Hydrology and Water Resource Management

01CI1501

Objective of the Course:

- To demonstrate the process for measurement of precipitation, infiltration, Evaporation
- To understand of construction of hydrograph, unit hydrograph and S-Hydrograph
- To impart the methodology for estimation of peak floods.
- To introduce flood management techniques.

Credit Earned: 02

Student's learning outcomes:

After successful completion of the course, it is expected that students will be able to,

1. Calculate average rainfall over a drainage basin using Isohyet method.
2. Determine rate of evaporation of the water and rate infiltration of the soil using suitable methods.
3. Obtain the runoff from a catchment using unit hydrograph.
4. Compute the discharge from bore well using Dupuit and Thiem theory.
5. Estimate the highest flood flow in the river using flood frequency analysis method.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Term Work (TW)	
02	00	00	02	50	30	20	-	-	100

Detailed Syllabus

Sr. No	Topic name	Hours
1	**Hydrology**	07
	1.1 **Precipitation:** Forms, type & formation of precipitation, measurement of rainfall, interpretation of rainfall data, estimating missing data, double mass curve, average rainfall over area,	4

	1.2 **Evaporation:** Evaporation and its Measurement	1
	1.3 **Infiltration:** factors affecting infiltration and its measurement	2
	1.4 **Stream flow:** its measurement & Data telemetry	1
2	**Hyetograph and Hydrograph Analysis**	**07**
	2.1 Introduction and construction of hydrograph	1
	2.2 Water shed characteristic, factors affecting runoff	1
	2.3 Hydrograph perception, its components, Factors affecting hydrograph assumptions and limitation of unit hydrograph, Derivation of unit hydrograph and application of Unit Hydrograph,	3
	2.4 S-hydrograph and its application,	1
	2.5 Flow duration curve	1
3	**Ground Water hydrology**	**05**
	3.1 Groundwater formation and occurrence, Types of aquifers, aquifer parameter,	2
	3.2 Ground Water movement –Darcy's Law, Well Hydraulics, Well losses, yield of well, constant level pumping test and Recuperation Test	3
4	**Flood Management**	**02**
	4.1 Historical flood in Indian Rivers, Causes of floods,	1
	4.2 Flood mitigation measure, flood damage analysis	1
5	**Hydrologic Data Analysis**	**07**
	5.1 Flood estimation method,	1
	5.2 Design flood, Flood Frequency Analysis,	3
	5.3 Flood routing through reservoir and channel routing	2
	5.4 Types of Hydrological Simulation model	1
	TOTAL	**28**

Key Equipments: Symons's Rain Gauge, Float Type Automatic Rain gauge, Pan Evaporimeter, Double Ring Infiltrometer, Digital Current Meter

Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve an effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
10%	25%	40%	15%	10%	0%

Instructional Method and Pedagogy:

1. Prerequisite of the course and its pattern shall be discussed on the commencement of the course.
2. Lectures shall be conducted in class room using various teaching aids.
3. Presence in all academic sessions is mandatory which shall carry 5% marks of the total internal evaluation.
4. At the end of each unit/topic an assignment based on the course content shall be given to the students which shall carry 5% weightage for timely completion and submission of the assigned work.
5. The demonstrate the process of measuring the hydrological parameters that it covers the practical aspects of the course contents. It shall bring the clarity of the theoretical concepts among the students during the academic sessions

Recommended Study Material

1. K. Subramanya, Engineering Hydrology, Tata McGraw Hill Pub. Co. New Delhi.
2. Ven Te Chow, D.R. Maidment and L.W Mays, Applied Hydrology, McGraw Hill International Edition, New York
3. R.A. Wurbs and W.P. James, Water Resources Engineering, Prentice Hall of India, New Delhi.
4. R.K. Sharma and T.K. Sharma, Hydrology and Water Resources Engineering, Dhanpatrai Publications, New Delhi.
5. S. K. Garg, Hydrology and Water Resources Engineering; Vol. I, Khanna Publishers