

21ELCT122 SOIL, PLANT, WATER AND SEED TESTING

Hours Per Week :

L	T	P	C
1	-	4	3

Total Hours :

L	T	P
15	-	60



Source:

<https://images.app.goo.gl/sQ87DLc2RtKeBx9SA>

COURSE DESCRIPTION AND OBJECTIVES:

Main aims of this course is to provide knowledge on quality parameter of soil, plant, water and seed. At the end of this course students gain knowledge to classify the soil, water, plant and seed based on their quality

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Identify and classify the Soil, Plant, Water and Seed based on their physical / chemical properties
2	Knowledge about methods of analysis of different quality parameters of Soil, Plant, Water and Seed

SKILLS:

- ✓ *Classify the Soil, Plant, Water and Seed based on their chemical and physical properties*
- ✓ *Estimation of mineral and nutrients in soils, plants and water*

ACTIVITIES:

- o Visit agricultural fields and collect samples of Soil, Plant, Water and Seed
- o Determination of pH and EC of soil and water
- o Determination of total soluble sugars, phenols and protein content in plant and seeds
- o Seed viability and vigor test

UNIT - 1

Introduction to analytical methods: Types of analytical methods; Principle of pH meter, EC meter, spectrophotometer, flame photometer and AAS

UNIT - 2

Soil analysis: Objectives; Sampling, processing and storage of soil samples; Determination of texture and bulk density; Theory and interpretation of soil analytical results viz., pH, EC, organic carbon, N, P, K, S and micronutrients (Fe, Mn, Zn, Cu, B) and nutrient index

UNIT - 3

Plant analysis: Sampling, drying, processing and storage of plant samples; Analysis of nutrients, Quantitative rating of plant analysis data and interpretation of results; critical nutrient concentrations and optimal ranges

UNIT - 4

Water analysis: Sampling and processing of water samples; Analysis, interpretation and reporting on water quality and suitability for irrigation; Use of soil testing kit for major and micronutrient analysis

UNIT - 5

Seed testing: Introduction; definition and importance; Sampling procedures; Testing for moisture, purity, germination, viability and vigor; Storage

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS**

1. SSAC Standardization of solutions and reagents, acid base titrations
2. SSAC Collection and preparation of soil samples
3. SSAC Estimation of soil pH and EC
4. SSAC Estimation of soil organic carbon, qualitative & quantitative
5. SSAC Estimation of available soil nitrogen by Subbiah & Asija method
6. SSAC Estimation of available soil phosphorus by Olsens method and Brays & Kurtz method
7. SSAC Estimation of available soil potassium by flame photometer method
8. SSAC Estimation of soil sulphur by turbidity method
9. SSAC Estimation of soil micronutrients by AAS
10. SSAC Estimation of CEC and exchangeable sodium in soil
11. SSAC Determination of EC and pH of saturation extract/paste
12. SSAC Estimation of cations and anions
13. SSAC Plant sampling and sample preparation for analysis, study of soil biota
14. SSAC Digestion of plant material
15. SSAC Estimation of N, P and K in plant sample
16. SSAC Rapid plant tissue test for N, P, and K

17. SSAC Collection of irrigation water sample and Determination of EC and pH of irrigation water
18. SSAC Estimation of Ca & Mg in Irrigation water
19. SSAC Estimation of carbonates and bicarbonates in Irrigation water
20. SSAC Estimation of chlorides in Irrigation water
21. SSAC Estimation of sodium in irrigation water and computation of SAR and RSC
22. CPHY Floral biology of cereals, millets and pulse crops
23. CPHY Floral biology of oil seed and fibre crops
24. CPHY Description of seed structures, composition and economic importance of cereals, Millets, pulses, fibre crops & oil seed crops
25. CPHY Physical purity test – Purification of seeds, inert matter, weed seeds, other crop seeds
26. CPHY Genetic purity- ODV test of self pollinated crops (Paddy, greengram, black gram, groundnut etc.,)
27. CPHY Growout test for hybrids of Cotton, Castor, Sunflower, Sorghum, Bazra
28. CPHY Determination of moisture by destructive analysis (Oven method P_2O_5 – phosphorous penta-oxide) Non destructive analysis with equipment
29. CPHY Seed health – Seed Borne diseases & total fungal colonies determination by examination of dry seed, blotting paper method, sodium hydroxide etc
30. CPHY Normal seedlings abnormal seedlings, FUC/Hard seeds dead seeds, declaration of results, prescribe standards / sub standards

REFERENCES:

1. Das, D.K. 2014. *Introductory Soil Science*, Kalyani Publishers, New Delhi
2. Tandon, H.L.S. 2013. *Methods of Analysis of Soils, Plants, Waters, Fertilizers and Organic Manures*. Fertilizer Development and Consultation Organization, New Delhi
3. Chopra, S.L and Kanwar, J.S. 2010. *Analytical Agricultural Chemistry*. Kalyani Publishers, New Delhi
4. *Soil Test Based Fertilizer Application*. 2007 AICRP on STCR, ANGRAU, Hyderabad
5. Indian Society of Soil Science. 2015. *Soil Science – An Introduction*. IARI, NewDelhi

