

AMEV-17 HYDROLOGY AND WATER RESOURCES ENGINEERING

OBJECTIVES:

To introduce the student to the concept of hydrological aspects of water availability and requirements and should be able to quantify, control and regulate the water resources.

UNIT I PRECIPITATION AND ABSTRACTIONS

Hydrological cycle- Meteorological measurements - Requirements, types and forms of precipitation - Rain gauges-Spatial analysis of rainfall data using Thiessen and Isohyetal methods-Interception - Evaporation. Horton"s equation, pan evaporation measurements and evaporation suppression - Infiltration-Horton"s equation - double ring infiltrometer, infiltration indices.

UNIT II RUNOFF

Watershed, catchment and basin - Catchment characteristics - factors affecting runoff - Run off estimation using empirical - Strange"s table and SCS methods - Stage discharge relationships- flow measurements- Hydrograph - Unit Hydrograph - IUH

UNIT III FLOOD AND DROUGHT

Natural Disasters-Flood Estimation- Frequency analysis- Flood control- Definitions of droughts-Meteorological, hydrological and agricultural droughts- IMD method-NDVI analysis- Drought Prone Area Programmed (DPAP)

UNIT IV RESERVOIRS

Classification of reservoirs, General principles of design, site selection, spillways, elevation - area - capacity - storage estimation, sedimentation - life of reservoirs - rule curve

UNIT V GROUNDWATER AND MANAGEMENT

Origin- Classification and types - properties of aquifers- governing equations - steady and unsteady flow - artificial recharge - RWH in rural and urban areas

OUTCOMES:

The students completing the course will have

- an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments,
- ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge
- ability to conduct Spatial analysis of rainfall data and design water storage reservoirs

TEXT BOOKS:

- Subramanya .K. "Engineering Hydrology"- Tata McGraw Hill, 2010
- Jayarami Reddy .P. "Hydrology", Tata McGraw Hill, 2008.
- Linsley, R.K. and Franzini, J.B. "Water Resources Engineering", McGraw Hill International Book Company, 1--5.

REFERENCES:

- David Keith Todd. "Groundwater Hydrology", John Wiley & Sons, Inc. 2007

Ven Te Chow, Maidment, D.R. and Mays, L.W. "Applied Hydrology", McGraw Hill International Book Company, 1--8.
Raghunath .H.M., "Hydrology", Wiley Eastern Ltd., 1--8.