

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: Environmental Science & Technology

SUBJECT NAME: Water Resource Management

SUBJECT CODE: 2173512

B.E. Semester: VII

Type of course: Environmental Science & Technology

Prerequisite: Information of total water distribution, Types of water resources naturally available, Importance of water for sustainable development. Environmental Impacts due to scarcity of water resources.

Rationale: This subject is intended to make students aware about the extremities about the water crisis, the importance of different source of water and to manage the daily increasing need of water by management of natural water resources.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M) PA ALA		PA (V) ESE OEP		PA (I)		
4	0	0	4	70	20	10	00	00	00	100

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; OEP-Open Ended problem; AL-Active learning;

Content:

Sr. No.	Topic	Teaching Hours	Module Weightage (%)
1.	Introduction: Discuss the concepts & importance of water resource management, Scope of WRM, necessity of WRM, Role of various agencies in WRM like water quality control, scientist, geologist, biologist, Agriculturist, Industrialist, meteorologist, politicians, general public, workers, NGO's.	12	30
2.	Hydrology: Define Hydrology, Hydrological cycle, Forms of precipitation, precipitation occupancy and its types, measurement of rain fall, methods to determine average rainfall, runoff, factors affecting runoffs, evaporation, transpiration, evapo-transpiration, factors affecting evaporation.	10	20
3.	Ground Water: <ul style="list-style-type: none">Source of water, Importance of ground water and present scenario.	12	30

	<ul style="list-style-type: none"> • Terms related to groundwater engineering, aquifers, aquiclude, porosity, specific yield, specific retention, storage coefficient. • Types of well, open, tube and flowing well, concept, location & its importance. • Types of artificial recharge, spreading method, pit method, recharge well method, check dam series, unlined canals. 		
4.	<p>Water shed development:</p> <ul style="list-style-type: none"> • Concept of water shade, Characteristic of watershed, size, shape, hydrogeology. • Water shed management & peoples participation • Role of cooperative society in water shade management <p>Water Harvesting Structures:</p> <ul style="list-style-type: none"> • Necessity of rain water harvesting • Importance of rain water harvesting <p>Rainwater Harvesting Methods</p> <ul style="list-style-type: none"> • Check Dams • Percolation tanks • Roof harvesting • Vegetation & Plantation 	10	20

Suggested Specification table with Marks (Theory):

Unit No	Unit Title	Distribution of Theory Marks					
		R Level	U Level	A Level	N level	E level	Total
1	Introduction	8	6	6	5	5	30
2	Hydrology	6	4	4	3	3	20
3	Ground Water	8	6	6	5	5	30
4	Water shade development, harvesting	6	4	4	3	3	20

Legends: R : Remembrance ; U = Understanding; A = Application; N= Analyze; E= Evaluate 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:

- Irrigation, Water Resource & water power engineering, Dr. PN Modi, Standard book house, Delhi.
- Hydrology and water resources, RK Sharma, Dhanpatrai & Sons, Delhi.

- Ground water assessment, development & management, KR Karanth, Tata Mcg raw hill publication, Delhi
- Ground Water, HM Raghunath, New age international limited, Delhi
- Hydrology and water resource engineering, SK garg, Khanna Pub, Delhi.
- Watershed management in India, JVS moorthy, Wiley eastern Ltd.
- Irrigation theory & Practice, A.M Mitchel, Vikas publication house Pvt Ltd, Delhi

Course Outcome: After learning this course the students would be able to:

1. Discuss basic concepts of Water Resource Management.
2. Estimate the surface runoffs from given precipitation data,
3. Discuss the various types of survey investigation for reservoir planning.
4. Design appropriate rain water harvesting scheme and required structures for given conditions.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.