SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology
Civil Engineering

B. Tech. III Semester V

Subject Name : Hydrology and Water Resource Management **Subject Code:** BTCL13504
Type of course : PCC
Prerequisite : -
Rationale : To develop basic understanding about precipitation, infiltration, evapotranspiration, hydrograph, capacity of reservoir. To enable the students for estimation of runoff, infiltration, evaporation, floods and reservoir capacity. To create understanding about features of various types of dam.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
2	0	2	3	60	25	15	30	20	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	**Module 1: Surface Water Hydrology: Hydrological Process** Introduction to Hydrology, Hydrological cycle and application of hydrology. Precipitation, Types of Precipitation, measurement, analysis of Precipitation data, mass rainfall curves, intensity-duration curves, and concept of depth area duration analysis, frequency analysis. Elementary concepts of evaporation, transpiration, evapotranspiration and infiltration.	**08**	**24 %**
2.	**Module 2: Surface Water Hydrology** Selection of site, various methods of discharge measurements, Runoff- Factors affecting runoff, rainfall- runoff relationships, runoff hydrograph, unit hydrograph theory, S-curve hydrograph, synthetic unit hydrograph, use of unit hydrograph	**09**	**26 %**
3.	**Module 3: 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 Programme (DPAP)	**04**	**14 %**
4.	**Module 4: Reservoirs** Reservoirs- Types, capacity of reservoirs, yield of reservoir, reservoir regulation, sedimentation, economic height of dam, selection of suitable site.	**05**	**16 %**

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5.	**Module 5 : Groundwater And Management** Origin- Classification and types - properties of aquifers- governing equations – steady and unsteady flow - artificial recharge - RWH in rural and urban areas	**04**	**20 %**

Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
15	20	15	20	20	10

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels **(Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Text Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Engineering hydrology	K.Subramanya	Tata McGraw-Hill, New Delhi ISBN-10 1259029972 ISBN-13 978-1259029974	1984	4th
2	Water Resources Engineering	Ralph A. Wurbs, Wesley P. James	Pearson ISBN-10 0130812935 ISBN-13 978-0130812933	2002	1st
3	Engineering Hydrology	C.S.P.Ojha	Oxford University Press	2008	2nd
4	Hydrology: Design, Principles and Analysis	H. M. Raghunath	New Age International Publishers. ISBN-10 8122436188 ISBN-13 978-8122436181	1985	3rd

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5	Hydrology and Water Resources Engineering	S.K.Garg	KHANNA PUBLISHERS ISBN-10 8174090614 ISBN-13 978-8174090614	2010	4th

Course Outcome:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Define the key drivers on water resources, hydrological processes and their integrated behavior in catchments. (*R, U… Cognitive Level*)	25
CO-2	Apply the knowledge of hydrological models to surface water problems including basin characteristics, runoff and Hydrograph. . (*U, A…Cognitive Level*)	25
CO-3	Explain the concept of hydrological extremes such as Flood and Drought and management strategies. (*R, A… Cognitive Level*)	15
CO-4	Describe the importance of spatial analysis of rainfall and design water storage reservoirs. (*R, A…Cognitive Level*)	20
CO-5	Apply the concepts of groundwater for water resources management. (*R, U , A…Cognitive Level*)	15

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	2	2	2	2	2	1	2	2	-	-	-	2	2	2	2
CO-2	3	2	3	3	3	2	-	3	-	2	2	2	2	3	2
CO-3	3	3	2	3	2	2	2	2	-	2	3	3	1	2	3
CO-4	3	3	3	3	3	3	-	3	-	2	2	3	3	3	3
CO-5	3	3	2	2	3	2	-	3	2	3	3	3	2	2	3
Rationale*	**14**	**13**	**12**	**13**	**13**	**10**	**4**	**13**	**2**	**9**	**10**	**13**	**10**	**12**	**13**

Rationale*: The principles of hydrology will help To develop basic understanding about precipitation, infiltration, evapotranspiration, hydrograph, capacity of reservoir.

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List of Practicals:

1. To determine rate of infiltration and infiltration capacity using double ring infiltrometer.
2. Measurement of rainfall
3. Determination of capacity of well.
4. Estimation of flood using unit hydrograph
5. Computation of rate of infiltration using infiltrometer
6. Computation of live and dead storage capacity of reservoir

Major Equipment:

- Double ring infiltrometer
- Rainfall simulator
- Rain gauges
- Models of various dams

List of Open Source/learning website:

1. **https://archive.nptel.ac.in/courses/105/103/105103213/**