Course Type	Course Code	Name of Course	L	T	P	Credit
DC	ESC 201	Drinking Water Supply and Treatment	3	0	0	9

Course Objective

The objective of the course is to present Understanding the water chemistry and principles of water treatment processes and its design and transportation.

Learning Outcomes

Upon successful completion of this course, students will:

- An insight into the structure of drinking water supply systems, water collection, water purification and water supply scheme for drinking water.
- An understanding of water quality criteria and standards, and their relation to public health.
- Student can apply knowledge of basic water chemistry to solve problems associated with drinking water treatment.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**UNIT-I:** Drinking Water chemistry: Acids and Bases, titrations, buffers and buffer intensity, chemical equilibrium calculations, Langelier index, Oxidation and reduction reaction, stoichiometry, Redox couples, pE-pH diagrams. Basic concepts of organic chemistry, behaviour and fate of organics in the environment.	6	Understanding the role of water chemistry for selection of suitable method for treatment of surface and groundwater.
2	**UNIT-II:** Water requirements, Types of water demands, Water demand forecasting, Surface water and ground water sources, Water quality and drinking water standards, conventional contaminants and emerging contaminants; Water treatment: Source selection process, selection of treatment chain, plant siting.	6	To understand the criteria for planning of water supply system including the identification of degree of treatment.
3	**UNIT-III:** Physico-chemical processes (Process, Mechanism and Design): Sedimentation, Coagulation and Flocculation processes, Granular media filtration, Disinfection, Water softening, Adsorption and ion exchange processes, Desalination, Membrane filtration, Reverse osmosis, electrodialysis, Treatment of specific contaminants: Fluoride, Nitrate, Iron, Manganese and Arsenic etc.	19	This unit will help to understand the design component of each water treatment unit including conventional and advanced method.
4	**UNIT-IV** Determination of reservoir capacity, Gravitational, pumping and combined water supply schemes, Water-lifting arrangements, Distribution reservoirs and service storage, Pumping and design considerations for pumps, Design and hydraulic analysis of water distribution system, Distribution system components, Aqueducts, Hydraulics of conduits, Appurtenances and valves, water pipes, Storage tanks, Optimization of pipe network systems, Planning of urban and metropolitan water supply project and its implementation.	11	Understanding the layout and design of different unit of distribution network.

Recommended Text Books:

1. Environmental Engineering (2013 ed.)-Peavy and Rowe, McGraw Hill India.
2. Chemistry for Environmental Engineering and Science, (2003)-Sawyer, Clair N., Perry L. McCarty, and Gene F. Parkin. Boston: McGraw-Hill.

Recommended References:

1. Environmental Engineering-I, (33rd ed.)- S K Garg, Khanna Publishers Delhi.
2. Theory and practice of water and wastewater treatment (2009)-Textbook by Ronald L. Droste, Willey.