Water Supply Systems

Course Code	23CE2603	Year	III	Semester	II
Course Category	OE-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 Outcomes		
Upon successful completion of the course, the student will be able to		BL
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

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)
Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation
* - Average value indicates course correlation strength with mapped PO

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

Syllabus		
Unit No	Content	Mapped COs
1	**Water and Life:**Necessity of water - Domestic demand - Public demand - Irrigation - Transportation - Sanitation - Dilution of wastewaters - Dust palliative - Recreation - Fire protection.	CO1
2	**Sources of Water:** Surface sources - Ground sources - Water from atmosphere - Desalination - Recycling of wastewater - Recharging of aquifers.	CO2
3	**Dual Supply of Water:** Potable and non-potable water - Protected water - Grey water - Black water - Water-borne diseases - water related diseases - Sewage Irrigation.	CO3
4	**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
5	**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 Resources

Text Books

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

References

1. B.C. Punmia, "Water Supply Engineering, Vol. 1", "Wastewater Engineering Vol. II", 2nd Ed., 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 Ed., Wiley, 2010.
3. Metcalf and Eddy, "Wastewater Engineering", 3rd Ed., Tata McGraw-Hill, 2008.

E-Resourses:

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