

# WATER RESOURCES DEVELOPMENT

## COURSE CONTENTS

SI No	Particulars	Contact Hours
L-1	Government Hydropower policies and issues, SWOT-(Strength weakness opportunity threatening) of hydropower projects, type of clearance required for Hydropower project, master plan, topography, catchments area, types of streams, allotment of site-(Open bid, MoU, Joint venture).	2.5
L-2	Survey & investigation, PFR-(Pre-feasibility report), DPR (Detailed Project Report), Process of development of site (announcement, allotment, clearance, agreement, commissioning). Types of survey-Topographical, metrological, hydrological, ecological, geological. Arial Rainfall Measurement, Type of flow measurement Devices-(Notch, weir, flume), dilution method, and Flow duration curve (important), flood-discharge estimation kripitech formula, dickens formula, English formula, hydrograph, unit hydrograph.	2
L-3	Financial institution, SOI Map etc., Cost/ Estimation – wheeling charges, Banking; Moratorium, PPA(Power purchase agreement), SERC-(State electricity regulatory commission) Hydrological cycle.	1
L-4	Water Resources Planning- Water Resources in India Purpose & Classification of Water Resources Development Projects, Functional Requirements of Multipurpose Projects, Strategies for the Future.	1
L-5	Hydrology-Hydrologic Cycle, Precipitation, Runoff, Hydrograph Analysis	1.5
L-6	Precipitation & Precipitation Losses-Form & Types of Precipitation, Rainfall in India, Measurement of Rainfall, Design Storm, Evaporation & its Estimation, Reducing Reservoir Evaporation, Evapotranspiration, Interception, Storage in Depression, Infiltration, Watershed Leakage.	1.5
L-7	Ground Water- Subsurface Zoning, Water Bearing Material, Aquifers, Steady, unsteady & Ground Water Flow. Well Hydraulics, Well Losses, Stream & Seawater Intrusion, Groundwater Investigation.	2.5
L-8	Stream Flow-Terminology, Factors Influencing Runoff, Runoff Computation, Runoff Simulation Models, Storage, Discharge Measurements	2
L-9	Hydrographs-Concepts & Components, Unit Hydrograph, S-Hydrograph, Distribution Graph.	1.5
L-10	Design Floods-Introduction, Design Floods, Flood Estimations, Analysis of Regional Flood Frequency	1.5
L-11	Reservoir Planning & Dam Planning- Investigation Site Selection, Zones of Storage, Storage Capacity, Sedimentation & Control, Single & Multipurpose Reservoir, Flood Routing. Classification of DAMS, Factors Influencing Selection of Dam, Site Selection.	3
L-12	Spillways & Diversion Headworks-General, Types, Energy Dissipation, Indian Standards Criteria, Gates, Outlet works. Diversion Headwork Components, Weirs, Khoslas Theory, Silt Control, Site Selection, Effect of Weir on Regime of River.	2
L-13	Water Power Engineering – General, Classifications, Principle Components, Site Selection of Hydro-Power Plants, Turbines Power House, Water Power Potential Assessment, Design of Hydel Channel.	2
L-14	Remote Sensing Application on Water Resources – Preliminary Concepts	1