COURSE TITLE : WATER RESOURCES ENGINEERING
COURSE CODE : 5010/4140
COURSE CATEGORY : E
PERIODS/WEEK : 4
PERIODS/SEMESTER : 72
CREDITS : 4

TIME SCHEDULE

MODULE	TOPIC	PERIODS
I	Surface and ground water resources	17
	Test I	1
II	Hydrology and hydrology cycle	17
	Test II	1
III	Planning of irrigation schemes	17
	Test III	1
IV	Ground water and river Engineering	17
	Test IV	1
	TOTAL	**72**

Rationale

Today about 700 million people live in countries experiencing water stress or scarcity. By 2035, it is projected that 3 billion people will be living in conditions of severe water stress. Many countries with limited water availability face the increasing risk of scarcity water resources and the conflicts there on. While considering this situation, water resources engineering is gaining more relevance than ever before and it is essential for the technicians to acquire more field related knowledge in this subject. Accounting the above facts this subject study aims acquiring a basic knowledge on all aspects of water resource management in brief.

OBJECTIVES

MODULE - I

1.1.0 Familiarize with Surface and ground water resources

1.1.1 Explain the different sources of water in India
1.1.2 Understand the National water policy
1.1.3 Identify the different water supply projects
1.1.4

MODULE - II

2.1.0 Understand Hydrology and hydrologic cycle

2.1.1 Explain the hydrologic cycle
2.1.2 Explain the terms like precipitation evaporation and transpiration
2.1.3 Understand the computing methods of precipitation evaporation and transpiration
2.1.4 Identify the terms catchment area, runoff, rain gauges

2.1.4.1 Understand the factors affecting run off

2.1.5 Understand the water loss by infiltration and its measurement.

MODULE – III

3.1.0 Water Management Conservation system

3.1.1 Understand the need for conservation of water and management
3.1.2 Identify the different methods of water conservation systems and the role of forest.
3.1.3 Understand the rain water collection and storage system.
3.1.4 Understand ground recharge system
3.1.5 Understand river water storage by check dams

3.2.0 Drought and Flood Management

3.2.1 Familiarize the terms drought and flood
3.2.2 Understand the method of drought and flood management

MODULE – IV

4.1.0 Ground water and river Engineering

4.1.1 Understand the distribution of water distribution
4.1.2 Explain the different types of Aquifers
4.1.3 Explain the different types of wells
4.1.4 Understand briefly the different types of river training works
4.1.5 Understand the different types of reservoirs with their storage capacity

CONTENT OUTLINE

MODULE I

Surface and Ground Water Resources

Water resources survey –water resources in India - Rainfall distribution in India - Description of water resources planning-National water policy. Planning arrangements for drinking water supply project - irrigation water supply project, hydropower generation project and flood control project - Water Quality management-fresh water management-recycling and reuse of water.

MODULE II

Hydrology-Hydrologic cycle

Precipitation, Evaporation and Transpiration**,** The factors causing- precipitation, evaporation and transpiration - estimation of evaporation – water budget method – IMD Land plan -computing precipitation –hyetograph-mass curve method-inflow outflow method for evapotranspiration. The means of measuring rainfall-catchment area - runoff - factors affecting runoff-Rain gauges-water losses-Infiltration-measurement by double ring infiltrometer

MODULE III

Water Management Conservation system: Water conservation and management-surface water, rain water and ground water. Methods for improving percolation of water – Role of forest in conserving water – Rain water harvesting systems – Roof water collection system – Surface runoff collection – Ground recharge – Rain pits – Terracing – Contour bunding – Check Dams – Functions and Construction details.

Drought and Flood Management: Drought and floods ~ Drought and flood affected regions of India ~ Definition of drought ~ Tackling drought through water management ~ Flood management measures.

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MODULE IV

Ground water and river Engineering

Groundwater –vertical distribution of groundwater-Types of aquifer-Aquifer properties-Darcy's law-Steady radial flow to a well-unconfined and confined aquifers-Types of wells-open well, artesian well and tube well-Estimation of yield of an open well-Types of tube wells (only description, no design)

River Engineering-meandering-river training –objectives, classification, river training methods-levees, guide banks, groynes, artificial cut-offs, pitching, pitched islands (Design not necessary).

Reservoir-various types-zones of storages

REFERENCES:

1.. B.C.Punmia & BB Pande,''Irrigation and Water Power Engineering'', LaxmiPublications (P) Ltd.

2. K.Subramanya,''Engineering Hydrology'', Tata Mc Graw Hill Series, New Delhi..

3. P.N.Modi and S.M.Seth ,''Irrigation Engineering''-,S.B.H Publishers and Distributors, New Delhi.

4. M.J.Deodhar, "Elementary Engineering Hydrology" – Pearson education -Delhi