

Certificate Course in Soil Testing and Fertilizer Recommendation

Duration : 3 Months

Eligibility : 12th Science and Above Qualification

Syllabus Scheme

Sr. No.	Paper No.	Total Workload	Max Marks	Internal Marks	External Marks	Min. Pass Marks
1	Paper I - Theory	50 Hours	50	10	40	20
2	Paper II – Theory	50 Hours	50	10	40	20
3	Paper III – Practical	50 Hours	100	20	80	40

Note :

1. Internal Assessment for theory shall be based on performance in unit test & assignment.
2. Internal Assessment for practical shall be based on followings.
 - i) Field Visit : 10 Marks
 - ii) Record Book : 05 Marks
 - iii) Viva Voce : 05 Marks

Introduction to Soil Science

Paper : I

Lectures to be Delivered	:	50	Max. Marks : 50
Periods per Week	:	05	Min. Marks For Passing : 20

- Unit – I : Introduction: 8 Hours**
Definition of Soil, Concept of Lithosphere, Soil as a natural body, Soil Components: Air, Water, inorganic and organic solids, Formation of Soil, Types of Soils & Basic Concepts.
- Unit – II : Properties of Soil: 16 Hours**
Introduction to properties of Soil:
A) Physical Properties :-
Soil Separates, Texture, Aggregation and Structure, Temperature, Colour, Properties of Soil Mixture, Pore Space, Bulk Density, Particle Density, Aeration and Drainage, Compaction, Surface area, Soil water relationships.
B) Chemical Properties :-
Morphology of Colloids, Chemistry of Clays, Ionic Exchange, Acidity, Alkalinity, pH, Salinity, Reactions in Liming and Acidification.
C) Biological Properties :-
Soil Organic Matter, C: N Relationships, N-Transformation, Soil Organisms, Sulfur Transformation.
- Unit – III : Fertility Status of Soils 8 Hours**
Fertility status of soils, soil deficiency with respect to macro and micro nutrient components, brief study of micronutrient & macronutrient sources & Importance, remedial measures to overcome deficiency.
- Unit – IV : Soil Profile & Classification 8 Hours**
Soil profile, Soil forming factors, soil survey methods, soil survey reports, soil distribution, classification system.
- Unit – V : Conservation and Management 8 Hours**
Drainage, Soil erosion, types of Irrigation, Land use Classification, Plant & Animal waste, Municipal & Industrial by products & their impact, nutrient loading, tillage system, wetlands.

Books Recommended :

1. Soils and soil fertility, Troch, F.R. And Thompson, L.M. Oxford Press.
2. Fundamentals of soil science, Foth, H.D. Wiley Books.
3. Soil Science and Management, Plaster, Edward J., Delmar Publishers.
4. Principles of Soil Chemistry (2nd ed.) Marcel Dekker Inc., New York.
5. Handbook of Agricultural Sciences, S.S.Singh, P.Gupta, A.K.Gupta, Kalyani Publication.

Soil Testing and Analysis

Paper : II

Lectures to be Delivered : 50 Max. Marks : 50
Periods per Week : 05 Min. Marks For Passing : 20

Unit – I : Importance of Soil Testing and Analysis 8 Hours

Unit – II :
Sample Collection and Processing Purpose of Soil testing and analysis, selection of field, Method of Soil Sample collection Methods of soil sample processing, precautions during soil collection & processing, Preservation labelling and Storage of soil samples, various types of tools used for collection. **12 Hours**

Unit – III : Study of Instruments:
Brief study of instruments : PH Meter, Conductivity meter, spectrometer, UV-Spectrophotometer, (Calibration, Instrumentation, applications only) use of soil testing kit and mobile soil testing van. Kjeldahl's Assembly for determination of nitrogen. **8 Hours**

Unit – IV : Study of Laboratory Setup
Laboratory Layout, Built up area, Laboratory requirements, working pattern, budget requirement, trained manpower, various funding schemes and agencies. **10 Hours**

Unit – V : Soil Test Report & Fertilizer Recommendation :
Preparation of Soil analysis and test report, Fertilizer recommendation, preparation of soil test summaries and fertility maps. **10 Hours**

Books Recommended (Books suggested for Reading) :

1. Soil Sampling, Preparation and analysis, Marcell Dekker, Inc, New York.
2. Soil Sampling and methods of analysis, Carter M.R. and E.G. Gregorich, 2007, 2nd Ed..
3. Methods of soil analysis, Part, American society of Agronomy Inc., Keute, A. et al., 1986.

Paper: III
Soil Analysis & Testing Methods
PRACTICALS

No. Of Practical's : Max Marks : 100

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|-------------------|---|----|
| a) Practical Exam | : | 80 |
| b) Field Visit | : | 10 |
| c) Record Book | : | 5 |
| d) Viva Voce | : | 5 |

1. Visit to Soil Testing Laboratory & Report writing.
2. Visit to Farmers Fields for Collection of Soil Samples, identification of nutrient deficiency Symptoms in Crop.
3. Preparation of Various Chemical reagents required for soil testing.
4. Processing of Soil Sampling for analysis
5. Determination of PH of soil sample using PH meter
6. Determination of Electrical Conductivity of Soil Sample using Electrical Conductivity meter.
7. Determination of Organic Carbon by wet Oxidation method.
8. Determination of available Nitrogen from Soil Sample.
9. Determination of available phosphorus from soil sample.
10. Determination of available Potassium from soil sample.
11. Determination of Calcium Carbonate from soil sample.
12. Determination of micronutrients from soil sample.
13. Determination of lime requirement of deiclic soil.
14. Determination of Gypsum requirement of Soil.
15. Preparation of soil test report, Interpretation of result and fertilizer recommendation.
16. Preparation of soil test summaries and fertility maps.
17. Preparation of Soil Health Card.
18. Use of Various soil testing kits and working of mobile soil testing van.

Books Recommended:

1. Introduction to soil laboratory manual -J.J.Harsett stipes.
2. Introduction to soil science laboratory manual, Palmer and troch - Iowa state.