

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	ESD404	Water Resource Planning and Management	3	0	0	9

Course Objective

- The objective of the course is to understanding of the engineering of water resource systems in general and urban hydrologic systems in particular.
- To incorporate analytical abilities into the planning and design of water resource systems.

Learning Outcomes

Upon successful completion of this course, students will:

- The students will be able to understand the water resources planning and design problems with an emphasis on intelligent engineering decision making.
- The students will learn about different types of Hydraulic structures like spillways, dams, diversion head works, regulator.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Water Resources: Introduction, hydrological cycle, World water distribution, need for conservation & development of water resources. Precipitation: measurement of rainfall, Index of wetness, Design of rain gauge network, Probable maximum precipitation curve.	12	The knowledge of concepts of hydrological study and water resource conservation and development.
2	Infiltration: Infiltration Capacity Curve, Measurement & estimation of water losses, Runoff cycle, Runoff coefficients, Computation of runoff: unit hydrograph, Bernard's distribution, Unit Storm Method, Evapotranspiration.	4	The knowledge regarding infiltration behaviour and its uses in estimation of water losses runoff, percolation and evapotranspiration.
3	Stream: Stream Flow Measurement, Notches, Weirs, control meters, Ventur-Flumes, Velocity area method, Slope area method. Reservoir-Types of reservoirs, Storage zones, Catchment yield & reservoir yield, Reservoir capacity, mass curve of inflow and outflow. Reservoir sedimentations and losses, Selection of sites for a reservoir, economic height of dam, Hydrological reservoir routing-Trial and Error method, Modified Pu's method and Goodrich method.	11	The information regarding stream measurement, reservoir and different hydrological reservoir method.
4	Recharging of underground storage, infiltration galleries, infiltration wells, springs, Floods flows and management; Definition and causes of flood, estimation of design flood and flood flows for design of hydraulic structures, Flood control measures, Flood routing.. Groundwater hydrology.	8	The knowledge about recharging of groundwater through recharging structure and its management aspects.
5	Aquifer; porosity, permeability, measurement of yield, Laws of groundwater movement: Darcy's law, Thieme's equilibrium formula, Dupuit's formula etc. Water resources planning & management: Impact of climate change on water resources.	7	The information regarding aquifer and its characteristics along with its planning and management.

Text Books

- Water Resources Engineering- Larry W. Mays, John Wiley and Sons, Mc Graw Hill.
- Hydrology and Water Resources Engineering- S.K. Garg, Khanna Publishers

Reference Books

- Water Resources Engineering - Ray K Linsley, Joseph B Franzini, David L Freyberg, George Tchobanoglous, Mc Graw Hill.
- Hydrology- M.M. Das, M.D. Saikia, PHI Learning Pvt Ltd., New Delhi.