

Sant Gadge Baba Amravati University

Dept. of Lifelong Learning & Extension

Short Term Certificate Course

(3 Month)

Syllabus

For

Certificate Course in Soil Testing

(Section A)

Introduction to Soil Science

Unit – I:

Introduction:

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:

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

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

Soil profile, Soil forming factors, soil survey methods, soil survey reports, soil distribution, classification system.

Unit – V:

Conservation and Management

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 (2Wed.) Marcel Dekker Inc., New York.
5. Handbook of Agricultural Sciences, S.S.Singh, P.Gupta, A.k.Gupta, Kalyani Publication.

(Section-B)
Soil Testing and Analysis

Unit – I:

Importance of Soil Testing and Analysis

Unit – II:

Sample Collection

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 labeling and Storage of soil samples, various types of tools used for collection.

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.

Unit – IV:

Study of Laboratory Setup

Laboratory Layout, Built up area, Laboratory requirements, working pattern, budget requirement, trained manpower, various funding schemes and agencies.

Unit – V:

Soil Test Report & Fertilizer Recommendation :

Preparation of Soil analysis and test report, Fertilizer recommendation, preparation of soil test summaries and fertility maps.

PRACTICALS

Soil Analysis & Testing Methods

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 (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, 2ndEd..
3. Methods of soil analysis, Part, American society of Agronomy Inc., Kuete, A. Et. at., 1986.
4. Introduction to soil laboratory manual -J.J.Harsett stipes.
5. Introduction to soil science laboratory manual, Palmer and troch - Iowa state.
