

# GUJARAT TECHNOLOGICAL UNIVERSITY

## B.E. SEMESTER : VIII

### ENVIRONMENT ENGINEERING

Subject Name: **GROUND WATER CONTAMINATION**

Sr. No.	Course Contents	Total Hrs
1.	Introduction: Definition of ground water, aquifers, vertical distribution of subsurface water.	04
2.	Ground water hydraulics: Darcy's law, its range of validity, Dupuit Forchheimer 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	08
3.	Ground water quality: Indian and international standards	02
4.	Sources of Ground water pollution: Sources that are at (i) Ground Level,(ii) Below Ground Level but above Water Table (iii) Below Water Table	06
5.	Transport of Ground Water Contamination Transport Mechanisms, Dispersion and diffusion, Retardation, Numerical Flow and Transport Modeling	10
6.	Ground water Restoration and Treatment Source control strategies, Treatment technologies, In situ treatment methods, Pump and treat method, Bioremediation	10
7.	Ground water conservation: Ground water budget, seepage from surface water, artificial recharge	08

#### Reference Books:

1. Ground Water : by Raghunath
2. Ground Water Hydrology: By D K Todd
3. Ground water Remediation and treatment technologies by Nicholas Cheremisinoff

#### Term Work:

Term work will comprise of assignments on the questions based on

1. Definition of terms used in ground water hydrology
2. Numericals on Darcy's law, Dupuit law for yield.
3. Ground water contamination,
4. Assignment of questions transport of contaminants
5. Methods of treatment of contaminated ground water