

**City University of Hong Kong
Course Syllabus**

**offered by School of Data Science
with effect from Semester A 2021/22**

Part I Course Overview

Course Title: Statistical Methods and Data Analysis

Course Code: SDSC2102

Course Duration: One Semester

Credit Units: 3

Level: B2

- Arts and Humanities
 Study of Societies, Social and Business Organisations
 Science and Technology

Proposed Area:
(for GE courses only)

Medium of Instruction: English

Medium of Assessment: English

Prerequisites:
(Course Code and Title) MA2506 Probability and Statistics

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

(A 150-word description about the course)

This course aims to introduce essential statistical methods and analytical tools used to analyze data, gain insights, and make informed decisions. In this course, core topics in probability and statistics are reviewed and expanded through on the study and practice of data analytics. Students will learn how to: describe and visualize data; test our understanding against data; and create statistical models based on domain knowledge. This course will let students gain hands-on experience using different statistical techniques and tools. Upon completion of this course, students should be able to think critically about data and apply standard statistical inference procedures to draw conclusions from such analyses.

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.	Summarize common types of data and distributions	10%	√		
2.	Understand the model of linear regression and be familiar with the linear regression methods	15%	√	√	
3.	Understand the methods of model selection and apply to statistical models	20%	√	√	
4.	Understand the generalized linear model	15%	√	√	
5.	Familiarize the basic time series models and the applications	20%	√	√	
6.	Employ statistical techniques and tools to gain insights from data of real-life cases	20%	√	√	√
		100%			

* If weighting is assigned to CILOs, they should add up to 100%.

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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 self-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. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4	5	6	
Lecture	Formal lectures	√	√	√	√	√	√	2 hours/week
Laboratory work	Apply programming tools to perform statistical analysis and generate analytics results.				√	√	√	1 hour/week

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	5	6		
Continuous Assessment: <u>40%</u>								
Homework assignments			√	√	√	√	30%	
Lab work			√	√	√	√	10%	
Examination: <u>60%</u> (duration: 2 hours)								
Examination	√	√	√	√	√	√	60%	
							100%	

*The weightings should add up to 100%.

For a student to pass the course, at least 30% of the maximum mark for the examination should be obtained.

5. Assessment Rubrics

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

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Homework assignments	Based on submitted written work to evaluate understanding of subject matter, evidence of knowledge base, capacity to analyse and synthesize, and evidence of original and critical thinking.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Lab work	Based on submitted lab reports to evaluate understanding of subject matter, evidence of knowledge base, capacity to analyse and synthesize, and evidence of original and critical thinking.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	Based on submitted written work to evaluate understanding of subject matter, evidence of knowledge base, capacity to analyse and synthesize, and evidence of original and critical thinking.	High	Significant	Moderate	Basic	Not even reaching marginal levels

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.)

- Probability theory, Transformations and Expectations
- Common families of distributions
- Joint probability distributions
- Descriptive statistics
- Point estimation, Hypothesis testing
- Simple linear regression and multiple linear regression

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.	Applied Statistics and Probability for Engineers
2.	Statistical Inference

2.2. Additional Readings

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