**GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN**

department of information technology

MATHEMATICAL OPTIMIZATION

**Year 2017-18**

CLASS : IV IT FACULTY : DR. A.SUSEELATHA

**Course Outcomes**

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| **1** | Explaining the concept of mathematical modeling and developing a model. |
| **2** | Solving LPP using Graphical method, Simplex method, and duality. |
| **3** | Finding minimum transportation costs and applying assignment models in business and industry. |
| **4** | Explain the processing of jobs through different number of machines and solving queuing problems in single-channel and multiple-channel situations |
| **5** | Explaining inventory management, management decision making, project management and simulation techniques |
| **6** | Applying probability distributions and Markov process in different situations. |

**Lecture Schedule**

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| Unit | Lecture No. | Topic |
| UNIT - I | 1 | Introduction to Operations Research: Definition, Features, Types of models |
| 2 | Methodology, Limitations and Scope of Linear programming |
| 3,4 | Introduction, Formulation of LPP, Assumptions for solving LPP, Application of LPP |
| 5,6 | Graphical method of solving LPP |
| 7 | Handout 1 |
| UNIT-II | 8 | Steps in Solving problems using Simplex method, Principle of simplex method |
| 9,10,11 | Problems on Simplex method |
| 12  | Limitations of LPP, Concept of primal dual relationship |
| 13,14 | Formulation of the dual of the primal problem |
| 15,16 | Solution of LP problem using duality |
| 17 | Handout 2 |
| UNIT - III | 18,19 | General Transportation problem, The transportation table, LP formulation of a transportation problem, Duality in Transportation problem  |
| 20,21 | Solution of a transportation problem, finding initial basic solution: North West corner method, Least-Cost method, Vogel’s approximation method. |
| 22 | Test for optimality, Degeneracy in Transportation problem |
| 23 | MODI method |
| 24 | Stepping Stone Solution method |
| 25 | Unbalanced Transportation problem |
| 26 | Handout 3 |
| 27 | Assignment model: Definition, formulation |
| 28,29 | Hungarian assignment method |
| 30 | Handout 4 |
| UNIT - IV | 31 | Sequencing Problems: Introduction, Basic terms in sequencing, Types of sequencing problems, priority sequencing |
| 32,33 | Sequencing ‘n’ jobs through two machines |
| 34 | Processing ‘n’ jobs through ‘k’ machines |
| 35,36 | Two jobs 3 machines case |
| 37 | Handout 5 |
| 38 | Queuing theory: Introduction, Queuing systems. |
| 39, 40 | Single channel |
| 41 | Multiple channels |
| UNIT -V | 42, 43, 44 | Introduction to Inventory Management, objectives, developing a model |
| 45, 46 | EOQ model, problems |
| 47 | Introduction to PERT & CPM |
| 48 | Construction of networks |
| 49 | Calculation of EST, LST, EFT, LFT, drawing of networks and calculation of timings, critical path |
| 50 | Handout 6 |
| UNIT -VI | 51 | Introduction to simulation, applications, limitations |
| 52 | Monte Carlo simulation technique |
| 53 | Steps involved in use of simulation |
| 54 | Generating and using a random system |
| 55 | Simulation of Queuing system |
| 56 | Probability theory: Basic laws of probability, discrete and continuous random variables |
| 57 | Mean and variance of Binomial, Poisson, Normal distribution. |
| 58 | Markovian Process - applications |
| 59, 60 | Markovian Decision problems |

**TEXT BOOKS:**

1. Operations research, 2 Ed, Col D S Cheema, University Science Press, Lakshmi Publications.

2. Hamdy H. Taha, Operations Research -An Introduction, Pearson Education, 2003.

3. Taha Hamdy- Operations Research- An Introduction, Prentice-Hall, 7th Edition.

**REFERNCE BOOKS:**

1. Operations Research, Panneer Selvan, Prentice Hall of India.

2. Banks, J, Carson II J. S., Nelson B.L., and Nicol D.M. Discrete – Event System Simulation. Pearson Education Asia, 3rd Edition,

3. Principles of Operation Research (with applications to managerial decisions) – H.M Wagher, PHI, New Delhi.