

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	LGT4102
Subject Title	Simulation for Operations and Information Management
Credit Value	3
Level	4
Normal Duration	1-semester
Pre-requisite	AMA1501 Introduction to Statistics for Business
Role and Purposes	Simulation is a popular technique for modeling real systems in manufacturing and service industries in order to make decisions more effectively. Examples of such systems include assembly lines, branch networks of banks, container terminals, accident and emergency departments, and financial derivative trading systems, among many others. Most Fortune 500 firms use simulation in the business decisions. Students will gain the basic knowledge of simulation concepts and approaches for modeling and analysis of real systems. The subject will introduce various software tools that are popular in different business and engineering systems, and look at a wide variety of successful applications of simulation, all in the context of real practices. (Outcome 6)
Subject Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (a) Understand the basic concepts and approaches of simulation. (b) Analyze practical problems using a modern simulation software. (c) Evaluate simulation outcomes for business insights and informed decision-making. (d) Adopt a system view in using simulation for real problems, which often requires cross-organizational effort and avoid optimizing local activities at the expense of overall performance. <p>The subject will help students develop critical and creative thinking, and arouse interest in life-long learning to keep abreast of modern computer simulation technology.</p>
Subject Synopsis/ Indicative Syllabus	Introduction to simulation; types of simulation and Monte Carlo simulation; simulation modeling process; performing simulations on Excel; generation of random numbers and observations; statistical analysis of simulation outputs; techniques for reducing variance; testing and debugging a simulation model; use of popular simulation packages; applications to operations and supply chain management, marketing, and financial and investment management.
Teaching/Learning Methodology	In the lectures, the general principles of the syllabus topics will be presented and developed, together with guidance on further reading and activities. Lectures may also be used for the presentation and discussion of leading cases. In-class tutorials will help students develop and apply the general principles of the topic in student-centered activities, including simulation model building and programming, exercises, and case discussions, etc.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks		% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
				a	b	c	d
	1. Assignment, quiz, case study, etc.		20 %	✓	✓	✓	✓
	2. Term project		30%		✓	✓	✓
	3. Final Examination		50 %	✓	✓	✓	
	Total		100 %				
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Assessment of coursework includes homework assignments, quiz, simulation, case study, term project, etc. The final exam will cover all topics in the syllabus, with a focus of testing students' understanding of the basic concepts, approaches of simulation modeling and testing, and methods for the analysis of simulation output, etc. It will also test students' insights into the application of simulation in solving real business issues.</p>							
Student Study Effort Expected	Class contact:						
	<ul style="list-style-type: none"> Lectures & Laboratories 						39 Hrs.
	Other student study effort:						
	<ul style="list-style-type: none"> Homework assignments and case studies 						45 Hrs.
	<ul style="list-style-type: none"> Reading assignments 						42 Hrs.
	Total student study effort						126 Hrs.
Reading List and References	<p><u>References</u></p> <p>Lecture notes (handouts).</p> <p>Keith Allman, Josh Laurito, Michael Loh. (2015) Financial Simulation Modeling in Excel: A Step-by-Step Guide, Wiley.</p> <p>Jerry Banks, John S. Carson, Barry L. Nelson, David M. Nicol. (2014) Discrete Event System Simulation, 5th Edition, Pearson Education Limited.</p> <p>F.S. Hillier and M.S. Hillier, Introduction to Management Science, latest edition, McGraw Hill.</p> <p>Kelton, W. David, Sadowski, Randall, Zupick, Nancy. (2014) Simulation with ARENA, 6th Edition, McGraw-Hill.</p> <p>Hector Guerrero. (2010) Excel Data Analysis – Modeling and Simulation, Springer.</p> <p>Law, A.M. and Kelton, W.D. (2014) Simulation Modelling and Analysis, 5th Edition, McGraw-Hill.</p>						

	<p>Gerard M. Verschuuren. (2013) Excel Simulations, Holy Macro.</p> <p>Wayne Winston, (2016) Microsoft Excel Data Analysis and Business Modeling, Microsoft Press.</p> <p>Interfaces (INFORMS journal)</p>
--	--