GUJARAT TECHNOLOGICAL UNIVERSITY
CIVIL (TRANSPORTATION ENGINEERING) (13)
DECISION MODELS IN MANAGEMENT
SUBJECT CODE: 2721314
M.E. 2nd SEMESTER

Type of course : Major Elective - III

Prerequisite   : Nil

Rationale   :

The course is basics of making management decisions. The study of the course is important to understand the Quantitative methods for making any management decisions. The formulation of the linear and non linear problems is studied in the course, which may be useful to the student in the research work. It also includes understanding of basics of Queuing theory and models. The principles of transportation problems, their formulation are covered in the study. Various Optimization techniques are also included for the study. It is necessary to solve the various integer programming, dynamic programming, network models etc.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	0	4	70	30	30	0	10	10	150

Content:

Sr.No.	Topics	Teaching Hrs.	Module Weightage
1	Introduction: Quantitative methods for management decisions. Operation research. Decision environment, Decision making processes.	3	5%
2	Linear programming problems, graphical solution, non linear programming. Heuristics, Simplex method, duality, post optimality analysis; Primal and dual solution approaches; Sensitivity analysis, Unconstrained and constrained optimization, Kuhn- Tucker theory; Quadratic programming applications.	18	25%
3	Transportation and transhipment problems.	5	15%
4	Assignment problems.	5	15%
5	Queuing theory, Queuing Models, Markov decision processes; Applications to inventory management and Replacement processes.	5	15%
6	Discrete event simulation; Generation of random variables, simulation processes and languages.	2	5%
7	Network models. Shortest path method, maximum flow. Minimum spanning tree problem.	5	15%
8	Integer programming, goal programming, dynamic programming. Decision theory. Role of knowledge; Deterministic and probabilistic situation, Single and multiple person decision making.	2	5%

References:
1.   Rao S.S., Engineering Optimisation - Theory & Practice, New Age International Publishers, Revised Edition III, 2006.

2.	N.D.Vohra. Quantititative techniques in management, TMH, New Delhi, ISBN-0-07-451979-4
3.	Deightler, philips, wilde (phi), Foundations of optimization
4.	Ravindran, D.T.Philips and J.J.Solberg, Operations Research; Principles and Practice, John Wiley, 2nd Edition 1987
5.	S.Bazzarra, J.J.Jarvis and H.D.Sherali, Linear Programming and Network Flows, 2nd Edition , John Wiley, 1990
6.	L.Winston, Operations Research; Application and Algorithms, Kent P.W.S. 2nd Edition, 1991
7.	A.Taha, Operations Research; An Introduction, MacMillan, 1982
8.	Kapoor, Computer Assisted Decision Models, Tata McGrw-Hill, New Delhi, 1991

Tutorials:
1.	Problems based on linear programming, Simplex method and its varieties.
2.	Problems based on Non-linear programming.
3.	Solving Transportation, Transhipment and Assignment problems.
4.	Problems based on simulation.
5.	Problems based on shortest path method and minimum spanning tree.
6.	Problems based on Integer, goal, dynamic programming.
7.	Computer applications for solving above problems.

Course Outcomes:
1.	To give the concepts of quantitative methods for management decision and subsequently their applications in transportation engineering.
2.	To provide the basic understanding of simulation process and its applications in transportation engineering.
3.	To make students conversant with shortest path method

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website