GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3151311
Semester – V
Subject Name: GROUND WATER HYDROLOGY AND CONTAMINATION

Type of course: professional Core Course

Prerequisite: Knowledge of Hydrology

Rationale: To learn the principles and theories of Hydrology and contamination.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	**Introduction:** Definition of ground water, aquifers, vertical distribution of sub surface water, hydrological properties of water bearing strata, ground water in hydrologic cycle.	04
2	**Ground water hydraulics:** Darcy's law, its range of validity,Dupuit's assumptions, Applications of Darcy's law for simple flow systems, Governing differential equations for confined and unconfined aquifers, steady and unsteady flow solutions for fully penetrating wells, partially penetrating wells, interference of wells, test pumping analysis with steady and unsteady flows, delayed yield, method of images	14
3	**Ground water quality :** Indian and international standards for different purposes	8
4	**Ground water pollution :** Sources, remedial and preventive measures	8
5	**Ground water conservation:** Ground water budget, seepage from surface water, artificial recharge	8

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Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**40**	**10**		

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and 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 Books:

1. Ground Water : by Raghunath
2. Ground Water Hydrology: By D K Todd
3. Groundwater Resources Education by W C Walton
4. Numerical Ground Water Hydrology by Roger Diewest.
5. Ground water hydrology and contamination by Nicholas Cheremenisoff

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Apply the laws of ground water hydraulics and solve the differential equations for different types of aquifers.	45
CO-2	Compare the Indian and international water standards for different purposes.	15
CO-3	Identify the sources of ground water contamination and suggest the remedial and preventive measures to overcome ground water contamination.	20
CO-4	Decide the mechanisms for ground water conservation.	20