

CIPC2007 WATER SUPPLY & SANITARY ENGINEERING (3-0-0)

Course Objectives:

The course in Water Supply & Sanitary Engineering aims to provide students with a comprehensive understanding of water resource management, treatment technologies, and environmental engineering principles. It seeks to develop advanced knowledge of water supply systems, wastewater treatment, and solid waste management. Students will explore critical concepts including water quality, treatment processes, effluent management, and sustainable environmental solutions. The objective is to equip students with theoretical and practical skills in analyzing water systems, understanding complex treatment technologies, and applying sophisticated techniques for ensuring public health, environmental protection, and sustainable water resource management.

Module-I

Quantity of water: Sources of water, Per capita demand, design period, population forecast, fluctuation in demand.

General requirement for water supply: Types of intakes, Pumping and Transportation of water.

Quality of water: Physical, chemical and biological characteristics of water and their significance, necessity of treatment, Drinking water standards

Module-II

Basic unit operations and unit processes for surface water treatment: Screening, Plain Sedimentation, Sedimentation aided with Coagulation, Filtration, Disinfection, Softening
Miscellaneous treatments (principles only): Removal of colours, tastes and odours, removal of iron and manganese, fluoridation and defloridation, Ion exchange, electro-dialysis, RO

Module-III

Quantity and characteristics of wastewater, effluent discharge standards.

Domestic wastewater treatment: Primary treatment, Screening, Grit removal, Sedimentation, Sedimentation aided with coagulation. Secondary treatment: Basis of microbiology, Growth and food utilization, Suspended-culture systems, Attached-culture systems, Secondary clarification, Disinfections of effluents. Sludge treatment and disposal: Sludge characteristics, thickening, disposal

Module-IV

Solid waste management: Source, classification, characteristics, generation, collection, Storage and transport of MSW, MSW management, Waste minimization of MSW, Reuse and recycling, Biological & thermal treatment (principles only), land fill

Course Outcomes:

1. To explore the sources of water, general requirement for water supply and characterize water.
2. To study the principles of water treatment and design treatment units.
3. To understand the principles of waste water treatment and design treatment units.
4. To Explain components of solid waste management and evaluate recovery, treatment and disposal alternatives.

Text and Reference Books:

1. Environmental Engineering (Volume I & II) by S. K. Garg-Khanna Publishers
2. Environmental Engineering (Volume I &II) by B. C. Punmia-Khanna Publishers
3. Environmental Engineering by H. S. Peavy, D.R. Rowe and G. Tchobanoglous, MGH.