GUJARAT TECHNOLOGICAL UNIVERSITY

ENVIRONMENTAL SCIENCE AND TECHNOLOGY (35)
WATER SUPPLY & MANAGEMENT
SUBJECT CODE: 2183510
B.E. 8TH SEMESTER

Type of course: Environmental Science & Technology

Prerequisite: A good fundamental knowledge of water supply planning, execution and management.

Rationale: This subject is intended to make students aware about the basic fundamentals of water demand calculation, sources of water, collection, conveyance and distribution for public uses. This subject also make student aware about the issues and challenges in water management.

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)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	**Introduction**: Water supply schemes, Pricing, Planning and Execution of modern water supply scheme **Water demand calculations**: Total water requirement, Per capita demand, Variation in demand, Effect of variation in demand on the design capacity, Population forecasting.	15	25
2.	**Hydrological concepts**: Measurement of rainfall, Water budget, Characteristic of rain water, Runoff and estimation of run off. **Sources of water supplies**: Surface source, Storage reservoir and Ground water: zones of underground water, ground water yield, Aquifers and their types.	15	25
3.	**Raw water collection & conveyance**: Water Intakes, Conduits, Flow in pipe systems, Water hammer pressure, Pipe joints and Appurtenances, Water lifting pumps. **Assessment of Water Quality & Purification**: Drinking water quality standards and Measurement, Purification of water supplies: Screening, Plain sedimentation,	15	25

	Sedimentation with coagulation, Filtration, Disinfection, Aeration, Softening and miscellaneous treatment.		
4.	**Water Distribution system**: Layouts, Methods of distribution, Types distribution reservoirs, Analysis of complex pipe networks: Hardy-Cross method **Water resources management (WRM)**: Current issues and challenges around WRM, Conceptual framework for WRM, Water management in industries, Water management Policy during droughts.	15	25

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
31	**35**	**16**	**5**	**13**	**-**

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. S.K. Garg," Water supply and Sanitary Engineering" Kanna publishers, Delhi 5th Edition, 2001.
2. K.S. Rangwala, " Water supply and Sanitary Engineering"
3. G.S. Birdie and JS. Birdie," Water supply and Sanitary Engineering" Dhanpat rai publishers Delhi, 6th Edition,2002.
4. Suresh K.Dhamija,"Environmental Studies", S.K.Katarial Sons Delhi, 2nd Edition, 1998
5. Rao & Dutta,"Industrial waste water treatment"
6. M.N. Rao & H.V. Rao," Air pollution ",19th Edition, 1989, Tata Mcgrawhill Publishing Company Ltd.

Note: Apart from above references one can use some other books and material if required.

Course Outcome:

On successful completion of this course unit, the student should be able to:

1. explain of planning of water supplies scheme
2. have good knowledge water treatment method
3. access quality of water
4. have knowledge about water management

List of experiments

Minimum **5** practical to be performed and remaining time should be allotted to open-ended projects/study reports/latest outcomes in technology study**:-**

1	Determination of available chlorine.
2	Determination of residual chlorine.

3	Determination of chlorine demand of a given sample of water.
4	Determination of membrane filtration technique.
5	Jar test.
6	Determination of permeability.
7	Determination of porosity.

Equipment: Glass wares, Weighing balance, Sieve analysis apparatus, Jar test.

Open ended Projects:

- Sampling of water
- Physical analysis of water
- Case study

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.