4/4 B.Tech. SEVENTH SEMESTER

CE7T5C   **WATER RESOURCES SYSTEM PLANNING**   **Credits: 3**

Lecture: 3 periods/week   **Internal assessment: 30 marks**

Tutorial: 1 period /week   **Semester end examination: 70 marks**

Pre-requisites: Mathematics, water resources engineering

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

Course outcomes:

At the end of course the student will have:
1. Understanding of systems approach to water resources planning and management
2. Capability to apply linear programming in water resources
3. Capability to apply dynamic programming in water resources
4. Ability to apply optimization models for water resources engineering.
5. Knowledge in water management practices

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

Formulation linear programming models, graphical method, simplex method, application of linear programming in water resources. Revised simplex method, duality in linear programming, sensitivity and past optimality analysis.

UNIT – III

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 – IV

NON-LINEAR OPTIMATIZATION TECHNIQUES

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

SIMULATION

Application of simulation techniques in water resources.

UNIT – V

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.

<u>Learning resources:</u>
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.

e-learning resources:
http://nptel.ac.in/courses.php
http://jntuk-coeerd.in/

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