

7th Semester	RCI7D006	Water Resource Engineering	L-T-P 3-0-0	3 Credits
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Module-I: (06 hours)

Introduction - Hydrologic cycle and significance of its components; Clouds, Precipitation, interception, evaporation, evapo-transpiration, depression storage, infiltration, Interflow and surface runoff.

Precipitation - Measurement of precipitation, rain gauge network, adequacy of Rain gauge station, Test for consistency of record, Estimation of missing data, Mean precipitation over an area, depth-area-duration relationships, maximum intensity/depth-duration-frequency relationship

Module-II: (08 hours)

Runoff: Runoff characteristics of streams, Catchment characteristics, Rainfall-Runoff Correlation, runoff volume: empirical equations, SCS-CN method of estimating runoff volume, flow duration curve, flow-mass curve,

Reservoir Planning: capacity of reservoirs, Calculation of storage Volume of reservoir from mass curve, Maintainable demand, Variable demand, Sequent Peak Procedure

Module-III: (08 hours)

Hydrograph: factors affecting runoff hydrograph, components of hydrograph, base flow separation, effective rainfall, unit hydrograph: derivation, limitations, different duration, Synthetic unit hydrograph, IUH.

Flood:flood estimation, Rational Method, Empirical formula, frequency analysis, Flood Routing, Reservoir routing and Channel routing,

Module-IV: (08 hours)

Drought: Definition and Classification, Methods of Water Harvesting, Environmental flow, Environmental flow assessment

Open Channel Flow: Classification of flows, Velocity Distribution, Equation of continuity, energy equation, momentum equation, energy-depth relations, Specific Energy, Critical depth and its computation, critical, subcritical, supercritical flow,

Module- V: (10 hours)

Open Channel flow: Uniform flow, Chezy'sKutter's equation, Manning's Formula, Most economical Section, Non-uniform flow, Gradualvaried flow, classifications of flow profiles, Controlled sections; Rapidly Varied flow, Hydraulic jumps

Books:

- [1] Engineering Hydrology, K Subramanya, McGraw Hill.
- [2] Applied Hydrology, K N Muthreja, Tata McGraw Hill.
- [3] Flow in Open Channels, K Subramanya, McGraw Hill
- [4] Open Channel Hydraulics, VenTeChowMcGraw Hill Book Company
- [5] Water Resources Engineering, L W Mays, Wiley.
- [6] Engineering Hydrology, C S P Ojha, R Berndtsson and P Bhunya,, Oxford.
- [7] Hydrology and Water Resources Engineering by K. C. Patra, Narosa Publishing House, New Delhi