 17	Data Structure: Array and Linked List	
	Sep. 19	Data Structure: Hash Table	
4	Sep. 24	Data Structure: String	
	Sep. 26	Data Structure: Tree	Assignment 1 Due
5	Oct. 1	Public Holiday	
	Oct. 3	Data Structure: Graph	Assignment 2 Release
6	Oct. 8	Divide-and-Conquer	
	Oct. 10		
7	Oct. 15		
	Oct. 17	Searching	Assignment 2 Due
8	Oct. 22		Assignment 3 Release
	Oct. 24		
9	Oct. 29	Sorting	
	Oct. 31		
10	Nov. 5		Assignment 3 Due
	Nov. 7	Greedy Algorithm	Assignment 4 Release
11	Nov. 12		
	Nov. 14	Dynamic Programming	
12	Nov. 19		
	Nov. 21	Backtracking	Assignment 4 Due
13	Nov. 26		
	Nov. 28	Revision	

Tentative Lab Course Content

Week	Date	Topics
1		
2		Introduction of Anaconda and Jupyter Notebook
3		Data Structure
4		Data Structure
5		Data Structure
6		Data Structure
7		Divide and Conquer
8		Divide and Conquer
9		Search
10		Search
11		Sorting
12		Sorting
13		Sorting

NOTE: The above actual dates may be modified due to the requirements of the class. Also, the indicated dates may be moved backward or forward depending on class progress. **Exact dates and instructions will be announced on course webpage**.