WATER SUPPLY SYSTEMS

(SYLLABUS)

Course Code	23CE2603	Year	III	Semester	II
Course Category	Open Elective-II	Branch	CIVIL	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Environmental Science
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks:	100

Course Learning Objectives:

The objectives of this course are to:

- Understand the necessity of water and its role in daily life, industry and environment.
- Learn about surface, groundwater and atmospheric sources and methods of water conservation and recycling.
- Study potable and non-potable water, greywater, blackwater and water-related health issues.
- Understand water distribution systems, supply methods and emergency water management.
- Learn industrial water requirements, wastewater characteristics and effluent standards.

Course Outcomes:

At the end of the course, students will be able to:

CO	Statement	Blooms level
CO1	Explain the various aspects of water usage in daily life.	**L2**
CO2	Apply methods to make natural waters suitable for regular use.	**L3**
CO3	Apply the principles of utilizing non-potable water.	**L3**
CO4	Assess water distribution systems and determine their suitability under different operational conditions.	**L4**
CO5	Analyze the characteristics of wastewater and its treatment requirements.	**L4**

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	1	1			2					1	2	1
CO2	2	2	2	1	1					1	1	3	2
CO3	1	2	1			1					1	2	2
CO4	2	2	3	2	1	2		1	1	1	1	3	3
CO5	2	3	2	3	1	2		1	1		1	3	2

(1 = Low, 2 = Medium, 3 = High)

Syllabus

Unit No	Content	Mapped COs
I	**WATER AND LIFE** Necessity of water - Domestic demand - Public demand - Irrigation - Transportation - Sanitation - Dilution of wastewaters - Dust palliative - Recreation - Fire protection.	CO1
II	**SOURCES OF WATER** Surface sources - Ground sources - Water from atmosphere - Desalination - Recycling of wastewater - Recharging of aquifers.	CO2
III	**DUAL SUPPLY OF WATER** Potable and non-potable water - Protected water - Grey water - Black water - Water-borne diseases - water related diseases - Sewage Irrigation.	CO3
IV	**DISTRIBUTION OF WATER** Based on topography - Gravity distribution - Direct pumping - Combined pumping and gravity flow. Service Reservoirs - Continuous supply - Intermittent supply - Networks of distribution - Emergency water supply as in case of fire accidents - Valves, hydrants and meters.	CO4
V	**INDUSTRIAL WATER** Location of Industry with reference to surface sources of water - Quality of water required for industrial operations - Characteristics of wastewater produced - Standards for letting industrial effluents into sources of water.	CO5

Learning Resource(s)

Text Book(s)

1. K.N. Duggal, "Elements of Environmental Engineering", 7th Edition, S. Chand Publishers, 2010.
2. M.J. Hammer and M.J. Jr. Hammer, "Water and Wastewater Technology", 4th Edition, Prentice Hall of India, 2003.
3. Howard S. Peavy, Donald P. Rowe, George Technobanoglous, "Environmental Engineering", 1st Edition McGraw - Hill Publications, Civil Engineering Series, 1985.

Reference Book(s)

1. B.C. Punmia, “Water Supply Engineering, Vol. 1”, “Wastewater Engineering Vol. II”, 2nd Edition, Ashok Jain and Arun Jain, Laxmi Publications Pvt. Ltd., New Delhi, 2008.
2. G. Fair, J.C. Geyer and D.A. Okun, “Water and Wastewater Engineering”, 3rd Edition, Wiley, 2010.
3. Metcalf and Eddy, “Wastewater Engineering”, 3rd Edition, Tata McGraw-Hill, 2008.

Web Materials:

1. https://archive.nptel.ac.in/courses/105/105/105105201/

Faculty **HoD-CE**