

Year & Sem: E2S1	Course Code: CE2205	Course Name: Environmental Engineering	No. of Credits: 4	L 2	T&PS 2	P 0
---------------------	------------------------	--	-------------------	--------	-----------	--------

UNIT- I: Water quality/ Characteristics:

Wholesomeness and palatability, Physical, chemical and biological characteristics of water, their sources, and Drinking water standards Water quality monitoring: Estimation of physical, chemical and biological characteristics, different types of tests and equipment used for examinations

UNIT-II:Water Quantity Estimation

Water demand for various purposes, Population forecast, Different forecasting methods: Arithmetic, Geometric, Incremental increase, logistic etc.

UNIT -III : General Requirement For Water Supply :

sources, intake, pumping and conveyance, Different types of intakes, pumps, Design of conveyance pipe, Distribution reservoirs, mass curve method

UNIT 1V: Surface Water Treatment for Potable Water Supply:

Basic unit processes and operations for surface water treatment- flow-sheets.

Sedimentation: factors affecting efficiency, design values of various parameters, tube settlers. Coagulation and flocculation: mechanisms, common coagulants, rapid mixing and flocculating devices, G and GT values, Jar test, coagulant aids - polyelectrolyte etc.

Filtration: classification, slow and rapid sand filters, dual media filters, sand, gravel and under-drainage system, mode of action, cleaning, limitations, operational difficulties, performance, basic design consideration

Disinfection: chlorination, chemistry of chlorination, kinetics of disinfection, chlorine demand, free and combined chlorine, break point chlorination, super chlorination, de chlorination, chlorine residual, use of iodine, ozone, ultraviolet rays and chlorine dioxide as disinfectants.

UNIT V: Ground Water Treatment for Potable Water Supply:

Basic unit processes and operations for surface water treatment- flow-sheets. Aeration: Types of aeration; **Water softening**: lime soda and Base Exchange methods, principle reactions, design considerations, sludge disposal. Miscellaneous treatments: removal of iron and manganese, taste, odor and color, principles and methods; de-fluoridation, reverse osmosis

UNIT VI: Water Distribution Systems And Networks

Requirements of water distribution, methods of distribution, Types of distribution layouts: Dead end, Grid iron, radial, ring system, design values of various parameters, Hydraulic analysis: Hardy cross method.

References/Text Books:

1. Santhosh Kumar Garg, Environmental Engineering Vo.I, Khanna publishers, 21st edition, 2012
2. Howard S. Peavy, Environmental Engineering, McGraw-Hill International editions, 1985
3. Gerard Kiely, Environmental Engineering, Tata McGraw-Hill Indian edition, 2007.
4. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.

Video Lectures (Web Links):

1. <http://nptel.ac.in/courses/105106119/#>