

<b>Devi Ahilya Vishwavidhyalaya, Indore, India</b>			
<b>Institute of Engineering &amp; Technology</b>			
<b>Subject Code and Name</b>	<b>Type</b>	<b>L-T-P</b>	<b>Credits</b>
<b>7VLRE1: Environmental Engineering – II</b>	<b>L</b>	<b>T</b>	<b>P</b>
	<b>PE</b>	<b>3-1-1</b>	<b>4+1(P)</b>

### **Course Objective:**

The course is designed

1. To understand the desirable properties of subgrade soil, aggregates, bituminous and other such materials. To learn the standard testing procedure for these materials.
2. To learn the granular, bituminous and concrete mix designs and their application.
3. To understand how to carry out various traffic studies. To learn the concept of traffic capacity of roads and its application. To learn the macroscopic and microscopic models of traffic flow and their application
4. Develop a comprehensive understanding of the airport master planning process according to ICAO guidelines. Design and plan critical airport infrastructure elements like terminals, runways, and landside facilities.

### **COURSE CONTENTS**

**Unit I : Sewage And Sewerage Engineering** - Definition & Classification of Sewage - Quantity of Sanitary Sewage and Storm Water – Fluctuations in Flow Pattern – Design Flow of Sewage – Physio-chemical and Biological Characteristics – Assessment of Organic Solids by BOD, COD, TOC, ThOD, & TOD – Microbiology of Sewage – Systems and Layouts of Sewerage – Analysis and Design of Sewers under Different Flow Situations - Sewer Sections – Materials for Sewers – Laying, Jointing, and Testing of Sewers – Appurtenances and Maintenance - Pumping of Sewage and Pumping Stations.

**Unit II : Preliminary And Primary Treatments Of Sewage** - Principles and Objectives of Sewage Treatment – Operation and Design of Bar Rack and Grit Chamber with Velocity Control Devices – Principles of Primary Treatment and Design of Primary Sedimentation Tank – Disposal of Rackings, Gritty Materials, and Sludge Solids.

**Unit III : Biological Treatment Processes** - Objectives of Biological Treatment – Path Ways of Decomposition – Aerobic, Anaerobic, and Anoxic Processes – Operation & Design of Conventional Activated Sludge Process with Diffuser and Mechanical Aerators – Process Modifications – Analysis and Design of Trickling Filter – High rate and Standard Rate Filters – Low Cost Waste Water Treatments – Principles and Design of Stabilization Ponds, Oxidation Ponds and Aerated Lagoons – Rural Sanitation – Operation and Design of Septic and Imhoff Tanks – Excreta Disposal Schemes.

**Unit IV: Engineering Methods Of Sludge Disposal** - Objectives of Sludge Disposal – Types and Characteristics of Sludges in a Typical Treatment Plant – Operation and Design of Sludge Digestions – Energy Recovery Aspects regarding Methane Production – Sludge Lagooning, Unconventional Methods

