

No	Course Information of Environmental Engineering II	
1.	Unit Name : Environmental Engineering II	
2.	Unit Code : CE-52018	
3.	Classification : Engineering Subject	
4.	Credit Hours : 3	
5.	Semester and Year Taught: 1/5	
6.	Pre-requisite (if any) : None	
7.	Mode of Delivery : Lecture , Tutorial	
8.	Assessment System and Breakdown of Marks ::	
	Practical	15%
	Practical Exam	5%
	Tutorial	10%
	Final Examination	70%
	Total	100%
9.	Academic Staff Teaching Unit :	
10.	<p>Objective of Unit:</p> <p>The objective of this course is to :-  identify the total quantity of wastewater, the section of the sewer, the composition as well as characteristics of wastewater and treatment of wastewater.</p>	
11.	<p>Learning Outcomes of Unit:</p> <p>On completion of this unit, students shall be able to:</p> <p>(a) Describe collection and conveyance of sewage treatment and unit operations for wastewater treatment.</p> <p>(b) Analyze the characteristics of wastewater and oxygen sag in the stream.</p> <p>(c) Compute wastewater flow rates, hydraulic design of sewers, preliminary treatment and sedimentation tank.</p>	
12.	<p>Synopsis of Unit:</p> <p>The unit is intended to describe about wastewater flow, hydraulic formulae and elements of circular sewers, characteristics of wastewater, oxygen sag analysis, unit operations of wastewater treatment system and preliminary treatment.</p>	
13.	<p><b>Topic 1: Collection and Conveyance of Sewage</b></p> <ul style="list-style-type: none"> <li>• Conservancy System</li> <li>• Water Carriage System</li> <li>• Factors governing choice of separate system</li> </ul>	

**Topic 2: Wastewater Flow Rates**

- Dry Weather Flow
- Variation in Rate of Sewage
- Storm Water Flow
- Rational Method
- Empirical Formulae

**Topic 3: Hydraulic Design of Sewers**

- Hydraulic Formulae
- Nomograms/ Tables for Hydraulic Computation
- Minimum Velocity of Flow
- Maximum Velocity of Flow
- Hydraulic Elements of Circular Sewers
- Egg Shaped Sewers
- Storm Water Drains

**Topic 4: Wastewater Characteristics**

- Characteristics of wastewater
- Cycles of Decomposition
- Oxygen Demand
- Chemical Oxygen Demand

**Topic 5: Natural Methods of Wastewater Disposal**

- Wastewater Disposal Methods
- Types of Receiving Water for Dilution
- Self- Purification of Natural Streams
- Disposal by Land Treatment
- Comparison of Disposal Methods

**Topic 6: Unit Operations for Wastewater Treatment**

- Unit Operations and Processes
- Methods of Treatment of Wastewater
- Methods of Sludge Processing and Disposal

	<p><b>Topic 7: Preliminary Treatment</b></p> <ul style="list-style-type: none"><li>• Racks and Screens</li><li>• Design of Grit Chambers</li><li>• Proportional Flow Weir</li><li>• Detritus Tanks</li><li>• Skimming Tanks</li><li>• Vacuum Floatation</li></ul> <p><b>Topic 8: Sedimentation and Chemical Clarification</b></p> <ul style="list-style-type: none"><li>• Types of Settling</li><li>• Types of settling Tanks</li><li>• Design of Sedimentation Tanks</li><li>• Chemical Clarification</li></ul>
14.	<p>Main References:</p> <p><b>CE 52018 Environmental Engineering II, Wastewater Engineering (including air pollution) By</b></p> <p><b>Dr. B . C Punmia, Er. Ashok K. Jain, Dr. Arun K. Jain</b></p>