

Xavier Institute of Management, Bhubaneswar
XIM University

Course	Quantitative Methods for Business Decisions (QMBD)
Program	Executive MBA
Batch	2023-2024
Term	Four
Credits	3.0
Instructor	Prof. Arun Kumar Paul (arun@xim.edu.in)

1.0 Course introduction and objectives:

1.1 Course introduction: Most of the successful business decisions rely on a mix of qualitative and quantitative methods to define a problem, select potential alternatives and help predict what options will have the greatest chance of success. Whether making purchasing, marketing, manufacturing or financing decisions, it is essential to obtain a quantitative foundation to assist in the decision-making process. This course intends to provide a formal quantitative approach to problem solving, to give an insight for managerial situations where a quantitative approach is appropriate and conceptual understanding of the role that quantitative methods play in the decision-making process. In addition to creating the theoretical foundations, this course also introduces some widely used Quantitative Models applied for Business Decision.

1.2 Course objectives: After successfully completing this course, students should be able to:

- learn some of the current quantitative tools and techniques used in decision making.
- know quantitative models and their relevance & application in business situations.
- select and apply suitable quantitative approaches in business decision making.

2.0 Major course content:

- a) Introduction to Qualitative and Quantitative Research; Data and its types;
- b) Model formulation; BEP analysis and its application
- c) Problem formulation under constraints – Linear, Non-linear, and applications
- d) LPP, sensitivity analysis and its applications with managerial implications
- e) Multi-Criteria Decision Making (MCDM) – Weighted scoring methods
- f) Analytic Hierarchy Process (AHP)
- g) Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS)
- h) Monte Carlo simulation – decision making with quantified uncertainties
- i) Inferential statistics and applications using MS Excel and SPSS
- j) Regression models using MS Excel and SPSS
- k) Data Envelopment Analysis (DEA)
- l) Goal Programming basics
- m) Network models with examples
- n) Queuing theory, Waiting line models

- o) Theory of Constraints - Introduction
- p) Game Theoretic approach - Introduction
- q) Multi-Attribute Utility Theory (MAUT) - Introduction
- r) Interpretative Structural Modeling (ISM)

3.0 Course learning outcomes (CLO):

- a) **CLO1:** Be able to understand the fundamental concepts of quantitative methods for problem formulation and solving under business conditions.
- b) **CLO 2:** Be able to understand, analyse and apply appropriate models for various business function problems.
- c) **CLO3:** Be able to exhibit voluntary cooperation and team-working attributes in a group setting to define and solve problems, jointly in a select group and present the findings in the class, and submit a soft copy of the report.

4.0 Reading and references:

- a) **Text book** - Quantitative Methods for Business by Anderson, Sweeney, Williams, Camm & Martin, CENGAGE Learning
- b) **Reference books** –
 - i. Business Statistics for Contemporary Decision Making by Ken Black, Wiley India
 - ii. Basic Econometrics by Damodar N. Gujarati, Mc Graw Hills
 - iii. Multivariate Data Analysis, by Joseph F. Hair, Jr; William C. Black, Barry J. Babin and Rolph E. Anderson, Prentice Hall
 - iv. Statistics for Management by Levin, Rubin, Rustogi and Siddiqui, 7th edn., Pearson
 - v. Data Analysis, Optimization, and Simulation Modeling by Albright, Zappe and Winston, CENGAGE Learning
 - vi. Quantitative Methods for Decision Making using Excel by Davis and Pecar, Oxford University Press.
 - vii. *Selected Reading Articles & Cases will be provided and will be discussed during the course*

5.0 Pedagogy and student's workload:

The pedagogy will include delivery methods like lectures, case studies, journal articles, quantitative problems and group projects. Students are expected to read the given class materials, solve assignments and solve problems on their own. It is expected that students should spend around 5-6 hrs of time for this subject outside the classroom.

6.0 Provisional Session Plan:

Session No.	Topic Description	Remarks
1,2	Introduction to Qualitative and Quantitative Research; Data and its types; Model formulation; BEP analysis Problem formulation under constraints – Linear, Non-linear	Reading materials, Cases will be given to

3,4	Multi-Criteria Decision Making (MCDM) – Weighted scoring methods; AHP; TOPSIS	the students.	
5 - 7	LPP, sensitivity analysis and its applications		
8-10	<i>Monte Carlo simulation – decision with quantified uncertainties</i>		
11,12	Inferential statistics, Regression models , SPSS		
13	Data Envelopment Analysis; Goal Programming		
14	Network models		
15,16	Waiting line models		
17	Theory of Constraints		
18	Game Theoretic approach		
19	Multi-Attribute Utility Theory (MAUT); Interpretative Structural Modeling (ISM) - Introduction		
20	Case study presentations; Group work presentations		
Quiz, Final Exam, Group / Case Presentations			As per agreed schedule

7.0 Assessment scheme:

Component	Weightage (%)	Assessment of course learning outcome(s) (CLO)
Quizzes (two @ 15% each)	30%	CLO1
End-Term	40%	CLO2
Group project presentation	20%	CLO3
Class attendance and participation	10%	CLO1

8.0 Academic discipline and integrity (to follow Student Manual of Policies):

- Students are expected to come to / join in the class on time.
- Students are expected to join the class with prior preparation and having done assigned pre-readings.
- Students are expected to submit assignments on time.
- Utmost care will be taken to *maintain class decorum*, follow the exact **evaluation norms**, *conduct* fair examinations, fair and transparent evaluation of examination papers, etc.

9.0 Mapping course learning outcomes (CLO) with the program learning goals (PLG):

PLG#	Program Learning Goal	Trait	Addressed by Course	
			Yes	No
PLG1	Functional and Business Skills	The students will demonstrate understanding of elements of strategic operations management	Yes	
PLG2	Analytical Skills	The students will use analytical techniques to identify a quality business problem, and suggest a solution	Yes	
PLG3	Collaboration and teamwork attributes	The students will exhibit voluntary cooperation and effective teamwork in a group setting while working on a group-project.	Yes	
PLG4	Ethical responsibility	The students will understand the ethical complexities of conducting business. The students will adopt techniques in scenarios involving ethical dilemma and offer resolution	Yes	
PLG5	Communication	The students will produce reasonably good quality business document as part of the SMS course requirements. The students will become effective and confident communicators, by presenting their views in the class and making the group presentations.	Yes	