City University of Hong Kong
Course Syllabus

offered by Department of Management Sciences
with effect from Semester A 2022 / 2023

Part I Course Overview

Course Title:	Special Topics in Operations Research
Course Code:	MS8942
Course Duration:	One Semester
Credit Units:	**3**
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	MS8941 Linear and Discrete Optimization
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

To introduce postgraduate students to the concept of randomized algorithms, as well as the techniques of exploring the LP solution structures to LP based approximation algorithms. Application on classical models will be explained and some recent progress will also be explored.

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.	Understand the key concepts of NP-Completeness, Randomization, Approximation, Learn the fundamental theorems and tools for the topics.		✓	✓	
2.	Work in groups to modify and apply the techniques learned for specific problems			✓	✓
3.	Able to independently read and understand research papers of the topics.		✓	✓	
4.	Work collaboratively in a team and effectively communicate and present information in oral and written format.		✓	✓	
		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			
Lecture	Fundamentals of the special topics will be introduced in lectures.	✓	✓					
Assignment	To work on assignment problems to consolidates knowledge on the research topic.	✓	✓					
Written	To work on problems or to	✓	✓					

Report and Presentation	conduct a study on a project that consolidates knowledge on the research topic. Students will submit this group work in a written report with a focus on evaluation, analysis and synthesis of the work and present the results of the assignment in a group presentation. Groups can be tested on their knowledge with questions from the lecturer and fellow students.							
TLA	Brief Description	CILO No.	Hours/week (if applicable)					

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4				
Continuous Assessment: __100__%								
Assignment	✓	✓	✓	✓			50%	
Written Report and Presentation	✓	✓	✓	✓			50%	
Examination: __0__% (duration: , if applicable)								
							100%	

5. Assessment Rubrics

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

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignment	Solve the problems correctly with good understanding of the concepts and methods	High	Significant	Basic	Not even reaching marginal levels
2. Written Report and Presentation	Clear and precise written report and presentation	High	Significant	Basic	Not even reaching marginal levels

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignment	Solve the problems correctly with good understanding of the concepts and methods	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Written Report and Presentation	Clear and precise written report and presentation	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information

1. Keyword Syllabus

NP-Complete, Randomization, Relaxation, Rounding, Approximation, Duality, Complementary slackness conditions, Primal-Dual Schema, Set Cover Problem, Facility Location Problem, Parallel Machine Scheduling

2. Reading List

2.1 Compulsory Readings

Nil.

2.2 Additional Readings

1.	Approximation Algorithms, Vijay V. Vazirani, 2003. Berlin: Springer.
2.	Other reading materials from books and journals will be provided.