| Course Number and Name |
|---|
| BMA701 & OPERATIONS  RESEARCH  FOR ENGINEERS |

| Credits and Contact Hours |
|---|
| 4 & 60 |

| Course Coordinator's Name |
|---|
| Dr.Ramya |

| Text Books and References |
|---|

**Text Books:**
1. Kanti Swarup, Gupta, P.K and Manmohan, "Operations  Research", Sultan  Chand  &  Sons 1997

**References:**
1   Handy A. Taha, "Operations  Research", 7thEdn. Prentice Hall of India.  2007.
2   Gupta and Hira  DS " Operations  Research",  S. Chand & Co, New Delhi, 2006
3.    http://www.nptel.ac.in/syllabus/111107064/

| Course Description |
|---|
| To impart knowledge about various tools in Operations Research to apply and solve real life problems in Engineering. |

| Prerequisites | Co-requisites |
|---|---|
| Numerical Methods | Nil |
| required, elective, or selected elective (as per Table 5-1) ||
| Required ||

| Course Outcomes (COs) |
|---|

CO1: Apply linear programming model and assignment model to domain specific situations.
CO2: Analyze the various methods under transportation model and apply the model for testing the closeness of their results to optimal results.
CO3: Apply the concepts of PERT and CPM for decision making and optimally managing projects
CO4: Analyze the various replacement and sequencing models and apply them for arriving at optimal decisions.
CO5: Analyze the inventory and queuing theories and apply them in domain specific situations.

| COs/SOs | a | b | c | d | e | f | g | h | i | j | k | l |
|---------|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H |   |   |   |   |   |   |   |   |   |   | M |
| CO2 | L |   | M |   | L |   | M |   | M | H |   |   |
| CO3 |   |   |   |   | H |   |   | H |   |   |   | L |
| CO4 |   | H | H |   |   |   |   | H | L | H |   |   |
| CO5 | M |   |   |   | H |   |   |   | M |   |   | H |

**Student Outcomes (SOs) from Criterion 3 covered by this Course**

**List of Topics Covered**

## UNIT – I     LINEAR PROGRAMMING                                     12

Introduction to phases of Operations Research – Linear programming – formulation of the problem – graphical method – simplex method – two phase method – Assignment problems – Transportation models – Vogel's approximation method – Modi method – unbalanced transportation problem – degeneracy in transportation models.

## UNIT – II     RESOURCE SCHEDULING AND NETWORKS                      12

Resource scheduling – Sequencing n jobs through 2 machines and 3 machines. Networks – PERT and CPM – Network diagrams – shortest route – minimum spanning tree – probability of achieving completion date – crash time – cost analysis – resource smoothing and resource levelling.

## UNIT – III    INVENTROY AND REPLACEMENT MODELS                      12

Inventory models- Types of Inventory and variables in the Inventory problem – deterministic models- Replacement models – Replacement of items that deteriorate with time – equipment that fails completely and their analysis – factors for evaluation of proposals of capital expenditures and comparison and alternatives – present value average investment – rate of return pay off period – individual and group replacement policy.

## UNIT – IV     QUEUEING MODELS                                       12

Queuing theory – queuing system and structure – Kendalls's notation– Poisson arrival and exponential service time – characteristic of queuing models – single channel and multiple models – simulation.

## UNIT –V      DECISION MODELS                                        12

Game theory –Saddle point-Maximin-Minimax principle-Two person zero sum games (mixed Strategies)-Graphical method for 2×n or m×2 games-Dominance Property-Oddment method.