

Anekant Education Society's  
Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati.  
(Autonomous)

Department of chemistry

S.Y. B.Sc.

Certificate course on "Chemical Analysis of Soil and Water"  
(2022-2023)

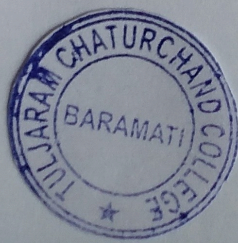
### SYLLABUS

#### Course Objectives:

- To understand the chemical composition of soil and water, including major ions, nutrients, and contaminants.
- To familiarize students with common analytical methods such as titration, spectrophotometry, chromatography
- To teach appropriate soil and water sampling techniques, including considerations for sample preservation and transport.
- To investigate the sources and effects of pollutants in soil and water systems, including heavy metals, pesticides, and organic contaminants.
- To enhance skills in scientific writing and reporting, focusing on the presentation of analytical findings and their implications.
- To understand the regulatory frameworks governing soil and water quality, including local and international guidelines.
- To develop critical thinking and problem-solving skills in evaluating environmental issues related to soil and water chemistry.

#### Course Outcomes:

- CO1: Students will gain a comprehensive understanding of the chemical properties of soil and water and their significance in environmental science.
- CO2: Students will develop practical skills in various analytical techniques for assessing soil and water quality.
- CO3: Students will be able to interpret analytical results and understand their implications for environmental health and agricultural practices.
- CO4: Students will learn to design and conduct experiments, including sampling, analysis, and reporting findings related to soil and water chemistry.
- CO5: To assess the quality of soil and water using established environmental standards and guidelines.
- CO6: To enhance skills in scientific writing and reporting, focusing on the presentation of analytical findings and their implications
- CO7: To provide hands-on experience through fieldwork, enabling students to apply theoretical knowledge in real-world settings.



Syllabus for Certificate Course (S.Y.B.Sc. Not related to subject)  
(2 Credits, 12 theory lectures and 18 hours practical)

*Title: Chemical Analysis of Soil and Water.*

**SECTION I : SOIL ANALYSIS**

1. Theory :

Introduction, Types of soil, Soil sampling, Sampling Procedure, Preparation of the solution, Procedures for soil analysis like  $P^H$ , EC, Micro and Macro elemental Analysis, Importance of soil analysis, Soil density and porosity, moisture in soils, Benefits/Advantages.

2. Practical:

- Determination of Na/K/Ca from soil sample by flame photometry.
- To determine sulphur/Phosphorous from soil sample by UV Visible spectrophotometer
- To determine pH, and EC from soil samples by pH metry and conductometry
- To determine Magnesium from soil sample
- To determine moisture in soil by gravimetric method.

**SECTION II : WATER ANALYSIS**

1. Theory :

Introduction, pH and EC of water, physical analysis of water, Human Use of water, Specific ion toxicity, Biological matter of water, Drinking water standards, water quality related problems in public health, Environment, Chemical Analysis of water, Biological Parameters of water, Purification and applications of water, Dissolved oxygen, Carbonates, Bicarbonates, Electrical conductivity, Hardness of water, COD, BOD, water sampling method, Advantages.

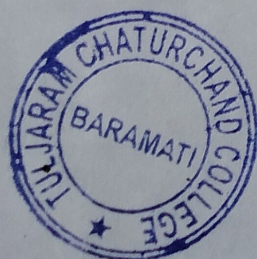
2. Practical ;

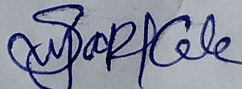
- To determine pH and EC from water sample
- To determine carbonates and Bicarbonates from water samples
- To determine hardness from water sample OR Determination of Ca by EDTA method
- To determine Na/K from water samples by flame photometry.

**References:**

1. Environmental Chemistry- A.K. Day
2. Soil, Plant, Water and Fertilizer Analysis. – P. K. Gupta.
3. Experimental Physical Chemistry, - R.C. Das, and B. Behera
4. Systematic experimental physical chemistry for BSc students, - S.W. Rajbhoj

**Evaluation: Report submission, MCQ Test and Practical examination.**



  
Head  
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