

Course title	Water resources planning and management								Course No	CE5480			
Department	Civil Engineering	New	L	T	E	P	O	C	Old	L	T	P	C
		Credits	4					8	12	Credits	4		
Offered for	M.Tech								Status	Modified			
Faculty	K. Srinivasan, S. Mohan, Balaji Narasimhan								Type	M.Tech. Core			
Pre-requisite	None								To take effect from	Jan 2021			

Objectives:

The aim of the course is to teach different methods for planning, developing, and managing the limited water resources in a sustainable manner.

- 1) To learn how to assess surface and ground water resources.
- 2) To learn how to develop suitable plans for water resource development and management.
- 3) To learn the principles of integrated water resources management.
- 4) To learn the optimization techniques in water resources planning and management.

Course Contents:

- 1) Introduction: history of water resources development, water resources of India, problems and perspectives, conceptual framework.
- 2) Economics of Water resources planning: benefit-cost analysis of water resources projects, supply and demand, aggregation of demand, market equilibrium, optimality conditions, willingness to pay, water pricing.
- 3) Water Law: riparian rights, groundwater ownership, prior appropriation.
- 4) Uncertainty and risk analysis in Water Resources Planning: methods of uncertainty analysis and application to design and operation of hydrosystems.
- 5) Systems Analysis: systems concepts, conventional and evolutionary optimization techniques, simulation-optimization models, applications to water resources planning and management.
- 6) Planning, design and management of water supply, irrigation, and hydropower systems.
- 7) Flood mitigation and management: structural and nonstructural measures, flood damage estimation, optimal flood mitigation plan.
- 8) Ground water management, conjunctive use of surface and ground water systems.
- 9) Water quality management in rivers and streams.
- 10) Optimal planning and operation of single and multiple reservoirs, planning and development of multipurpose projects, decision support systems for water resources management, sustainable development of water resources.
- 11) Use of GIS in Water Resources Planning.

Text Books:

- 1) Mays, L.W. Water Resources Engineering. John Wiley & Sons, 2010.
- 2) Loucks, D.P. et al. Water resources systems planning and management: an introduction to methods, models and applications. UNESCO pub., 2005.
- 3) James, L.D. and Lee, R.R. Economics of Water Resources Planning, 1971.
- 4) S. Vedula and P. P. Mujumdar, "Water Resources Systems Modelling Techniques and Analysis," Tata-McGraw Hill, New Delhi, 2005.
- 1) Jayawardena, A. W. Environmental and hydrological systems modelling. CRC Press, 2013.
- 2) Labi, S. Introduction to Civil Engineering Systems: A Systems Perspective to the Development of Civil Engineering Facilities. John Wiley & Sons, 2014.
- 3) Arora and Jasbir Singh. Introduction to optimum design. Elsevier, 2004.
- 4) Taha, H.A. Operations research: an introduction. Pearson Education India, 2004.