City University of Hong Kong
Course Syllabus

offered by Department of Management Sciences
with effect from Semester A 2024/25

Part I Course Overview

Course Title:	Statistical Data Analysis
Course Code:	MS5217
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)*	MS5212 Statistical Methods I
Exclusive Courses: *(Course Code and Title)*	MS5312 Business Statistics

Part II Course Details

1. Abstract

This course offers a comprehensive introduction of statistical principles and computational tools utilized in data analysis. The main aim is to develop the necessary expertise to carry out descriptive, analytical, and predictive data analysis to tackle real-world issues. The class will extensively showcase examples of solving statistical problems in finance and economics to provide practical insights. Moreover, the course lays the foundation for quantitative skills that can be utilized in elective courses pertaining to marketing, finance, economics, operations management, and advanced data science disciplines.

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.	Identify the key issues of a business problem; and formulate these issues into statistical models for further analysis.	N.A.	✓	✓	✓
2.	Apply the statistical knowledge acquired through the course to select the most appropriate technique for a given problem.	N.A.	✓	✓	✓
3.	Analyze relevant data effectively using appropriate statistical techniques to solve the problems and evaluate the results in the context of the problems.	N.A.		✓	✓
4.	Enhance proficiency in utilizing statistical packages for conducting statistical analysis.	N.A.		✓	✓
		N.A.			

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.				Hours/week (if applicable)
		1	2	3	4	
Lectures	Students will learn the concepts and specific subject knowledge during the lectures	✓	✓	✓		2.0
Class discussion	Students will work in groups to discuss real business problems and cases, and to explore possible solutions. The instructor provides instant feedback and support for students' queries.	✓	✓	✓		0.5
In-class exercise	Students will work together on assigned problem sets to consolidate their understanding of the concepts and methods, with the teacher acting as a facilitator. They are required to formulate the problem into a mathematical model (the concept) and proceed to solve the problem (the method). Although these are standard textbook exercises, these exercises have real-life applications.	✓	✓	✓	✓	0.5

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3	4				
Continuous Assessment: 60 %								
Assignment	✓	✓	✓	✓			60%	
Examination: 40 % (duration: 3 hours, if applicable)								
Examination	✓	✓	✓				40%	
							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	Core concepts, ideas, and use of statistical software	Strong evidence of knowing how to apply the relevant techniques and software in performing statistical analysis	Evidence of knowing how to apply the relevant techniques and software in performing statistical analysis	Some evidence of knowing how to apply the relevant techniques and software in performing statistical analysis	Little evidence of familiarity with the subject matter	No evidence of familiarity with the subject matter
2. Examination	Core concepts and ideas; use of appropriate statistical methods	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 literature	Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature	No evidence of familiarity with the subject matter

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	Core concepts, ideas, and use of statistical software	Strong evidence of knowing how to apply the relevant techniques and software in performing statistical analysis	Evidence of knowing how to apply the relevant techniques and software in performing statistical analysis	Some evidence of knowing how to apply the relevant techniques and software in performing statistical analysis	Little evidence of familiarity with the subject matter
2. Examination	Core concepts and ideas; use of appropriate statistical methods	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 literature	Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material	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.)

- Basic R programming
- Exploratory data analysis and graphics
- Monte Carlo approximation (law of large numbers)
- Basic probability
- Bayes' Theorem
- Normal model for conjugate prior and posterior inference.
- Probability Distribution (discrete and continuous distributions)
- Sampling distribution (central limit theorem)
- Statistical estimation
- Confidence intervals
- Hypothesis testing
- Basic linear regression
- Data Privacy

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.	Statistics for Business: Decision Making and Analysis, by Robert Stine and Dean Foster
2.	OpenIntro Statistics, by David Diez, Mine Cetinkaya-Rundel, Christopher Barr, and OpenIntro
3.	Naked Statistics, by Charles Wheelan
4.	AIQ: How People and Machines Are Smarter Together, by Nick Polson and James Scott

2.2 Additional Readings

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

Nil