

21SSAC221 MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P
30	-	30

COURSE DESCRIPTION AND OBJECTIVES:

The course is aimed at offering the elements of soil fertility management, detailed idea about the preparation of manures and their importance in agriculture and about chemical fertilizers and their reactions in soils

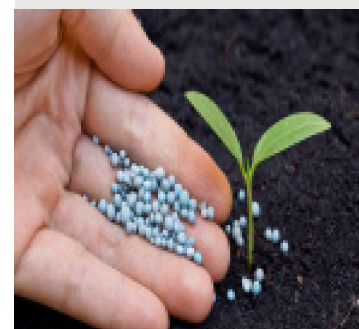
COURSE OUTCOMES:

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

COs	Course Outcomes
1	Acquire knowledge about essential plant nutrients, their availability and critical levels required for crop growth
2	Good understanding about various organic and inorganic sources of nutrients and the amounts required for sustainable production and productivity of various crops
3	Understand the concept of soil fertility and productivity and how it can be enhanced

SKILLS:

- ✓ *Quality analysis of fertilizers*
- ✓ *Identify different chemical fertilizers and different sources of nutrients*
- ✓ *Calculate requirement of fertilizers to the unit area of soil*
- ✓ *Estimation of nutrients in fertilizers*
- ✓ *Reclamation of problematic soils*
- ✓ *Green manure crop – Soil management*



Source :

<https://plantcaretoday.com/apply-fertilizer-how-much.html>

ACTIVITIES:

- o Quantification of available N, P and K in soils
- o Quantification of available N and P in plants
- o Determination of N, P and K in fertilizers
- o Identification of Problematic soils

UNIT - 1

Introduction: History of soil fertility and plant nutrition; Criteria of essentiality and essential plant nutrients, Role, deficiency and toxicity symptoms of essential plant nutrients; availability and factors affecting availability of nutrients, Mechanisms of nutrient transport to plants, Relation between nutrient supply and crop growth

UNIT - 2

Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers; secondary & micronutrient fertilizers; Complex fertilizers; Nano fertilizers, Fertilizer Storage, Fertilizer Control Order; Residual effects and fertilizer use efficiency; nutrient interactions and their effect on crop growth

UNIT - 3

Manures and other organic materials: Concepts and importance of organic manures; properties and methods of preparation of farmyard manure, compost, green manure, vermicompost, biofertilizers and other organic concentrates; composition, availability and crop responses to organic additions; Recycling of organic wastes and residue management

UNIT - 4

Major and micronutrients: Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients; Soil fertility evaluation; Soil testing; Critical levels of different nutrients in soil; Forms of nutrients in soil, plant analysis, rapid plant tissue tests

UNIT - 5

Fertilizer recommendations and management: Indicator plants; Methods of fertilizer recommendations to crops; Factor influencing nutrient use efficiency (NUE); Timing and methods of application under rain fed and irrigated conditions; Foliar application of fertilizers; Economics of fertilizer use; Integrated nutrient management

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS**

1. Introduction to analytical instruments and principles-spectrometry and flame Photometry
2. Estimation of available N (inorganic) in soils
3. Estimation of available P in soils
4. Estimation of exchangeable K, Na, Ca and Mg in soils
5. Estimation of available S and B in soils
6. Estimation of available Cu, Fe, Mn and Zn in soils
7. Basics of Plant analysis and estimation of N in plant samples
8. Estimation of P in plant samples
9. Estimation of K & S in plant samples
10. Identification acid radicals in fertilizers /salts

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11. Identification of basic radicals in fertilizer /salt
 12. Estimation of N in Ammonium sulphate
 13. Estimation of N in Urea and FYM
 14. Estimation of water soluble P_2O_5 in SSP
 15. Estimation of K in Muriate of potash or Sulphate of potash by using Flame photometer

REFERENCES:

1. Indian Society of Soil Science, 2012. *Fundamentals of Soil Science*. IARI, New Delhi
2. D. K .Das 2014. *Introductory Soil Science*. Kalyani Publishers, New Delhi
3. Yawalkar K.S, Agarwal, T.P and Bokde, S 1995. *Manures and Fertilisers*. Agril. Publishing House, Nagpur
4. Samuel Tisdale, Nelson Werner L, Beaton James D and Havlin John L. 2005. *Soil Fertility and Fertilizers: An Introduction to Nutrient Management*, Macmillian Publishing Co., New York

