

Name of Faculty	:	Faculty of Engineering & Technology
Name of Program	:	Master of Technology (M. Tech)
Course Code	:	1MEE02
Course Title	:	Water Supply and Treatment
Type of Course	:	Programme Core (PC)
Year of Introduction	:	2023-24

Prerequisite	:	Basic knowledge of environmental science, chemistry and engineering principles. Understanding of fluid mechanics and hydraulics.
Course Objective	:	To understand the processes involved in water supply and treatment and Explore challenges, issues related to sustainable water management.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	To understand the principles and processes involved in water treatment.
	CO2	To design and analyze the operation of water treatment plants.
	CO3	To analyze water quality data and interpret the results.
	CO4	To design and evaluate water distribution systems.
	CO5	To recognize and address the environmental and public health aspects of water supply and treatment.
	CO6	To discuss the challenges and issues related to sustainable water management.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				Total Marks
L	T	P		SEE	CIA	SEE	CIA	
3	2	0	4	70	30	30	20	150

Legends: **L**-Lecture; **T**-Tutorial/Teacher Guided Theory Practice; **P** – Practical, **C** – Credit, **SEE** – Semester End Examination, **CIA** – Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	UNIT I Sources of water, Quantity of Water: Design period and population forecast, Water quality: Criteria for different impurities in water for potable and non-potable use	8	19%	CO1
2	UNIT II Conventional water treatment: Screens, Types of settling and settling tests, Design of Sedimentation Tank, Coagulation: mechanisms of coagulation, Mixing and Flocculation, Design of clariflocculator, Filtration: Slows sand filters, rapid sand filters and dual layer filtration, Aeration: Concepts, limitations of aeration, types of aerators, Disinfection mechanism and it's different agents	12	28%	CO1 CO2 CO3
3	UNIT III Specific Treatment: Water Softening, Ion Exchange, Electrodialysis, Membrane Technology: ultra filtration, nano filtration, Reverse Osmosis, Desalination, Defluoridation, Demineralization, Removal of colour, odour and heavy metals	8	19%	CO2 CO3
4	UNIT IV Intakes, type of intake, conveyance of water, different type of pipes used in water supply, pipe-joint, laying of pipe, hydrostatic test, Type of distribution system, different layout of distribution system, methods of supplying water, pressures in distribution system, distribution resources and its capacity, type of reservoirs & accessories, design of distribution system, design of pipelines and analysis of complex pipe networks-Hard cross method, Valves and Fittings, Plant Hydraulics	14	34%	CO4 CO5 CO6

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	20	30	20	15	10	5

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Water Sources	4
2	Calculation of water demand	4
3	Conventional Water Treatment Processes	4
4	Water Treatment Methods	6
5	Water Supply Infrastructure	4
6	Water Distribution Systems	6

Suggested Learning Websites

Sr. No.	Name of Website
1	https://www.coursera.org/
2	https://microbiologysociety.org/
3	http://www.nptel.iitm.ac.in/courses.php?branch=Civil
4	https://www.nesc.wvu.edu/

Reference Books

Sr. No.	Name of Reference Books
1	Tebbutt, Principles of Water Quality Control, 5th edition, Butterworth Heinemann, 1998.
2	Peavy, Rowe & Tehobanoglous, Environmental Engineering, McGraw Hill.
3	Weber W., Physicochemical Processes for Water Quality Control, Wiley-Interscience, New York, 1972.
4	Water supply and sewerage- Steel and McGhee, McGraw Hill NY, latest ed.
5	Manual on Water Supply and Treatment (3rd edition) -Ministry of Urban Development, New Delhi, 1999.
6	Syed R. Qasim, Wastewater Treatment Plants: Planning, Design, and Operation, 2nd edition, CRC Press.