City University of Hong Kong
Course Syllabus

offered by Department of Management Sciences
with effect from Semester B 2017 / 18

Part I Course Overview

Course Title:	Quantitative Decision Making Techniques
Course Code:	MS5720
Course Duration:	One Semester
Credit Units:	3
Level:	P5
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)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course aims to provide students with a basic understanding of probability and statistics; knowledge of a wide range of quantitative techniques and their assumptions; the ability to apply an appropriate method to analyse and interpret solutions for problem solving and decision making.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Demonstrate basic knowledge and understanding of the concepts of confidence interval estimation, hypothesis testing, linear regression modelling and time series forecasting modelling, decision analysis, linear programming models, network models and inventory models.		✓		
2.	Select and apply an appropriate quantitative model to formulate a problem situation in business and operations management		✓	✓	
3.	Apply the appropriate methodology to analyse and solve different quantitative models			✓	✓
4.	Evaluate different alternatives based on the appropriate model solution for decision support			✓	✓
		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)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4			
Lecture	Concepts and applications of various statistical and quantitative analyses to problem solving and decision making are explained. (Analysis methods included are regression, forecasting, linear programming and inventory models) In-class exercises in the form of short questions are designed to test students' understanding of the concepts and methods learned in a lecture. The lecturer will give further explanation to the class at the end of the exercise.	✓	✓	✓				
Tutorial	Tutorial exercises/cases are designed to develop students' analytical skills in problem formulation, solution generation and interpretation. These are take-home exercises/cases for students to practise after a lecture and to share and participate in class discussion during the next tutorial. The lecturer will facilitate the class discussion and give feedback and comments.	✓	✓	✓	✓			

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3	4				
Continuous Assessment: __30__%								
Mid-term test	✓	✓	✓	✓			20%	
Group assignment	✓	✓	✓	✓			5%	
Group project	✓	✓	✓	✓			5%	
Examination: __70__% (duration: 2 hours, if applicable)								
Examination	✓	✓	✓	✓			70%	
							100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Mid-term Test	ABILITY to APPLY quantitative analysis concepts and techniques to different problem situations with ACCURACY.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Group Assignment	ABILITY to APPLY quantitative analysis concepts and techniques to different problem situations with ACCURACY.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Group Project	ABILITY to analyse an open-ended case requiring CREATIVITY, quantitative analysis and REPORT-WRITING skills.	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Written Examination	ABILITY to APPLY quantitative analysis concepts and techniques to different problem situations with ACCURACY.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

1. Introduction to Modelling and Management Science
   Model building and management science. MS/OR problem solving process. Constraints in the MS/OR field.

2. Resource Allocation Using Linear Programming
   Problem formulation. Graphical and computer solution. Interpretation of computer solution. Sensitivity analysis. The transportation problem. The assignment problem.

3. Basic Probability Concepts
   Expected values. Standard deviation. Normal distribution. Concepts of sampling. Estimation and confidence intervals. Hypothesis testing.

4. Regression and Correlation
   Linear regression. Interpretation of regression parameters and coefficient of correlation.

5. Forecasting
   Exploration of time-series forecasting techniques.

6. Decision Analysis
   Decision making under risk. Decision trees. Opportunity loss. Expected value of perfect information. Expected value of sample information.

7. Project Management
   Project network. Critical path method. Project evaluation and review technique.

8. Inventory Management
   The inventory problem. Economic order quantity (EOQ). The EOQ model with non-instantaneous receipt. The EOQ with discounts.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1. Render, B., Stair, R. M., Hanna, M. E. and Trevor, S. H., *Quantitative Analysis for Management*, 12th edition, Pearson Education, 2015

2. Taylor III, B. W., *Introduction to Management Science*, 12th edition, Pearson, 2017

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Keller, G., *Statistics for Management and Economics*, 10th edition, Cengage Learning, 2015
2.	Albright, S. C. and Winston, W., *Business Analytics: Data Analysis and Decision Making*, 6th edition, Cengage Learning, 2017