

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering & Technology				II Year B.Tech. (Civil Engineering)		
Course Code & Name	Instructions Hours per Semester and Credits					
4RVPC5  Environmental Engineering-I	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	90	3
	20	10	0	60		

**Course Learning Objectives:**

1. To impart knowledge of Water Supply scheme to fulfil public demand.
2. To learn the Water treatment technological options for different quality of water.
3. To learn the sewerage treatment process for community waste water.
4. To know about the different pipe material and sewer materials and should be able to select the most appropriate material.

**Prerequisites:** Engineering Chemistry.

**COURSE CONTENTS**

**UNIT – I**

**Planning for Water Supply System:**

Public water supply system, planning, objectives, Design period, Population forecasting-different methods limitations and field practice., Water demand, fluctuation in demand (daily, hourly and seasonal), Sources of water and their characteristics,

Water Quality Characterisation and standards, types of impurities and their sources and effects, water borne diseases, examination of water (physical, chemical, bacteriological and sanitary), significance of important parameters, Water Quality Index.

**UNIT - II**

**Conveyance & Distribution System:**

Water supply Intake structures, Pipes and conduits for water, Materials and class of pipes-specification, merits & demerits of pipes Cast iron, mild steel pipes, asbestos cement, R.C.C and pre-stressed pipes. Selection of pump and pipe materials, types of pumps, Types of distribution systems, layout of Distribution System, Analysis of Water Distribution system by Hardy Cross Method.

**UNIT – III**

**Water Treatment:**

Objectives of water treatment, unit operations and processes. Methods of water treatment, theory and design of sedimentation, coagulation, filtration, disinfection, aeration, water softening, modern trends in sedimentation & filtration, miscellaneous methods of treatment.

**UNIT- IV**

### Quality of Waste Water

Characterisation & composition physical, chemical, microbiological, primary parameters of pollution BOD, COD, total solids, volatile solids total organic carbon, nitrogen & its forms, pH, Chlorides, Colour, Toxic Substances, Micro Organisms etc.

### UNIT - V

**Sewerage Systems:** . Components of sewer system. Types of systems, sanitary sewers, storm sewers, combined and partially combined sewers, quantity of sewerage, infiltration, design period, factors, self cleaning velocity, maximum velocity depth/section of sewers, minimum size, slope, alignments

#### Course Outcomes:

CO. No.	CO	PO
CO1	Forecast the population and design water supply schemes.	PO-1, PO-2, PO-4
CO2	Identify the various constituents present in a water sample.	PO-1, PO-2, PO-4
CO3	Demonstrate water quality concepts and their effect on treatment process selection.	PO-1, PO-2, PO-3
CO4	Identify different treatment units in a water treatment plant and formulate their design procedures	PO-1, PO-2, PO-3
CO5	Design various water distribution network systems.	PO-1, PO-2, PO-3,

#### BOOKS RECOMMENDED:

1. Kshirsagar K.R., *Water Supply Engg.*
2. Kshirsagar K.R., *Sanitary Engg.*
3. Hussain, *Water Supply and Sanitary Engg.*
4. Birdi G.S., *Public Health Engg.*
5. Punmia, B.C. *Water Supply Engineering* - Laxmi Publications (P) Ltd. New Delhi
6. Garg S.K., "Environmental Engineering", Vol 1, Khanna Publishers, New Delhi 2005.
7. Garg S.K., "Environmental Engineering", Vol 2, Khanna Publishers, New Delhi
8. Relevant IS Codes.

#### CO-PO-PSO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO 1	PSO 2	PSO 3
4RVPC5.CO1	3	3		2								3	2	2
4RVPC5.CO2	3	3		2	1							3	2	2
4RVPC5.CO3	3	3	3		1							3	3	2
4RVPC5.CO4	3	3	2		1							3	2	2
4RVPC5.CO5	3	3	3									3	2	2