City University of Hong Kong
Course Syllabus

offered by Department of Advanced Design and Systems Engineering
with effect from Semester A 2022 / 23

Part I Course Overview

Course Title:	Special Topics in Stochastic Modeling
Course Code:	ADSE8106
Course Duration:	One semester
Credit Units:	1
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites:	Nil
Precursors:	Nil
Equivalent Courses:	SEEM8106 Special Topics in Stochastic Modeling (offered until 2021/22)
Exclusive Courses:	Nil

Part II Course Details

1. Abstract

This course will introduce some basic methodologies in stochastic models, with an emphasis on engineering applications. Topics covered include probability and statistics basics, discrete-time Markov chains and processes; exponential distribution and the Poisson process; other Point processes; Renewal processes, Renewal reward theorem; continuous-time Markov chains; introduction to martingales and applications; introduction to Brownian motion.

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.	Describe the basic principles, methodologies and tools in stochastic modelling	20%		✓	
2.	Select appropriate stochastic models and methodologies for analyzing engineering problems	30%			✓
3.	Apply theoretical analysis and quantitative methods for the stochastic models	30%			✓
4.	Demonstrate reflective practice in an engineering context	20%	✓		
		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)

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Large class Activities	Delivery of the course will be achieved through a series of formal lectures supported by practical case studies. A series of lectures will introduce basic elements and importance of stochastic models	✓	✓	✓	✓	13 hours/semester
Mini-project	A typical stochastic modelling task will be given to students to solve. The students are expected to work in teams to tackle the given problem. This learning activity will be mainly student-led but with some structural guidance from the teacher.	✓	✓	✓	✓	4 hours/semester

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: _100___%						
Mini-Project	✓	✓	✓	✓	100%	
Examination: __0__% (duration: , if applicable)						
					100%	

5. Assessment Rubrics

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

Assessment Task	Criterion	Pass (P)/ Fail (F)
1. Mini-Project	Project is completed in groups and is graded by the course leader.	Pass/ Fail

The grading is assigned based on students' performance in assessment tasks/activities.

This is a Pass/Fail course.

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Pass (P)/ Fail (F)
1. Mini-Project	Project is completed in groups and is graded by the course leader.	Pass/ Fail

The grading is assigned based on students' performance in assessment tasks/activities.

This is a Pass/Fail course.

Part III Other Information

1. Keyword Syllabus

- Probability theory
- Poisson processes
- Renewal theory
- Markov chains and processes
- Queueing models

2. Reading List

2.1 Compulsory Readings

1.	Sheldon Ross. Introduction to Probability models

2.2 Additional Readings

1	C. L. Chiang. An Introduction to Stochastic Processes and Their Applications.
2	P. Guttorp. Stochastic Modeling in Scientific Applications.
3	S. Ross. Stochastic Processes.