MANGALORE UNIVERSITY

DEPARTMENT OF M.Sc. COMPUTER SCIENCE

MASTER OF COMPUTER APPLICATIONS (MCA) PROGRAMME

MCAS411:OPERATION RESEARCH		
Hours/Week: 4 **Credits : 4**		**I.A. Marks: 30** **Exams. Marks: 70**

Course Outcomes:

CO1: Identify and develop operational research models from the verbal description of the real system.

CO2: Understand the mathematical tools that are needed to solve optimization problems.

CO3: Use mathematical software to solve the proposed models.

CO4: Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.

UNIT-I	**12 Hours**

Introduction: Nature and developments of operations research, characteristics of operations research, necessity of operations research in industry, scope of OR in management, objectives of OR, models in OR, role of computers in OR, limitations of OR. Linear Programming: Requirements of linear programming problems, formulation of linear programming problem, graphical solution, simplex algorithm, computational procedure in simplex, duality and its concept, application of L.P. model to product mix and production scheduling problems, limitations of linear programming.

UNIT-II	**12 Hours**

Transportation model: Definition of transportation model, formulation and solution methods, and degeneracy in transportation problems. Assignment Model: Definition of assignment model, comparison with transportation model, formulation and solution methods, the travelling salesman problem.

UNIT-III	**12 Hours**

Queuing Models: Application of queuing models, characteristics of queuing models, single channel queuing theory, solution to single channel with poison arrivals and exponential service infinite population model, Industrial applications of queuing theory. Simulation: When to use simulation, Advantages and limitations of the simulation technique, generation of random numbers, Monte-Carlo simulation, And computer-aided simulation: applications in maintenance and inventory management.

UNIT-IV	12 Hours

Game Theory and Network Analysis: PERT and CPM: Work breakdown structure, network logic, critical path, CPM Vs PERT, slack and floats. Game theory: Pure strategies and Mixed strategies. Application of software skill in Operations Research.

REFERENCE BOOKS

1. P.K. Gupta and D.S.Hira, S Chand, **Operations Research**, S Chand and company.
2. A.H. Taha, **Operation Research - An Introduction**, Macmillan Publishing Co.
3. W.D. Miller and M.K Starr ,**Executive Decisions and Operations Research**, Prentice Hall
4. Hillier and Lieberman, **Introduction of Operations Research**.
5. Ackoff and Sasiene, **Fundamentals of Operations Research**.
6. Jerry Banks, David M. Nicole, Barry L. Nelson, **Discrete-event system simulation**