

AMCE21 IRRIGATION ENGINEERING

UNIT-1 INTRODUCTION TO HYDROLOGY

1.1 Introduction, Water Resources, Hydrologic Cycle, Scope and Applications of Hydrology

UNIT-2 PRECIPITATION

- 2.1 Types of Precipitation, Precipitation in India, Forms of Precipitation, Measurement of Precipitation, Types of rain Gauges, Modern Methods of measurement of Precipitation,
- 2.2 Optimum Number of Rain gauge Stations, Statistical Method of Determination of Optimum Number of Rain Gauges, Estimating Missing Rainfall Data,
- 2.3 Double Mass Curve Analysis, Representation of Rainfall Data, Intensity Duration and Depth-duration Frequency Curve, Depth Area Duration Analysis,
- 2.4 Determination of Average Precipitation over an area, Illustrative Problems

UNIT-3 ELEMENTARY CONCEPTS OF EVAPORATION AND INFILTRATION

- 3.1 Evaporation and Factors affecting Evaporation, Measurement of Evaporation, Methods of Reducing Evaporation from Lakes or Reservoirs, Evaporation from Land surfaces,
- 3.2 Transpiration, Evapotranspiration, Infiltration, Methods of Determining Infiltration Rate, Infiltration Capacity Curve, Infiltration Indices, Illustrative problems
- 3.3 STREAM GAUGING: Selection of site, Determination of River stage, Stream flow measurements, Stage-Discharge curve

UNIT-4 RUNOFF

- 4.1 Run off and its Classification, Factors Affecting Runoff, Rainfall-Runoff Relationship, Methods of Estimating Runoff, Hydrograph, Factor Affecting Shape of Hydrograph,
- 4.2 Methods of Base Flow Separation, Unit Hydrograph, S-Curve or S-Hydrograph, Synthetic Unit Hydrograph, Estimation of Peak floods

UNIT-5 INTRODUCTION TO IRRIGATION

- 4.1 Functions and Necessity of irrigation, Advantages of Irrigation, Disadvantages of Irrigation, Irrigation Development and present status in India

UNIT-6 WATER REQUIREMENTS OF CROPS

- 6.1 Soil classification, Soil moisture and water requirements of crops, Water requirements of crops: Definition of terms, Factors affecting duty of water, Crop seasons in India,
- 6.2 Crop seasons in Maharashtra, Water Requirements of crops, Definitions of some terms, Optimum Crop Requirements, Command Areas,
- 6.3 Computations of capacity of the canal, Irrigations of Efficiencies, Illustrative Problems

UNIT-7 RESERVIOR PLANNING

- 7.1 Types of Reservoir, Types of Developments, Investigations for Reservoir Planning, Selection of suitable site for a Reservoir, Zones in the Reservoir storage,

- 7.2 Reservoir Storage Capacity and yield, Computation of Reservoir Capacity for a specific yield, Safe yield from a Reservoir of Given capacity, Reservoir sedimentation,
- 7.3 Determination of useful Life of Reservoir, Flood Routing, Selection of Dam site and Economic Height of Dam, Reservoir Losses, Multipurpose Reservoir Planning, Flood Routing,
- 7.4 Benefit Cost Ratio Analysis, Apportionment of Total cost of a Multipurpose Reservoir, Application of Optimization techniques: Systems Approach,
- 7.5 Economics of Reservoir planning, Illustrative Problems

UNIT-8 GROUND WATER HYDROLOGY

- 8.1 Occurrence of Ground Water, Definition of Terms, Divisions of Sub-surface Water, Types of Aquifer, Movement of Ground Water, Hydraulics of Well,
- 8.2 Determination of Coefficient of Transmissibility, Well Losses, Specific Capacity of Wells and Efficiency of Well, Well Irrigation, Tube Wells, Construction of Tube Wells,
- 8.3 Well Completion and its Maintenance, Well Shrouding and Well Development, Radial Wells or Collectors, Comparison Between Well Irrigation and Canal Irrigation system

UNIT-9 WATER LOGGING AND LAND DRAINAGE

- 9.1 Effects of Water Logging, Causes of Water Logging, Remedial Measures Drainage of Irrigation Land, Advantages of Tile Drains Over Open Drains, Merits of Tile Drains, Spacing and Depth of Tile Drains, Reclamation of Land
- 9.2 LIFT IRRIGATION SCHEMES: Planning of Lift Irrigation Schemes, Contour Survey of the area, Component parts of Lift Irrigation Schemes, Classification of Lift Irrigation Schemes, Design Criteria, Determination of Water rates

UNIT-10 APPLICATION OF WATER

- 10.1 Basic functions of Irrigation water, Methods of applying Irrigation water, Modern methods of irrigation system, Distribution of water, Rotational application, Water management
- 10.2 ASSESSMENT OF LANAL REVENUE: Considerations for determining the water charges, Criteria for fixing water charges, Methods of Assessment

Reference Books:

1. Drainage Engineering by Luthin J N
2. Irrigation -Theory and Practice by Michael A M
3. Irrigation Engineering by Gurcharan Singh