| **Course Title: Chemistry Core-1:Analysis of Water and Waste Water *w.e.f. the session 2023-24 and onwards*** | |
|---|---|
| **Class: M.Sc. Pt.-II / Semester-III** | **Course code: MCH-C301** |
| **Lectures: 60** | Credits : 04 |
| **MM: 70** | Exam Hours: 03 |

**NOTE:** The question paper shall consist of Two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer (about 150 words) type questions of SIX marks each and student shall be required to attempt any five questions. Sec.-B shall contain 08 descriptive type questions of TEN marks each and student shall be required to attempt any four questions. Both sections shall have questions from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

**COURSE CONTENTS:**

**Unit - I**

Sampling and storage of water samples. Analysis of water samples for the following: Colour, Odour, Taste, turbidity, conductivity, total solids, filterable, nonfilterable, fixed and volatile solids, pH, total alkalinity, $CO_3^{--}$ and $HCO_3^{-}$ alkalinity, acidity, B.O.D., C.O.D. and D.O.

**Unit - II**

**Chemical Analysis of Water samples**: Chemical Analysis of Water samplesfor $NH_3$, $NO_3$, $NO_2$, organic N, total N, Inorganic phosphates, silica, $SO_4^{--}$, Hardness (Ca and Mg) Na, K, residual Chlorine.

**Unit - III**

Optimum alum dose and it's determinations

**Bacteriological Examination of Water:** Preparation of culture media and nutrient-agar.Total counts and Coliform MPN with interpretation of test data from Industrial and Municipal points of view (Potability of water).

**Unit - IV**

Basic idea of D.C., A.C. and pulse polarography, stripping and cyclic Voltametry. Their basic applications with particular reference to analysis of water and waste water.

**Unit - V**

Potentiometric Determination of Pb in water. Water Pollution, effluent treatment. Suitability of treated water for agricultural/municipal supplies and industries. Water quality standard parameters (WHO and BIS).

**Suggested Readings**:

1. Standard Methods for Examination of water and Waste water by: APHA
2. Commercial Methods of Chemical Analysis by: F. D. Snell and F. M. Biffen
3. Chemical and Biological Method for Water Pollution Studies by: R. K.Trivedi and P. K. Goel
4. Water and Waste water Testing- A Laboratory Manual by: R. P. Mathur
5. Indian Standards for water Analysis (I. S. I.Publications)
6. Environmental Chemistry by: A. K. De
7. Environmental Pollutional Control Engineering by: C. S. Rao

## COURSE OBJECTIVES:

1. Sampling, storage and Physico-chemical analysis of water samples
2. Bacteriological Examination of Water
3. Polarography (D.C., A.C. and pulse), stripping and cyclic Voltammetry with particular reference to analysis of water and waste water

4. Water Pollution, Effluent treatment and Water quality standard parameters

## COURSE OUTCOMES:

On completion of this course, student shall be able to:
CO 1: Understand the importance of analysis of water.
CO 2: Knowledge of the chemicals present in water by Physico-chemical analysis.
CO 3: Describe about Bacteriological analysis of Water.
CO 4: To grasp the awareness about the pollution of water
CO 5: To create the ideas and concepts for water treatment process.

Mapping of Course outcomes (Cos) with Programme outcomes (POs)

| Course outcomes/ Programme outcomes | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| CO 1 | X | | X | | | X | X | X |
| CO 2 | X | | X | | | X | X | X |
| CO 3 | | | X | | | X | X | X |
| CO 4 | X | | X | | | X | X | X |
| CO 5 | | | X | | | X | X | X |