

IMQT3001 QUANTITATIVE METHODS - II (3-0-0)

Course Objectives:

1. To learn adequate theoretical; concept of Quantitative techniques in various applied field in management decision making
2. To understand role of optimization techniques in managerial decision making
3. To understand the applications of Theory of Games, Queue Theory, Simulation and future forecasting in managerial setting.

Module-1:Theory of Games:

Concept of Games; Two-Person Zero-Sum Games; Pure Strategies (Minimax and Maximin Principles); Games with Saddle Point; Mixed Strategies; Games without Saddle Point; The rules (Principles) of Dominance; Solution Methods games without Saddle Point(Algebraic Method, Arithmetic Method, Graphical Method).

Module-II: Queuing Theory:

The Structure of Queuing System- Characteristics, Queuing Process, Queue Discipline, Service Mechanism; Performance measures of Queuing System-Transition-State and Steady-State; Kendal's notation for representing queueing models, Classification of Queuing Models; Solution of Queuing Model(Single Server, M/M/1: (∞ /FCFS).

Module-III: Markov Chains:

Concept, Characteristics of a Markov Chain; Applications of Markov Analysis; State and Transition Probabilities; Multi-Period Transition Probabilities-Procedure for formulate matrix of Transition Probabilities; Procedure for determining Steady-State (Equilibrium) Conditions.SimulationDefinition of Simulation; Types of Simulation; Steps of Simulation Process; advantages and Disadvantages of Simulation; Stochastic Simulation and random numbers (Monte Carlo Simulation, random Number Generation). Simulation of Queuing Problems.

Course Outcomes:

- CO-1: Apply game theory models to analyse various real-world scenarios, including business competition, negotiations, and strategic decision-making, to derive optimal strategies and outcomes.
- CO-2: Learn simulation techniques such as Monte Carlo simulation, discrete-event simulation, and agent-based modelling, and be able to design, implement, and analyse simulation experiments to solve problems and make decisions in uncertain environments.
- CO-3: Analyse the properties of Markov chains, including transition probabilities, steady-state distributions, and absorbing states, and apply Markov analysis to model and analyse various real-world phenomena such as customer behaviour, inventory systems, and epidemiological dynamics.
- CO-4: Acquire a deep understanding of queueing theory, including the characteristics of queueing systems, queueing models, and performance metrics.

Books:

- Gupta & Hira, Operations Research, S.Chand.
- Sharma,Operations Research, Macmillan.