Course Title: Chemistry Core-2: Analysis of Soil *w.e.f. the session 2023-24 and onwards*	
Class: M.Sc. Pt.-II / Semester-III	**Course code: MCH-C302**
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 questionsfrom 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

(a) Phases Present in the soil: Soil air, Soil solution and solids, Factors affecting the composition and concentrations of the salts in the soils.

(b) Inorganic Portion of the Soil: Primary and secondary minerals, crystalline silicate, and Aluminosilicates, Amorphous substances & salts, Relation of particle size and texture with the nutrients present in the soil.

Unit - II

Organic Portion of the Soil: Variable nature, Non - Humified organic part, Humic substances (Humic Acids, Fulvic Acids and Humins). (only elementary knowledge of soil composition is required).

Soil sampling : Handling, transport, and storage of samples, seiving and grinding.

Unit - III

Physical Analysis of soil: Analysis of soil samples for the porous nature, Water absorbing capacity, Moisture contents, Loss on Ignition, pH and conductivity.Cation exchange capacity and its determination.

Unit - IV

Chemical Analysis of Soil :

Chlorides, Sulphates, Total alkalinity, soluble carbonates and Biocarbonates, Available phosphorus, total organic matter (by modified Walkley and Black Methods), Nitrogen by Kjeldahl digestion method, available nitrogen, exchangeable sodium and potassium.

Unit - V

Determination of exchangeable Hydrogen and Lime requirement. Determination of Gypsum requirement and water soluble salts in saline and alkaline soils.

An elementary idea of Chemical analysis as a measure of soil fertility. Interpretation of soil taste data with reference to different crops.

Suggested Readings:

1.Standard Methods for Chemical Analysis Vol. III (VI edition) Instrumental Methods Part – B by: Frank J. Welcher
2. Agricultural Chemistry Vol. I by: B. A. Yogdin
3. Practical Manual for Introductory Courses in Soils by: Haryana Agricultural University
4. Chemical and Biological Methods for water polution Studies by: R. K. Trivedi and P. K. Goel
5. Soil Chemical Analysis by: M. L. Jackson
6. USDA handbook to Diagnosis and improvement of Saline alkali soils by: I. B. M., New Delhi

COURSE OBJECTIVES:

1. Phases Present in the soil
2. Inorganic and organic portion of the Soil
3. Soil Sampling and storage
4. Physical and Chemical analysis of soils
5. Exchangeable Hydrogen
6. Lime and Gypsum requirement
7. Interpretation of soil test data for crops

COURSE OUTCOMES:

On completion of this course, student shall be able to:

CO 1: To gain knowledge about composition of soil in terms of different phases, organic and inorganic minerals present in the soil.
CO 2: To do sampling, storage and physico-chemical analysis of soil samples by some conventional and modern methods of analysis.
CO 3: To explain principle and method of determination of exchangeable hydrogen in soil.
CO 4: To calculate the amount of lime requirement and gypsum requirement of the soil
CO 5: The student becomes capable to prepare report base on the experimental results and interpret the soil test data for particular crop/crops and fertilizer recommendation.

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
CO 2	X					X		X
CO 3	X					X		X
CO 4	X					X		X
CO 5	X				X			X