Kadi Sarva Vishwavidyalaya, Gandhinagar

M.E. (Civil Infrastructure Engineering) Semester: III

(w.e.f. Academic Year 2017-18)

Subject Name: Operation Research in Construction Projects

Subject code: MECV302-N-A

A. Learning objectives:

- To introduce remote sensing and GIS as an important enabling tool for earth surface research problems and applications.
- To introduce the basics of remote sensing and GIS and the main satellite/sensors systems in use.
- To provide information of different engineering fields using remote sensing and GIS.

B. Teaching Scheme (Credits and Hours):

Teaching Scheme				Credit Scheme			Evaluation Scheme				
Lect (Hrs)	Tu (Hrs)	Prac. (Hrs)	Total (Hrs)	Theory	Pra/TW	Total	UE	IE	CIA	Prac/Viva	Total
03	02	00	05	03	02	05	70	30	20	30	150

C. Detailed Syllabus:

Unit No. **Topics**

1. **Introduction**
   Introduction to Operation Research history, nature, scope and phases of Operation Research, Classification of Operation Research models.
2. **Decision Theory**
   Decision strategies - decision under certainty - decision under risk - decision under uncertainty - formulation - decision criterion and decision under competitive situation
3. **Game Theory**
   Classification of games. Two - person, zero - sum games - formulation of pay off matrix-saddle points -games with pure strategies and mixed strategies - value of the game. Solution to 2 x 2 matrix, 2 x n matrix, m x 2 matrix and m x n pay-off matrix. Graphical method, algebraic method, linear programming methods. Guidelines to modelling an
   OR project.
4. **Linear Programming**
   General and standard forms of LPP, Formulation and solution methods - graphical solution - simplex method – dual simplex method, dynamic L.P, Transport and assignment models, Post - optimality analysis, Complications in LP problems and resolution, Queuing theory and waiting time - application to industries, Introduction to dynamic programming and network analysis, Monte - Carlo system simulations
5. **Case Studies**
   Developing mathematical models related to construction projects, Solution to problems using QSB computer package.

D. Lesson Planning:

Unit No.	Topics	Hours	Weightage (%)
1	Introduction	2	5
2	Decision Theory	12	27
3	Game Theory	12	27
4	Linear Programming	10	21
5	Case Studies	9	20
	Total	**45**	**100**

E. List of Tutorials

1. Decision Theory
2. Game Theory
3. Linear Programming
4. Case Studies

F. Instructional method and pedagogy **(Continuous Internal Assessment) (CIA)**

- Attendance is compulsory in lectures which carries 05 Marks.
- At regular intervals assignments is given to all students which carries 10 marks. Evaluation of these assignments will be observed under Daily Homework Daily Assessment (DHDA) System.
- One internal exam of 30 marks is conducted as a part of internal theory evaluation.

G. Students Learning Outcomes:

At the end of the course

- An understanding of various theory for Operation Research in Construction Projects.
- Application of programming methods in Operation Research in Construction Projects.

H. Text Books & Reference Books:

1. Theory & Problem of Operations Research by Richard Bronson, Schaum's Outline Series – Mc Graw Hill Book Co., 1983
2. Operations Research : An Introduction by Hamdy A. Taha - Maxwell Macmillan International Edition - IV Edition - 1989
3. Operations Research for Management by G.V. Shenoy, U.K. Srivastav, S.C. Sharma - Wiley Eastern Limited - 1988
4. Operations Research for Management by M.P. Gupta, J.K. Sharma-National Publishing House - 2nd Edition - 1987
5. Operations Management by John O. Mcclain and Joseph Thomas - Prentice Hall of India Private Limited, New Delhi - 1987
6. Quantitative Methods and Operations Research by R.C. Gupta - CBS Management Series - 1986
7. Quantitative Techniques in Management by Vohra -Tata McGraw Hill Book & Co.
8. Rea's Problem Solver - Operation Research - Research & Education Association Publication.