

Lecture Plan

Course Title: Soil and Water Chemistry (2+1)

Name of Course Instructor: Mr. Ashutosh Kumar Singh

Theory

Class No.	Topic
1	Introduction to Analytical Chemistry: Principles, Scope, Applications and Types
2	Classical Methods of Analysis: Volumetry
3	Classical Methods of Analysis: Gravimetry
4	Standard Solutions: Preparation, Standardization and Types
5	Titration Methods and Indicators
6	Units of Concentration, Dilutions and Calculations
7	Standard Curve and Nomograph
8	Water Chemistry: Water Molecule and Properties of Pure Water
9	Composition of Surface Water, Ground Water and Sea Water
10	Dissolved Gases and Environmental Factors Affecting Natural Waters
11	Acids, Bases, Salts, Hydrogen Ion Concentration
12	Modern Concept of pH and Buffer Systems
13	Water Sampling: Collection and Preservation Techniques
14	Measurement of Temperature, Transparency and Turbidity
15	Determination of pH, Electrical Conductivity, Salinity and Chlorinity
16	Determination of Total Solids (TDS, TSS, TVS and TVDS)
17	Dissolved Oxygen, Free Carbon Dioxide, Total Alkalinity and Total Hardness
18	Calcium, Magnesium, Inorganic Nitrogen (Ammonium & Nitrate), Phosphorus and Water Quality Criteria for Aquaculture
19	Soil Chemistry: Origin, Formation and Nature of Soils
20	Physical Properties of Soil: Colour, Texture, Structure, Pore Size, Bulk Density and Water Holding Capacity
21	Soil Types and Their Distribution
22	Soil Colloids, Cation Exchange Capacity and Organic Carbon
23	Carbon–Nitrogen Ratio and Soil Fertility
24	Soil Reaction: Acidity, Alkalinity, Electrical Conductivity and Redox Potential
25	Submerged Soils: Wetlands, Peat Soils, Mud-Water Fluxes, Methane and Hydrogen Sulphide Formation
26	Saline Soils, Alkali Soils and Acid Sulphate Soils
27	Iron Pyrites and Soil Reclamation
28	Soil Sampling and Sample Preparation
29	Soil Analysis: Texture, Water Holding Capacity, pH and Conductivity
30	Soil Analysis: Organic Carbon, Nitrogen, Phosphorus and Lime Requirement
31	Soil and Water Amendments: Lime, Manures, Fertilizers, Micronutrients, Zeolites, Alum and Gypsum

32	Environmental Amelioratives (Chlorination, Deodorizers, Bacterial Formulations), Soil Quality Criteria for Aquaculture
----	---

Practical

Practical No.	Name of Experiment
1.	Principle of Titrimetry
2.	Principle of Gravimetry
3.	Demonstration of Laboratory Glasswares
4.	Demonstration of Equipment used in Water and Soil Analysis
5.	Measurement of Water Temperature
6.	Determination of Turbidity in Water Sample
7.	Determination of pH in Water Sample
8.	Determination of Electrical conductivity of Water Sample
9.	Determination of Chlorinity and Salinity of Water Sample
10.	Determination of Total Solids in Water Sample
11.	Determination of Redox Potential of Water Sample
12.	Determination of Dissolved Oxygen in Water Sample
13.	Determination of Free Carbon Dioxide in Water Sample
14.	Determination of Total Alkalinity in a Water Sample
15.	Determination of Hardness in a Water Sample
16.	Determination of Ammonia in Water Sample
17.	Determination of Nitrite (NO ₂ -N) in water sample
18.	Determination of Nitrate (NO ₃ -N) in Water Sample
19.	Determination of Reactive Phosphorus in Water Sample
20.	Determination of Soil Texture by Sedimentation Method
21.	Determination of Soil pH
22.	Determination of Soil Electrical Conductivity (EC)
23.	Determination of Soil Available Nitrogen
24.	Determination of Soil Available Phosphorus
25.	Determination of Soil Organic Carbon



(Signature of Course Instructor)