City University of Hong Kong
Course Syllabus

offered by Department of Advanced Design and Systems Engineering
with effect from Semester A 2024 / 25

Part I   Course Overview

Course Title: Systems Modeling and Management

Course Code: SYE8202

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)
SEEM8202 Systems Modeling and Management (offered until 2021/22)
ADSE8202 Systems Modeling and Management (offered until 2023/24)

Exclusive Courses:
(Course Code and Title) Nil

Part II   Course Details

1.   **Abstract**

This course includes the introduction of: 1) simulation models and simulation studies; 2) simulation language (Arena); 3) statistical aspects including input analysis, random variate generation, output analysis, and variance reduction techniques; and 4) simulation optimization techniques.

2.   **Course Intended Learning Outcomes (CILOs)**

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes		
			A1	*A2*	*A3*
1.	**Introduce** the fundamental concepts and principles in system modelling and simulation.	20%	✓	✓	
2.	**Introduce** appropriate simulation language for modelling systems	30%		✓	✓
3.	**Understand** basic statistical aspects related to simulation modelling	30%		✓	✓
4.	**Apply** methodologies for improving the performance of stochastic systems	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. Learning and Teaching Activities (LTAs)

LTA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
Large Class Activities	Learning through teaching is primarily based on lectures. Mini-lectures and tutorials will be used to facilitate understanding and applications of various concepts and methods.	✓	✓	✓	✓	✓	26 hrs/ semester
Tutorial Exercises	The homework exercises provide students with the opportunities to familiarize themselves with the methods learnt during the lectures.	✓	✓	✓	✓	✓	21 hrs/ semester

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.					Weighting	Remarks
	1	2	3	4	5		
Continuous Assessment: __40__ %							
Assignments Students are required to effectively apply knowledge and skills learned from the course in solving some simple practical problems.	✓	✓	✓	✓	✓	40%	
Examination: __60__ % (duration: 2 hrs , if applicable)							
Exam Students will be assessed via the examination their understanding of concepts and mastering in skills of modelling and problems solving learned in class, textbooks and reading materials and their ability to apply subject-related knowledge.	✓	✓	✓	✓	✓	60%	
						100%	

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

5. Assessment Rubrics

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments	Students' ability to model the systems and systematically analyse them.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Final exam	It assesses students' ability to solve different types of simulation problems.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignments	Students' ability to model the systems and systematically analyse them.	Excellent	Good	Marginal	Failure
2. Final exam	It assesses students' ability to solve different types of simulation problems.	Excellent	Good	Marginal	Failure

Part III   Other Information

1.   Keyword Syllabus

- ➢ Probability and Statistics
- ➢ Arena
- ➢ Random Number Generation
- ➢ Input Analysis
- ➢ Output Analysis
- ➢ Comparing Systems
- ➢ Variance Reduction

2.   Reading List
2.1   Compulsory Readings

1.	Law, A. M., Simulation Modeling and Analysis, 5th edition, McGraw-Hill Education, New York, 2015.
2.	Kelton, W. D., Sadowski, R. P., and Zupick, N. B., Simulation with Arena, 6th edition, McGraw-Hill, New York, 2015.

2.2   Additional Readings

NIL