

(ELECTIVE – C/II)
4/4 B.Tech. SEVENTH SEMESTER

CE7T6C

WATER RESOURCES SYSTEM PLANNING

Credits: 3

Lecture: 3 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Objectives:

- To get aware of the procedures and usefulness of application of linear and dynamic programming in water resources management and optimization.

Learning outcomes:

At the end of course the student will have:

- Understanding of systems approach to water resources planning and management
- Ability to apply optimization models for water resources engineering.

UNIT – I

INTRODUCTION:

Concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models, objective function and constraints, types of optimization techniques.

UNIT – II

LINEAR PROGRAMMING IN WATER RESOURCES-I:

Formulation linear programming models, graphical method, simplex method, application of linear programming in water resources.

UNIT – III

LINEAR PROGRAMMING IN WATER RESOURCES-II:

Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT – IV

DYNAMICS PROGRAMMING IN WATER RESOURCES:

Belman's of principles of optimality forward and backward recursive dynamic programming, case of dimensionality, application of dynamic for resource allocation.

UNIT – V

NON-LINEAR OPTIMATIZATION TECHNIQUES:

Clerical of method optimization, Kuch-Tucleer, gradential based research techniques for simple unconstrained optimization.

UNIT – VI

SIMULATION:

Application of simulation techniques in water resources.

UNIT – VII

WATER –RESOURCES ECONOMICS:

Principles of Economics analysis benefit cost analysis socio economic intuitional and pricing of water resources.

UNIT – VIII

WATER RESOURCES MANAGEMENT:

Planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, and conjunctive use of surface and sub-surface water resources.

Learning resources

Text books:

1. Water Resources System Analysis by Vedula and Mujumdar, Tata McGraw-Hill. 2005.
2. Water Resources Economics by James and Lee, Oxford Publishers, 2005.

Reference books:

1. Bhave, P.R. Optimal design of water distribution networks, Narosa Publishing House, 2003.