(6) Management Decision Science-BMGT3083

<table>
<tr><td>1.</td><td>Name of Course</td><td colspan="5">Management Decision Science</td></tr>
<tr><td>2.</td><td>Course Code</td><td colspan="5">BMGT3083</td></tr>
<tr><td>3.</td><td>Name(s) of academic staff</td><td colspan="5"></td></tr>
<tr><td>4.</td><td>Rationale for the inclusion of the course/module in the programme</td><td colspan="5">Managers are continually barraged with information that may be reliable or not. They must regularly choose courses of action in the face of many uncertainties, often much more rapidly than they would like. Do they make optimal decisions and how should we assess what is “optimal”? This course will contrast how managers do make decisions with how they should make decisions, by thinking about how “rational” decision makers act, by conducting in-class experiments and examining empirical evidence of how they do act (often erroneously) in managerial situations.</td></tr>
<tr><td>5.</td><td>Semester and Year offered</td><td colspan="5">1/2</td></tr>
<tr><td rowspan="2">6.</td><td>Total Student Learning Time (SLT)</td><td colspan="4">Face to Face</td><td>Total Guided and Independent Learning</td></tr>
<tr><td>L = Lecture
T = Tutorial
P = Practical
O= Others</td><td>L
28</td><td>T
14</td><td>P
0</td><td>O
0</td><td>Guided = 42
Independent = 84
Total = 126</td></tr>
<tr><td>7.</td><td>Credit Value</td><td colspan="5">3</td></tr>
<tr><td>8.</td><td>Prerequisite (if any)</td><td colspan="5">Management</td></tr>
<tr><td>9.</td><td colspan="6">Objectives:
To promote an understanding of
• the fundamentals of TQM and its historical development,
• The integration of quality control and management tools, the Six Sigma philosophy,
• Lean manufacturing and service concepts,
• Quality Function Deployment,
• Benchmarking and Statistical Process Control.
• The role of Supply Chain Management (SCM) in quality improvement will be reviewed.</td></tr>
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10.	Learning outcomes:
	At the end of this subject, students should be able to:
	• Learn and apply key concepts and tools of analysis that form the theoretical foundations of management science (Program outcomes include Critical Thinking and Problem-solving, Team—collaboration).
	  ○ Apply through case studies and the use of analytical tools the major concepts of management science
	  ○ Describe the categories of management science tools and techniques and demonstrate through application the ability to use the appropriate tools and techniques to address a given organizational issue.
	  ○ Demonstrate through critiquing and analyzing the literature, the ability to evaluate scholarly and practitioner focused research.
	• Apply practical applications of management science to real-world problems (Program outcomes include: Critical thinking and Problem-solving, Ethics and Communication-written and oral).
	• Apply management science tools and techniques, both qualitative and quantitative, to different categories of management problems and decision making situations.
	• Exhibit the ability to perform academic research on the topic of management science. (Research-understanding and Performing, Critical thinking, and Problem-solving).
	• Demonstrate how management science may be used in action research to find the best solutions to organizational challenges.
	• Demonstrate through example how to present and display findings by using management science tools to present to a management team. (Program outcomes include: Communication-Written, Critical Thinking and Problem-solving)
	• Develop and present a recommendation or initiative that builds a business case be performing an analysis using qualitative, quantitative, and/or mixed methods.

11.	Transferable Skills: • To enhance the student's ability in applying demand analysis and segmentation techniques in quality management. • To develop the student's ability for managing the firm's marketing efforts directed to the decision science • Provide a framework for understanding decision science strategy development and, thereby, provide the student with decision-making capabilities in the field.

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<tr><td>12.</td><td>Teaching-learning and assessment strategy
A variety of teaching and learning strategies are used throughout the course, including:
• Lecture sessions
• Tutorial sessions
• Case Studies
• Student-Lecturer discussion
• Collaborative and co-operative learning
• Workshops and Training Seminars
• Independent study

Assessment strategies include the following:
• Ongoing quizzes
• Midterm tests
• Performance Assessment (Participation, project, Assigned exercises)
• Case Presentations</td></tr>
<tr><td>13.</td><td>Synopsis:
This course provides students with an introduction to an area of management science that is sometimes called “operations research.” The objective of this course is to have you develop an appreciation of the management science approach to problem formulation and solution, which, with the increased use of computers, is now so important in today's business and industrial sectors. The course focuses on “quantitative approaches to decision making,” and introduces you to a variety of management science models, methods, and procedures. In this course a greater emphasis is placed on problem modelling and the interpretation of results, and less emphasis is given to mathematical techniques and solution algorithms.</td></tr>
<tr><td>14.</td><td>Mode of Delivery: Face to Face
• Lecture sessions
• Tutorial sessions</td></tr>
<tr><td>15.</td><td>Assessment Methods and Types:
The assessment for this course will be based on the following:

Coursework **50%**

Quizzes 10%
Assignments 10%
Project 10%
Mid-Semester Exam 20%
Final Examination **50%.**

Total **100%**</td></tr>
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16. Mapping of the course/module to the Programme Aims
The individual course is mapped to the programme aims using a scale of **one** to **five** where (one being the least relevant/related and five being the most relevant/ related).

A1	A2	A3	A4	A5	A6
4	4	4	4	4	3

17. Mapping of the course/module to the Programme Learning Outcomes
The learning outcomes of this course are mapped to the eight MQF domains using a scale of **one** to **five** where (one being the least relevant/related and five being the most relevant/ related).

LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12
4	4	4	4	4	4	2	2	2	2	4	2

18. Content outline of the course/module and the SLT per topic

WEEK	Details	SLT			
		L	T	Indep.	Total
WEEK 1	**Management Science** • The Management Science Approach to Problem Solving • Model Building: Break-Even Analysis • Computer Solution • Management Science Modelling Techniques • Business Usage of Management Science Techniques • Management Science Models in Decision Support Systems	2	1	6	9
WEEK 2	**Linear Programming: Model Formulation and Graphical Solution** • Model Formulation • A Maximization Model Example • Graphical Solutions of Linear Programming Methods • A Minimization Model Example • Irregular Types of Linear Programming Problems • Characteristics of Linear Programming Problems	2	1	6	9

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	WEEK 3	**Linear Programming: Computer Solution and Sensitivity Analysis** • Computer Solution • Sensitivity Analysis **Linear Programming: Modelling Examples** • Product Mix Example • Diet Example • Investment Example • Marketing Example • Transportation Example • Blend Example • Multi-period Scheduling Example • Data Envelopment Analysis Example	2	1	6	9
	WEEK 4	**Integer Programming** • Integer Programming Models • Integer Programming Graphical Solution • Computer Solution of Integer Programming Problems with Excel and QM for Windows • Integer Programming Modelling Examples **Transportation, Trans-shipment, and Assignment Problems** • The Transportation Model • Computer Solution of a Transportation Problem • The Trans-shipment Model • The Assignment Model • Computer Solution of the Assignment Problem	2	1	6	9
	WEEK 5	**Network Flow Models** • Network Components • The Shortest Route Problem • The Minimal Spanning Tree Problem • The Maximal Flow Problem	2	1	6	9
	WEEK 6	**Project Management** • The Elements of Project Management • CPM/PERT • Probabilistic Activity Times • Microsoft Project • Project Crashing and Time-Cost Trade-Off • Formulating the CPM/PERT Network as a Linear Programming Model	2	1	6	9

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	WEEK 7	**Multi-criteria Decision Making** • Goal Programming • Graphical Interpretation of Goal Programming • Computer Solution of Goal Programming Problems with QM for Windows and Excel • The Analytical Hierarchy Process • Scoring Model	2	1	6	9
	WEEK 8	**Nonlinear Programming** • Nonlinear Profit Analysis • Constrained Optimization • Solution of Nonlinear Programming Problems with Excel • A Nonlinear Programming Model with Multiple Constraints • Nonlinear Model Examples	2	1	6	9
	WEEK 9	**Nonlinear Programming** • Nonlinear Profit Analysis • Constrained Optimization • Solution of Nonlinear Programming Problems with Excel • A Nonlinear Programming Model with Multiple Constraints • Nonlinear Model Examples	2	1	6	9
	WEEK 10	**Probability and Statistics** • Types of Probability • Fundamentals of Probability • Statistical Independence and Dependence • Expected Value • The Normal Distribution	2	1	6	9

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	WEEK 11	**Decision Analysis** • Components of Decision Making • Decision Making without Probabilities • Decision Making with Probabilities • Decision Analysis with Additional Information • Utility **Forecasting** • Forecasting Components • Time Series Methods • Forecast Accuracy • Time Series Forecasting Using Excel • Time Series Forecasting Using QM for Window • Regression Methods	2	1	6	9
	WEEK 12	**Queuing Analysis** • Elements of Waiting Line Analysis • The Single-Server Waiting Line System • Undefined and Constant Service times • Finite Queue Length • Finite Calling Population • The Multiple-Server Waiting Line • Additional Types of Queuing Systems	2	1	6	9
	WEEK 13	**Simulation** • The Monte Carlo Process • Computer Simulation with Excel Spreadsheets • Simulation of a Queuing System • Continuous Probability Distributions • Statistical Analysis of Simulation Results • Crystal Ball • Verification of the Simulation Model • Areas of Simulation Application	2	1	6	9

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	WEEK 14	**Inventory Management** • Elements of Inventory Management • Inventory Control Systems • Economic Order Quantity Models • The Basic EOQ Model • The EOQ Model with Non-instantaneous Receipt • The EOQ Model with Shortages • EOQ Analysis with QM for Windows • EOQ Analysis with Excel and Excel QM • Quantity Discounts • Reorder Point • Determining Safety Stocks Using Service Levels • Order Quantity for a Periodic Inventory System	2	1	6	9
		Total	28	14	84	126
19.	**Main references supporting the course**: Taylor. (2010). *Introduction to Management Science*, (10th Edition), Pearson					
	Additional references supporting the course: 1. Michael Pidd. (2010). *Tools for Thinking: Modelling in Management Science*, (3rd Edition), Wiley 2. Terry Williams. (2009). *Management Science in Practice*. Wiley 3. Hossein Bidgoli. (2010). *The Handbook of Technology Management, Volume 2: Supply Chain Management, Marketing and Advertising, and Global Management*. Wiley					
20.	**Other additional information** All related subject materials will be available to the students during the period of the course					