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 Stochastic Processes**
Course Code:	**MA3160**
Course Duration:	**1 semester**
Credit Units:	**3 CUs**
Level:	**B3**
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)*	**MA2001 Multi-variable Calculus and Linear Algebra or equivalent**
Precursors: *(Course Code and Title)*	**Nil**
Equivalent Courses: *(Course Code and Title)*	**Nil**
Exclusive Courses: *(Course Code and Title)*	**MA4535 Applied Probability**

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course introduces probability models, stochastic processes and their applications. The primary aim is to elucidate the fundamental principles of probability theory through examples and to develop the ability of students in applying what they learned from this course to widely divergent concrete science and engineering problems.

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 clearly concepts from probability and describe basic stochastic processes.	10%	√		
2.	evaluate various quantities for probability distributions and random variables.	20%		√	
3.	formulate and solve problems about stochastic processes.	20%		√	
4.	develop mathematical models for a range of empirical phenomena and analyze models of queueing system on the basis of stochastic processes.	20%	√	√	√
5.	the combination of CILOs 1-4	30%	√	√	√
		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		
Lectures	Learning through **teaching** is primarily based on lectures.	Y	Y	Y	Y	Y		39 hours in total
Tutorials	Learning through **tutorials** is primarily based on interactive problem solving allowing instant feedback.		Y					2 hours
				Y				2 hours
		Y						1 hour
					Y			2 hours

Take-home assignments	Learning through **take-home assignments** helps students understand probability theory, solve problems on probability distributions and stochastic processes, as well as apply the knowledge of which and queueing theory to build mathematical models in sciences and engineering.	Y	Y	Y	Y			after-class
Online applications	Learning through **online examples for applications** helps students apply concepts of probability and theories of stochastic processes and/or queueing system to model problems in engineering sciences.				Y			after-class
Math Help Centre	Learning activities in **Math Help Centre** provides students extra help.	Y	Y	Y	Y			after-class

4. Assessment Tasks/Activities (ATs)

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

30% Coursework

70% Examination (Duration: 2 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	5			
Continuous Assessment: _30___%								
Test	Y	Y	Y				15-30%	Questions are designed for the first part of the course to see how well the students have learned theory and techniques of probability and stochastic processes.
Hand-in assignments	Y	Y	Y	Y			0-15%	These are skills based assessment to see whether the students

								are familiar with theory, techniques of probability and stochastic processes and related applications in queueing systems and scientific modelling.
Formative take-home assignments	Y	Y	Y	Y			0%	The assignments provide students chances to demonstrate their achievements on probability and stochastic processes as well as their applications learned in this course.
Examination: _70___% (duration: 2 hrs, if applicable)								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 stochastic processes.
** 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 the theories and techniques of probability and stochastic processes	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Hand-in assignments	Ability to apply the learned theory and techniques of probability and stochastic processes	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	Ability to apply the learned theory and techniques of probability and stochastic processes	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Formative take-home assignments	Ability to apply the learned theory and techniques of probability and stochastic processes	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.. Distributions. Stochastic processes. Queuing theory. Markov chains. Poisson processes

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.	Introduction to probability models, Sheldon M. Ross, 10th ed., San Diego, Calif. : London : Academic, c2007.
2.	Probability and stochastic processes: a friendly introduction for electrical and computer engineers Roy D. Yates, David J. Goodman, New York : John Wiley, c1999.
3.	
…	

2.2 Additional Readings

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

1.	
2.	
3.	
…	