offered by Department of Management Sciences
with effect from Semester A 2024 /25

Part I   Course Overview

Course Title:	Managerial Decision Modeling
Course Code:	MS5313
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**

Serving as a foundation course for developing advanced analytical and planning skills, this course aims to sharpen students' ability to creatively design, formulate, and construct quantitative models for managerial decision problems. Specifically, this course is intended to
- Provide students with the key concepts, knowledge, and tools to use data, analytical models and information technology to support practical managerial decision-making.
- Develop students' basic skills and hands-on experiences to uncover useful information and to analyse various business decision problems
- Expose students to the practical cases of how quantitative modelling and analysis skills have generated significant business values and competitive advantages.

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 the attitude and/or ability to discuss the basic knowledge in concepts, principles and benefits of quantitative methods and analytical models.		✓	✓	
2.	Apply quantitative methods to design, formulate, and create analytical models for managerial decision problems in a precise and creative manner.			✓	
3.	Evaluate the analytical results and recommend best possible solutions for managerial decision making.			✓	✓
		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 real-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)
(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No. 1	2	3				Hours/week (if applicable)
Lectures and Discussions	Participate in lectures and class discussions to understand and explain the fundamental concepts, principles, and benefits of quantitative methods and analytical models in managerial decision-making. Engage in interactive sessions to clarify doubts and deepen comprehension.	✓						3 hours / week
Case Studies and Practical Exercises	Engage in case studies to design and formulate analytical models using quantitative methods, addressing real-world managerial decision problems with precision and creativity. Complete practical exercises to apply tools like Excel Solver for solving constrained optimization problems, including linear, integer, and non-linear programming models.		✓	✓				
Group Projects and Presentations	Collaborate on group projects to apply quantitative methods, analyze multiple objective decision problems, and utilize decision-making tools. Present and discuss project findings to assess analytical results and recommend the best possible solutions for effective managerial decision-making.		✓	✓				

4. Assessment Tasks/Activities (ATs)
(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No. 1	2	3				Weighting	Remarks
Continuous Assessment: 30%								
Course Assignment	✓	✓	✓				20%	
Class Participation	✓		✓				10%	
Examination: 70% (duration: 2 hours if applicable)								
Written Examination	✓	✓	✓				70%	
							100%	

5. Assessment Rubrics

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

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

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Course Assignment	The depth of understanding and creative application of quantitative methods, precise formulation of models, and the insightful analysis leading to well-justified recommendations.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Class Participation	The frequency and quality of active engagement, contributions to class discussions, and demonstration of understanding through interactive sessions.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	The accuracy and comprehensiveness of knowledge and understanding, with correct and creative application of methods and models,	High	Significant	Moderate	Basic	Not even reaching marginal levels

	and insightful analysis and recommendations.			

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. Course Assignment	The depth of understanding and creative application of quantitative methods, precise formulation of models, and the insightful analysis leading to well-justified recommendations.	High	Significant	Satisfactory	Not even reaching satisfactory level
2. Class Participation	The frequency and quality of active engagement, contributions to class discussions, and demonstration of understanding through interactive sessions.	High	Significant	Satisfactory	Not even reaching satisfactory level
3. Examination	The accuracy and comprehensiveness of knowledge and understanding, with correct and creative application of methods and models, and insightful analysis and recommendations.	High	Significant	Satisfactory	Not even reaching satisfactory level

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.)

   Introduction to Modelling and Management Science
   Modelling for Managerial Decisions. Quantitative vs. qualitative Problem Solving Process. Use and Implementation of Modelling

   Basic Concepts in Probability and Statistics
   Expected Values. Standard Deviation. Normal Distribution. Concepts of Sampling. Estimation and Confidence Intervals. Data analysis using Excel

   Time Series Analysis
   Time series forecasting techniques and their applications. Moving averages. Exponential Smoothing. Seasonality. Trend models.

   Regression Analysis
   Simple Linear Regression models. Estimation and prediction using regression method. Interpretation of regression parameters and coefficient of correlation.

   Discriminant and Classification Analysis
   The two-group discriminant problem. The k-group discriminant problem. Excel implementation and business applications.

   Constrained Optimization techniques
   Optimization modelling. Linear Programming formulation. Using Excel Solver to solve constrained optimization problem.
   Other constraint optimization models (including Integer and Non-linear programming problems) and their applications.

   Multiple Objective Decision Making Techniques
   Multiple objective decision problems and decision making tools. The Analytical Hierarchy Process.

   Implementation Issues
   Success, challenges and issues in quantitative managerial decision support. Uses and abuses of quantitative results in real-Life situations. Strengths and limitations of quantitative models.

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.)

Nil

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

1.	George E. Monahan, Management Decision Making: Spreadsheet Modeling, Analysis, and Applications (2000), Cambridge University Press, Cambridge, England, ISBN: 0 521 78118 3
2.	S. Christian Albright, Wayne Winston, Christopher Zappe, Data Analysis and Decision Making with Microsoft® Excel, Revised, 3rd Edition, ISBN-10: 0324662440, ISBN-13: 9780324662443, © 2009
3.	Cliff Ragsdale, Spreadsheet Modeling & Decision Analysis: A Practical Introduction to Management Science, Revised, 5th Edition, Virginia Polytechnic Institute, ISBN-10: 0324656637, ISBN-13: 9780324656633 © 2008
4.	Taylor, B W, Introductory Management Science, 8/e (2004, Prentice Hall)
5.	Levine, D M, Stephan, D, Krehbiel, T C and Berenson, M L: Statistics or Managers, 4/e (2005, Prentice Hall)
6.	Wisniewski, M: Quantitative Methods for Decision Makers (2002, Prentice Hall)
7.	www.informs.org