

# City University of Hong Kong

## Information on a Course offered by Department of Management Sciences with effect from Semester A in 2009 / 2010

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### Part I

Course Title: Linear and Discrete Optimization

Course Code: MS8941

Course Duration: One Semester

Credit Units: 3

Level: R8

Medium of Instruction: English

Prerequisites: Nil

Precursors: Nil

Equivalent Courses: Nil

Exclusive Courses: Nil

### Part II

#### Course Aims

To introduce students to deterministic operations research models with a focus on applications and techniques of linear and discrete optimization.

#### Course Intended Learning Outcomes (CILOs)

*Upon successful completion of this course, students should be able to:*

No.	CILO
1	<i>Formulate</i> linear and discrete optimization problems
2	<i>Prove</i> basic results in optimization
3	<i>Solve</i> optimization problems with a computer software
4	<i>Identify</i> the appropriate method to use for a given problem

## Teaching and Learning Activities (TLAs)

(Indicative of likely activities and tasks designed to facilitate students' achievement of the CILOs. Final details will be provided to students in their first week of attendance in this course)

No.	TLA
CILO 1,2,4	<i>Interactive lecture</i> Topics will be covered in an interactive lecture setting with students being encouraged to ask and answer questions, clarify ideas and perform work-along exercises.
CILO 1,2,3,4	<i>Tutorials</i> Assignments and computational exercises will be provided for students to strengthen their concepts. Students will present and discuss the solutions during the class.

## Assessment Tasks/Activities

(Indicative of likely activities and tasks designed to assess how well the students achieve the CILOs. Final details will be provided to students in their first week of attendance in this course)

No.	Type of assessment tasks/activities	Weighting (if applicable)
CILO 1,2,3,4	<i>Tutorial assignments</i>	25%
CILO 1,2,4	<i>Mid-term test</i>	25%
CILO 1,2,4	<i>Final examination (3 hours)</i>	50%

## Grading of Student Achievement:

Tutorial assignments/ Mid-term test/ Final examination

Letter Grade	Grade Point	Grade Definitions	
A+	4.3	Excellent	Strong evidence of knowing how to apply concepts and techniques to solve optimization problems.
A	4.0		
A-	3.7		
B+	3.3	Good	Some evidence of knowing how to apply concepts and techniques to solve optimization problems.
B	3.0		
B-	2.7		
C+	2.3	Adequate	Little evidence of knowing how to apply concepts and techniques to solve optimization problems..
C	2.0		
C-	1.7		
F	0.0	Failure	Very little evidence of knowing how to apply concepts and techniques to solve optimization problems.

## **Part III**

### **Keyword Syllabus**

- Linear optimization: Formulation, geometry, optimality, simplex method, duality, sensitivity analysis, large scale optimization, interior point method, network optimization
- Discrete optimization: Formulations, complexity, duality, valid inequalities, branch and bound, Lagrangian methods, approximation

### **Essential Reading**

- Introduction to Linear Optimization by Dimitris Bertsimas and John N. Tsitsikilis.

### **Supplementary Reading**

- Integer and Combinatorial Optimization by George Nemhauser and Laurence A Wolsey
- Theory of Linear and Integer Programming by Alexander Schrijver
- Applications of optimization with Xpress-MP by Christelle Gueret, Christina Prins, Marc Sevaux
- OPL Studio

### **Online Resources**

- Online software: <http://www-neos.mcs.anl.gov/>