

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-DSEB3**

**ELECTIVE-II / III: OPERATIONS RESEARCH**

**Inst.Hrs : 6**  
**Credits : 5**

**YEAR: III**  
**SEMESTER: VI**

**Learning outcomes:**

**Students will acquire knowledge in**

- Solving Linear Programming Problems.
- Sequencing the jobs to be carried out based on Cost Optimization.
- Solving assignment and transportation problems and Queuing Theory Models.

**UNIT I**

Linear programming: Formulation – graphical solution. Simplex method. Big-M method. Duality-primal-dual relation.

Chapter 6 Sections 6.1 – 6.13, 6.20 – 6.31

**UNIT II**

Transportation problem: Mathematical Formulation. Basic Feasible solution. North West Corner rule, Least Cost Method, Vogel's approximation. Optimal Solution. Unbalanced Transportation Problems. Degeneracy in Transportation problems.

Assignment problem: Mathematical Formulation. Comparison with Transportation Model. Hungarian Method. Unbalanced Assignment problems

Chapter 9 Sections 9.1 – 9.12 ,Chapter 8 Sections 8.1 – 8.5

**UNIT III**

Sequencing problem:  $n$  jobs on 2 machines –  $n$  jobs on 3 machines – two jobs on  $m$  machines –  $n$  jobs on  $m$  machines.

Game theory : Two-person Zero-sum game with saddle point – without saddle point – dominance – solving  $2 \times n$  or  $m \times 2$  game by graphical method.

Chapter 10 Sections 10.1 – 10.6 ,Chapter 12 Sections 12.1 – 12.15

**UNIT IV**

Queuing theory: Basic concepts. Steady state analysis of  $M / M / 1$  and  $M / M / S$  models with finite and infinite capacities.

Chapter 5 Sections 5.1 – 5.18

**UNIT V**

Network: : Project Network diagram – CPM and PERT computations. (Crashing excluded)

Chapter 13

Sections 13.1 – 13.10

**Content and treatment as in**

Operations Research, by R.K.Gupta , Krishna Prakashan India (p),Meerut Publications.

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**Reference:**

1. Gauss S.I. Linear programming , McGraw-Hill Book Company.
2. Gupta P.K. and Hira D.S., Problems in Operations Research ,S.Chand& Co.
3. KantiSwaroop, Gupta P.K and Manmohan , Problems in Operations Research,Sultan Chand & Sons.
4. Ravindran A., Phillips D.T. and Solberg J.J., Operations Research, John wiley & Sons.
5. Taha H.A. Operation Research, Macmillan pub. Company, New York.
6. Linear Programming, Transporation, Assignment Game by Dr.Paria, Books and Allied (P) Ltd.,1999.
7. V.Sundaresan,K.S. Ganapathy Subramaian and K.Ganesan, Resource Management Techniques, A.R Publications.

**e-Resources:**

1. <http://ebooks.lpude.in.operationsresearch>.
2. <https://ocw.mit.edu>.