

Department of Chemistry
Certificate Course: Soil and Water Analysis

About Course:



Pravara Rural Education Society's Art, Commerce, Science and Computer Science College, Ashvi kd, Tal- Sangamner, District -Ahmednagar which provides education in science stream at under graduate level to educationally, economically, socially backward students of this area.

Soil testing is an efficient tool for determination of soil fertility status and to access the nutrient requirement of the crops. It is practical application of soil science to crop Production (Goswami, 1986). Liebig's law of minimum states that the growth of plant is limited by the plant nutrient element present in the smallest amount, all others being inadequate quantities. From this it follows that the given amount of soil nutrients is sufficient for any yield of given parentage nutrient composition.

Ramamurti et. al (1967) established the theoretical basis and experimental proofs for the fact that Liebig's law of the minimum operates equally for N, P, and K. This forms the basis for fertilizer application for targeted yield, first advocated by Troug (1960). Among the various methods of fertilizers recommendations the one based on yield targeting is unique in the sense that this method not only indicates soil test based fertilizer dose but also the level of yield the farmer can hope to achieve it.

The balance fertilization is the key of targeted yield equations thereby increase efficiency of applied fertilizers. The fertilizer application based on soil test and yield target help to save 10-15 % of fertilizer cost in each season.

Water is a universal solvent. It contains variable quantities of dissolved solids and gases. Sometimes, suspended and colloidal, organic and inorganic material occurs as well.

Waters are usually classified as hard and soft according to the concentration of calcium and magnesium ions. These ions when present in high concentration such waters are termed as

hard waters. The irrigation water which contains calcium and magnesium ions is hard and not suitable for domestic use but makes the agricultural land soft. On the other hand water which contains sodium ions is soft for domestic use but makes the agricultural land hard.

As the college is situated in rural area and most of the students are from farmer background hence to aware them about soil and water parameters, the Academic Council of Art, Commerce, Science and Computer Science College in its meeting decided to introduce a Certificate Course in Soil and water Analysis for next five academic sessions w. e. f. 2014-15. The continuation of the course after five year will depend on interest and participation of students, course outcomes from the institution.

Objectives of the Course:

1. To develop basic understanding regarding soil testing in the students.
2. To introduce them with macro and micro nutrients for soil.
3. To enhance their skills about water analysis.

Soil and Water Analysis Course Design and Examination Scheme

Instructional Design:-

The course duration is of Three months which includes theory classes, practicals, field Visits and assignment.

Course Structure and Examination Scheme:-

Course No.	Course Name	Contact Classes (Hour)	Laboratory Experiment (Hour)	Internal Examination	External Examination		Total Marks
					Theory	practical	
1.	Soil and Water Analysis	24	24	10 Marks	20 Marks	20 Marks	50

Course Fee: NA

No. of Seats: 25

Grading system: Following Percentage based grading system will be applicable to the course.

Range of % of Marks	Grade
90- 100	O
80-<90	A+
70-<80	A
65-<70	B+
55-<65	B
45- <55	C
40- <45	P
<40	Fail

Certificate Course: Soil and Water Analysis

Syllabus: Certificate course in Soil and Water analysis

Theory

Chapter	Content	Lectures
1.	Soil Analysis: Introduction, Types of soil, Soil pollutants, role of soil testing, Collection of soil sample for testing, determination of soil parameters viz., pH, EC, Organic carbon, NPK, soil testing for micronutrients, Gypsum requirement of soil, Lime requirement of soil, Uses of soil analysis	12
2.	Water Analysis: Introduction, Types of Water, Water pollutants, role of water testing, Common Sampling tools and accessories, sample collection procedure, water quality parameters viz., pH, electrical conductivity, chlorides, sulphates, calcium, magnesium, sodium, potassium, Water quality indices and suitability.	12

Practicals:

Practical	Title
Part I: Soil Analysis	
1.	To determine PH of given soil sample
2.	To determine salinity of given soil sample
3.	To determine nutrient content (NPK) of soil
4.	To determine micronutrient content of soil sample
5.	To determine electrical Conductivity of given soil sample
Part II: Water Analysis	
1.	To determine total hardness of water.
2.	To determine PH of given water sample.
3.	To determine alkalinity of water.
4.	To determine TDS of given sample of water
5.	To determine dissolved oxygen in water sample
6.	To determine Conductivity of Water Sample

Course Outcomes

After completion of the **certificate course in soil and water analysis**, student will be able to

1. Understand the Role of micronutrients in plant growth and development
2. Soil testing -Various soil test methods can be learnt
3. Impart knowledge on soil health, its assessment and maintenance for sustaining soil productivity.
4. Clear understanding of soil health and soil quality indices
5. Describe the main sources of water pollution, the main types of pollutant and how each type may be controlled
6. Understand the role of water testing

Water quality parameters like pH, ECD, Hardness, alkalinity, DO



Guidance to the farmers



Soil Sampling



