

31074 WATER RESOURCES MANAGEMENT

DETAILED SYLLABUS

Unit 1

1.1 INTRODUCTION Water resources – world water inventory - Importance of water resources - Necessity for conservation and development of water resources – water resources of India - water resources management - purpose - factors involved in water resources management.

1.2 HYDROLOGY Introduction – Definition -Application of Hydrology in engineering - Hydrological cycle - Precipitation – forms of Precipitation - measurements of rain fall - Rain gauge - types of rain gauges - rain gauge network – mean rainfall over a drainage basin – methods - Radar and Satellite Measurements of rainfall - runoff - Estimation of runoff - losses – Hydrograph – Unit Hydrograph - uses

Unit II

2.1 GROUND WATER

Ground water resources- zones of Ground water-Aquifer - types- terms used – porosity, permeability, yield, specific yield, specific retention, coefficient of storage, specific capacity – Darcy's law- measurement of yield of well -pumping test-recuperation testground water exploration –geo physical methods -Electrical resistivity method – seismic resistivity method- logs.

2.2 MANAGEMENT OF GROUND WATER

Concept of basin management - Ground water basin investigations - data collection and field work -mining yield - perennial yield - salt balance - basin management by conjunctive use - artificial recharge of Ground water - recharge methods.

Unit III

3.1 RIVERS AND RIVER TRAINING WORKS

Classification of river - Major rivers in India and Tamil Nadu - Inter linking of rivers in India and its importance – flood - flood forecasting - flood control in India. River training - objectives of river training - classification of river training - methods of river training – levees - guide banks – spurs – types - artificial cut-offs – launching apron - pitching of banks - pitched islands - miscellaneous methods.

3.2 STORAGE WORKS

Surface storage - purpose of surface storage – tanks – types - tank weirs – tank outlet – reservoirs – types - storage capacity of reservoir - methods of determination of storage capacity of reservoir – reservoir losses – dams - classification of dams - selection of dam site - Earth dams – types - methods of construction- causes of failure of earth dam - remedial measures – spillway - types - spillway crest gates-types – sluiceway – types

Unit IV

4.1 DISTRIBUTION WORKS

Irrigation Canal - Typical cross section of canal - components of canal section - classification of canal -alignment of canal - canal head works – types - components of diversion head works - cross drainage works – types - canal losses - lining of canal – necessity - types of lining.

4.2 MANAGEMENT OF CANAL IRRIGATION

Canal irrigation system - Need for canal irrigation management - objectives of canal irrigation management - methods of improving canal irrigation management - cropping pattern - need for crop rotation - crop water requirement - water delivery system - irrigation scheduling - frequency of irrigation - optimum use of irrigation water - irrigation efficiencies - conservation of water on the field - farmer's participation - irrigation manager.

Unit V

5.1 WATER SHED MANAGEMENT

Water shed - classification of water sheds - integrated approach for water shed management - role of remote sensing and GIS in water shed management - soil and water conservation – Necessity - soil erosion – causes - effects – remedial measures against erosion - contour bunding - strip cropping - bench terracing – check dams - vegetated water way – afforestation - crop residue - land drainage - surface drains - sub surface drains.

5.2 WATER HARVESTING AND RECYCLING

water harvesting - runoff collection - onsite detention basin - ponds - types - Seepage control – methods -evaporation control - Recycling of harvested water - waste water recharge for reuse – methods -water logging-remedial measures-soil reclamation.

Reference Book: Santhosh Kumar Garg, Hydrology and water resources engineering, khanna publishers, Delhi.