City University of Hong Kong
Course Syllabus

offered by Department of Management Sciences
with effect from Semester A 2024/2025

Part I   Course Overview

Course Title:	**Business Analytics with Spreadsheet and Python**
Course Code:	**MS5215**
Course Duration:	**One semester**
Credit Units:	**3**
Level:	**P5**
Medium of Instruction:	**English**
Medium of Assessment:	**English**
Prerequisites: *(Course Code and Title)*	**Nil**
Precursors: *(Course Code and Title)*	**Nil**
Equivalent Courses: *(Course Code and Title)*	**Nil**
Exclusive Courses: *(Course Code and Title)*	**Nil**

Part II   Course Details

1.   Abstract

This course equips students with essential modeling skills and data analytical tools in spreadsheet and Python for addressing complex business problems. Participants will learn to develop effective spreadsheet and Python models for business analysis, utilize data and models to derive better insights and drive informed decisions, and explore analytical techniques with practical business applications. Through a combination of practical concepts in Excel/Python and hands-on exercises, students will gain proficiency in leveraging analytics to solve real-world business challenges.

2.   Course Intended Learning Outcomes (CILOs)
(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Collect and analyze data, and build models using spreadsheets and Python	30%	✓	✓	✓
2.	Perform data analysis and develop solutions using spreadsheets and Python techniques	30%		✓	✓
3.	Demonstrate programming skills in Python	20%		✓	✓
4.	Communicate and explain data analysis results to non-specialists	20%		✓	✓
		100%			

A1:   Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.
A2:   Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.
A3:   *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Learning and Teaching Activities (LTAs)
(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No. 1	2	3	4	Hours/week (if applicable)
Lecture	In lectures, students learn the formulation of managerial problems in various functional areas, using techniques and tools in spreadsheet and Python. Students will learn logic and syntax in spreadsheet and Python programming.	✓	✓	✓		2.0
Class Discussion	Examples and exercises are given in class for discussion. Students will explore possible solutions to these tasks with tools in spreadsheet and Python	✓	✓	✓	✓	0.5
Computer-based laboratory	Hands-on experience with the techniques and problem-solving activities based on data analytics problems. Students will perform data analysis using spreadsheets and Python tools.	✓	✓	✓		0.5
Group Project	Students work in small groups to solve particular data analytics problems using spreadsheet and Python. The project is designed to be a decision-making process, including data collection, problem formulation, modeling, analysis, solution methods with appropriate tools, and validation of the results. Students will present and communicate their results and findings to their classmates.	✓	✓	✓	✓	N.A.

4. Assessment Tasks/Activities (ATs)
(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No. 1	2	3	4			Weighting	Remarks
Continuous Assessment: _70_%								
Course Assignment	✓	✓	✓				40%	To assess students' understanding of concepts and their ability to put the techniques learnt into practice.
Group Project	✓	✓	✓	✓			30%	To assess students' understanding of the course material, their collaborative skills, and their ability to communicate results to others effectively.
Examination: __ 30__% (duration: 3 hours if applicable)								
Written Examination	✓	✓	✓				30%	
							100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignment	Homework assignments are designed to help students practice their problem-solving and programming skills and obtain hands-on experience using Excel and Python techniques.	Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with subject matter.	Some evidence of understanding of the subject; ability to perform basic model building and data analysis.	Adequate familiarity with the subject matter; shows marginal ability to perform basic model building and data analysis.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature.
2. Group Project	Students work in small groups to produce a collaborative written report. They need to document in a well-written report the details of Excel and Python models of the business problem, and deliver an oral presentation in the class.	Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base and familiarity with literature. Clearly and correctly states most critical points and important findings of the project. Excellent presentation skills.	Evidence of original thinking, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature. Clearly and correctly states some critical points and important findings of the project. Good presentation skills.	Little evidence of original thinking, little evidence of critical capacity and analytic ability; reasonable understanding of issues. Correctly states some critical points and some of the findings of the project. Average presentation skills.	Very little evidence of original thinking, critical capacity, and analytic ability but shows marginal understanding of subject matters and issues and states a few critical points and findings of the project. Below average presentation skills.	Very little evidence of familiarity with the subject matter and issues; weakness in critical and analytic skills. Poor presentation skills.
3. Exam	Examination covers all topics of the course. It is designed to assess students' understanding on the concepts of Excel modelling and Python programming, and their ability to apply them to solve business problems.	Evidence of original thinking, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature. Clearly and correctly states some critical points and important findings of the project.	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.	Some evidence of understanding of the subject; ability to perform basic statistical model building and data analysis for marketing research.	Adequate familiarity with the subject matter to enable the student to progress without repeating the course.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature.

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignment	Homework assignments are designed to help students practice their problem-solving and programming skills and obtain hands-on experience using Excel and Python techniques.	Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with subject matter.	Adequate familiarity with the subject matter; shows marginal ability to perform basic model building and data analysis.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature.
2. Group Project	Students work in small groups to produce a collaborative written report. They need to document in a well-written report the details of Excel and Python models of the business problem, and deliver an oral presentation in the class.	Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base and familiarity with literature. Clearly and correctly states most critical points and important findings of the project. Excellent presentation skills.	Evidence of original thinking, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature. Clearly and correctly states some critical points and important findings of the project. Good presentation skills.	Little evidence of original thinking, critical capacity, and analytic ability; shows marginal understanding of subject matters and issues and states some critical points and findings of the project. Marginally below average presentation skills.	Very little evidence of familiarity with the subject matter and issues; weakness in critical and analytic skills. Poor presentation skills.
3. Exam	Examination covers all topics of the course. It is designed to assess students' understanding on the concepts of Excel modelling and Python programming, and their ability to apply them to solve business problems.	Evidence of original thinking, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature. Clearly and correctly states some critical points and important findings of the project.	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.	Ability to perform basic statistical model building and data analysis; adequate familiarity with the subject matter to enable the student to progress without repeating the course.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature.

Part III   Other Information (more details can be provided separately in the teaching plan)

1.   **Keyword Syllabus**
     (An indication of the key topics of the course.)

     Analytic techniques using spreadsheet and Python

     - Data description: e.g., summarizing data using descriptive statistics, Pivot Tables in Excel
     - Data visualization: e.g., tables and charts in Excel, Matplotlib in Python
     - Data management: e.g., database and Power Query in Excel, Pandas in Python
     - Data mining: e.g., clustering and classification techniques and implementations in Excel and Python

     Spreadsheet and Python programming
     - Spreadsheet Programming (e.g., functions, control flow statements, macro recorder)
     - Python Programming (e.g., basic language and syntax, objects and data types, functions, control flow statements)

     Applications in analytics
     - Comprehensive case study with applications in operations, supply chain, marketing, etc.

2.   **Reading List**

2.1   **Compulsory Readings**
      (Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Nil

2.2   **Additional Readings**
      (Additional references for students to learn to expand their knowledge about the subject.)

1.	Winston, Wayne L, *Microsoft Excel 2013: Data Analysis and Business Modeling*. Microsoft Press.
2.	Matthes, Eric, *Python Crash Course: A Hands-On, Project-Based Introduction to Programming.* No Starch Press.