

Course Code : SSC 102

Course Title : Soil Fertility, Fertilizers and Integrated Nutrient Management

Credit Hours : 3(2+1) Full Marks: 75 Theory: 50 Practical: 25

OBJECTIVES

Upon the completion of this course, the students will be able to understand soil in relation to soil fertility; inorganic and organic fertilizers, and role of organic matter and bio-fertilizers in crop production.

I. SYLLABUS

Historical development of soil fertility and plant nutrition; essential plant nutrients and criteria of essentiality; sources, functions, deficiency symptoms and availability of plant nutrients to plants; chemical fertilizers – composition, use, and behavior in soil; bio-fertilizers and their uses; prospects of bio-gas in the Nepalese economy and environmental trade-off; preparation of manure, green manure and composted manure; methods of soil fertility evaluation for crop production; integrated nutrient management; soil fertility problems of Nepal; soil management for sustainable agricultural development.

II. COURSE OUTLINE

A. Lecture

S. N.	Topic	No. of Lectures
1.	Historical development of soil fertility and plant nutrition	1
2.	Essential plant nutrients: a) Criteria of essentiality, b) macro/ primary and secondary plant nutrients, c) their sources, functions, deficiency symptoms and control measure , and availability to plants.	5
3.	Introduction to micro nutrients, their function, deficiency symptoms and control measure in plant.	2
4.	Fertilizers: a) Nitrogenous, phosphetic and potassic fertilizers, b) their composition, uses and behaviors in soil.	4
5.	Organic matter; source and composition and function.	2
6.	Organic manure : source, classification and preparation; bio-fertilizer and green manuring; bio-gas and its importance in Nepal	2
7.	Soil fertility evaluation: soil testing, plant analysis visual diagnosis, and biological test method	3

8.	Soil fertility problems with respect to Nepalese agricultural system; effect of continuous use of organic versus inorganic fertilizers on soil fertility	3
9.	Soil management for sustainable agriculture	3
10.	Factors affecting fertilizer use efficiencies; tillage and traction affecting soil fertility	2
11.	Integrated nutrient management (INM), concept and relevance, components and management options of INM	3
Total		30

B. Practical

S. N.	Topic	No. of Practicals
1.	Identification and function of soil fertility laboratory equipment	1
2.	Soil sampling and preparation for soil fertility analysis	1
3.	Use of kit box for different elemental analysis in soil	2
4.	Chemical calculation and preparation of standard solution.	1
5.	Determination of organic matter content in soil	1
6.	Basic principles of micro- Kjeldahl distillation assembly, spectrophotometer, flame photometer	2
7.	Determination of available nitrogen in soil	2
8.	Determination of available phosphorus in soil	1
9.	Determination of available potassium in soil	1
10.	Plant sampling and their preparation for elemental analysis	1
11.	Collection and identification of nutrient deficiency symptoms on major crops in and around AFU farm.	2
Total		15

REFERENCES

Nyle C. Brady and Ray R. Weil. 2012. *The Nature and Properties of Soils*. 14th Ed. Prentice-Hall, Inc.

Robert E. White. 2009. *Principles and Practice of Soil Science: The soil as a natural resource*. 4th Ed. Blackwell Publishing Co.

Tisdale, S.L., W.L. Nelson, J.D. Beaton, and J.L. Havlin. 1993. *Soil Fertility and Fertilizers*. 5th Ed. P. F. Corey (Ed.). Macmillan Publishing Co., 866 Third Avenue, New York.

Rabindra N. Roy. 2006. *Plant Nutrition for Food Security: a guide for integrated nutrient management*. Food and Agriculture Organization of the United Nations.