# ENVIRONMENTAL ENGINEERING LABORATORY

| VII Semester: CE | | | | | | | | |
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| **Course Code** | **Category** | **Hours / Week** | | | **Credits** | **Maximum Marks** | | |
| | | L | T | P | C | CIA | SEE | Total |
| **ACEB24** | CORE | - | - | 3 | 1.5 | 30 | 70 | 100 |
| **Contact Classes: Nil** | **Tutorial Classes: Nil** | **Practical Classes: 36** | | | | **Total Classes: 36** | | |

## I. COURSE OVERVIEW:

The Environmental Engineering laboratory has gained significance in determining the physical and chemical properties of water along with its suitability as drinking water as per the Bureau of Indian Standards. This laboratory focuses on developing processes to improve the natural and built sustain- able environment for all living beings.

## II. COURSE OBJECTIVES:

**The course should enable the students to:**

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| I | The water quality standards and their relation to public health. |
| II | The characteristics of water in case of quality analysis |
| III | The complete water quality assessment for domestic and Industrial supplies |
| IV | To select appropriate treatment schemes to remove certain pollutants present inwater or wastewater. |

## III. COURSE OUTCOMES:

**After successful completion of the course, students should be able to:**

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| CO 1 | **Demonstrate** the physical and chemical parameters of water and its suitability for drinking purposes and building construction. | Understand |
| CO 2 | **Measure** the turbidity and conductivity of water for presence of suspended particles | Apply |
| CO 3 | **Determine** the pH, alkalinity and acidity in water to check the presence of sufficient amount of alkalines and acids | Apply |
| CO 4 | **Determine** the water for presence of chlorides, Iron, Nitrates and Phosphorous which induces salinity, color and toxicity. | Analyze |
| CO 5 | **Determine** the optimum dosage of coagulant to remove impurities in the flocculation process | Analyze |
| CO 6 | **Determine** dissolved oxygen content, BOD and COD in water for the survival of aquatic animals and amount of pollutants. | Analyze |

| Week – 1 | INTRODUCTION TO ENVIRONMENTAL ENGINEERING LABORATORY. DETERMINATION OF PH AND TURBIDITY |
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Introduction to environmental engineering. Do's and Don'ts in the lab.
To determine the pH of given samples using universal indicator, pH paper and digital pH meter
Determination of turbidity of the given sample using nephelometer in NTU.

| Week – 2 | DETERMINATION OF PH AND TURBIDITY |
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Determination of turbidity of the given sample using nephelometer in NTU.
To determine the pH of given samples using universal indicator, pH paper and digital pH meter.

| Week – 3 | DETERMINATION OF TURBIDITY AND TOTAL DISSOLVED SOLIDS |
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Determining the electrical conductivity of the given water sample.
Determination of total dissolved solids of the sample.

| Week – 4 | DETERMINATION OF CONDUCTIVITY AND TOTAL DISSOLVED SOLIDS |
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Determination of total dissolved solids of the sample.
Determining the electrical conductivity of the given water sample.

| Week – 5 | DETERMINATION OF ALKALINITY, ACIDITY OF WATER AND CHLORIDE IN WATER. |
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Determining the amount of alkalinity present in the given samples & determine the acidity of the given sample of water.
Determine the amount of chloride present in the given water sample by Mohr's method.

| Week – 6 | DETERMINATION OF CHLORIDE AND ALKALINITY, ACIDITY IN WATER |
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Determine the amount of chloride present in the given water sample by Mohr's method.
Determining the amount of alkalinity present in the given samples & determine the acidity of the given sample of water

| Week – 7 | DETERMINATION OF DISSOLVED OXYGEN AND IRON IN WATER |
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Determine the nitrate nitrogen of the given sample of water.
Determine the quantity of dissolved oxygen present in the given sample(s) by using modified Winkler's (Azide modification) method.

| Week – 8 | DETERMINATION OF IRON AND DISSOLVED OXYGEN IN WATER |
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Determine the quantity of dissolved oxygen present in the given sample(s) by using modified Winkler's (azide modification) method
Determine the nitrate nitrogen of the given sample of water.

| Week – 9 | DETERMINATION OF OPTIMUM DOSE OF COAGULANT IN WATER AND DETERMINATION OF RESIDULE CHLORINE IN WATER |
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Determining the optimum coagulant dosage for clarifying the given sample of water by using alum as the coagulant and performing the jar test experiment.
Determining the residual chlorine content in water

| Week – 10 | DETERMINATION OF RESIDULE CHLORINE IN WATER AND DETERMINATION OF OPTIMUM DOSE OF COAGULANT IN WATER |
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Determining the residual chlorine content in water
Determining the optimum coagulant dosage for clarifying the given sample of water by using alum as the coagulant and performing the jar test experiment.

| Week – 11 | DETERMINATION OF BOD AND COD |
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Determining the amount of B.O.D. and C.O.D. exerted by the given sample
Determining the amount of C.O.D. and B.O.D. exerted by the given Sample

| Week – 12 | REVISION |
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Revision

**Reference Books:**

1. Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston , "BIM HANDBOOK", Wiley, 2nd Edition, 2011

**E-Text Books:**

1. http://auvsp.edu.in/datastore/auwebsite/documents/libraryebookspdf/building-information-modeling.pdf