City University of Hong Kong
Course Syllabus

offered by College/School/Department of _Mathematics_____
with effect from Semester __A____ 20_20_ / _21_

Part I Course Overview

Course Title:	**Probability and Statistics**
Course Code:	**MA2506**
Course Duration:	**One Semester**
Credit Units:	**4**
Level:	**B2**
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	**English**
Medium of Assessment:	**English**
Prerequisites: *(Course Code and Title)*	**Grade B or above in MA1201 Calculus & Basic Linear Algebra II and subject to approval from MA must be obtained; or** **Grade C- or above in MA1301 Enhanced Calculus & Linear Algebra II; or** **Grade C- or above in both MA1508 Calculus and MA1503 Linear Algebra with Applications**
Precursors: *(Course Code and Title)*	**Nil**
Equivalent Courses: *(Course Code and Title)*	**Nil**
Exclusive Courses: *(Course Code and Title)*	**MA2172 Applied Statistics for Sciences & Engineering** **MA2177 Engineering Mathematics and Statistics** **MA2510 Probability and Statistics**

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course introduces probability theory and statistical inference. It will help students learn the theoretical basis and practical applications of probability distributions, and understand the theory of statistical inference as developed from the basis of probability. It trains students in thinking and analyzing problems from a probabilistic and statistical point of view.

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.	explain concepts at high levels and implement basic operations in probability and statistics.	15%	✓		✓
2.	apply the methods of hypothesis testing and parametric estimation for some statistical problems.	25%		✓	
3.	create and formulate mathematical models using probability and statistics.	40%		✓	
4.	apply statistical and computational methods to a range of problems in science and engineering involving probability and statistics.	20%	✓	✓	✓
	** If weighting is assigned to CILOs, they should add up to 100%.*	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			
Lectures	Learning through **teaching** is primarily based on lectures.	✓	✓	✓	✓		40 hours in total	Lectures
Tutorials	Learning through **tutorials** is primarily based on interactive problem solving allowing instant feedback.	✓					4 hours	Tutorials
			✓				4 hours	
				✓			2 hours	
					✓		2 hours	

Assignments	Learning through **take-home assignments** helps students understand the theoretical basis and identify practical applications of probability and statistics, and develop the ability of analyzing problems from a probabilistic and statistical point of view.	✓	✓	✓	✓		after-class	Assignments
Online applications	Learning through **online examples for applications** helps students design and construct probabilistic and statistical models, and apply to some problems in science and engineering.			✓	✓		after-class	Online applications
Math Help Centre	Learning activities in **Math Help Centre** provides students extra help.	✓	✓				after-class	Math Help Centre

4. Assessment Tasks/Activities (ATs)

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

30% Coursework

70% Examination (Duration: 3 hours, at the end of the semester)

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

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4				
Continuous Assessment: _30___%								
Test	✓		✓	✓			15-30%	Questions are designed for the part of probability theory to see how well the students have learned the basic concepts, fundamental theory and recognized the applications of probability.
Hand-in assignments	✓	✓	✓	✓			0-15%	These are skills based assessment to enable students to demonstrate

								the basic concepts and fundamental theory of probability and statistics, and identify the applications.
Examination: (duration: 3 hrs)	✓	✓	✓	✓			70%	Examination questions are designed to see how far students have achieved their intended learning outcomes. Questions will primarily be skills and understanding based to assess the student's versatility in probability theory and statistical inference.
** The weightings should add up to 100%.*							100%	

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. Test	ABILITY to APPLY and EXPLAIN the basic concepts and methodology of probability and statistics	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Hand-in assignments	CAPACITY for LEARNING to understand the principles of probability and statistics	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Formative take-home assignments	CAPACITY for SELF-DIRECTED LEARNING to understand and apply different probability and statistics methods	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	ABILITY to DEVELOP models through probability and statistics and SOLVE problems with different methods	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. Sample Space. Discrete and Continuous Random Variables. Discrete and Continuous Probability Distributions. Central Limit Theorem. Chebyshev's Theorem. Mathematical Expectation and Variances. Moment Generating Functions. Estimation of Parameters. Hypothesis Testing for one and two samples.

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.	Probability and Statistics for Engineers and Scientists, by Walpole, Myers, Myers and Ye, 8th Ed., Pearson International Edition, 2007.
2.	
3.	
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2.2 Additional Readings

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

1.	Probability and Statistics for Engineers and Scientists, by Devore, 8th Ed., Cengage International Edition, 2012.
2.	
3.	
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