City University of Hong Kong
Course Syllabus

offered by Department of Management Sciences
with effect from Semester A 2022 / 2023

Part I   Course Overview

Course Title:	Introduction to Mathematical Statistics
Course Code:	MS8952
Course Duration:	One Semester
Credit Units:	**3**
Level:	R8
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 aims to provide a solid understanding of some of the core theoretical principles that lie behind the various estimation and testing techniques that are used in business and economic statistics. Special focus will be given to likelihood-based inference.

2.   Course Intended Learning Outcomes (CILOs)

No.	CILOs	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	To consolidate the core principles under econometric theory		✓		
2.	To understand and implement the technique of maximum likelihood estimation and develop an appreciation of the associated asymptotic distribution theory			✓	✓
3.	To understand and implement likelihood-based hypothesis testing			✓	✓
4.	To understand statistical issues associated with model selection in econometrics				✓
		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 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			
Interactive seminars	Course material will be delivered in seminar style lectures	✓	✓	✓	✓			
Student presentations	Seminars will be supplemented by presentation by students on special topics	✓	✓	✓	✓			
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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: 100%								
Assignments/Projects/Student Presentations/Quizzes	✓	✓	✓	✓			100%	
Examination: _0_% (duration: , if applicable)								
							100%	

5.   Assessment Rubrics

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignments/Projects/Student Presentations/Quizzes	Students work on assignments based on the concepts of each topic. Students are also assessed on the knowledge of the course materials.	High	Significant	Moderate	Not even reaching marginal levels

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments/Projects/Student Presentations/Quizzes	Students work on assignments based on the concepts of each topic. Students are also assessed on the knowledge of the course materials.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III   Other Information

1.   Keyword Syllabus

- Sufficiency and exponential family of distributions
- Moments and moment-generating functions
- Minimum variance unbiased estimation
- Methods of transformation
- Likelihood principle and maximum likelihood estimation
- Maximum likelihood asymptotic theory
- Likelihood-based hypothesis test
- Loss and risk functions, model selection and pre-testing

2.   Reading List

2.1   Compulsory Readings

Nil.

2.2   Additional Readings

1.	Greene, W.H. (2008), Econometric Analysis, 6th edition, Prentice Hall, New York. ISBN-13: 978-0-13-513245-6 ISBN-10: 0-13-513245-2
2.	Zaman, A. (1996), Statistical Foundations for Econometric Techniques, Academic Press, New York ISBN 0-12-775415-6