

# Syllabus for Bachelor of Agriculture

## Soil Science and Agricultural Chemistry

Subject code: 16AS0202

Subject Name: **Manures, Fertilizers and Soil Fertility Management**

B. Sc. (Hons.) Agri., **First Year (Sem. - II)**

### Objective:

To create the awareness of the students about Soil Fertility and Fertilizer management.

**Credit Earned:** 2+1= 3 Credit

### Course Outcomes:

After completion of this course, student will be able to:-

1. Know the requirements of manures and fertilizers for various crops and their proper time of application.
2. Know how the soil fertility and productivity can be maintained for better crop production.

### Teaching and Evaluation Scheme

Teaching Scheme (hours)		Credits	Theory Marks			Practical Marks		Total Marks
Theory	Practical		ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
2	2	3	50	30	20	25	25	150

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### Contents:

Unit	Topics	Contact Hours
<b>Theory</b>		
1.	Classification and importance of organic manures, properties and methods of preparation of bulky manures.	
2.	Green/leaf manuring. Transformation reactions of organic manures in soil and importance of C:N ratio in rate of decomposition.	
3.	Integrated nutrient management.	
4.	Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary and micronutrient fertilizers, complex fertilizers, nano fertilizers.	
5.	Soil amendments, fertilizer storage and fertilizer control order.	
6.	History of soil fertility and plant nutrition. Criteria of essentiality.	
7	Role, deficiency and toxicity symptoms of essential plant nutrients.	
8	Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants.	
9	Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients.	
10	Soil fertility evaluation and soil testing.	
11	Critical levels of different nutrients in soil.	
12	Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants.	
13	Methods of fertilizer recommendations to crops.	
14	Factors influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.	

Unit	Topics	Contact Hours
<b>Practical</b>		
1	Determination of moisture and organic matter content from manures samples.	
2	Estimation of N, P, K, and S from manure samples.	
3	Determination of N from urea fertilizers.	
4	Determination of NH <sub>4</sub> . N, NO <sub>3</sub> .N from nitrogenous fertilizers.	
5	Determination of P from phosphatic fertilisers	
6	Determination of K from potassic fertilisers	
7	Determination of S from sulphur fertilisers	
8	Estimation of available N, P, K, S and micro nutrient ( Fe, Mn, Zn, Cu ) from soil samples.	

### Reference Books:

1. Manures and fertilizers  
Das P. C., Rept. 2015, Kalyani Publishers Pvt. Ltd., New Delhi
2. Practical manual for Agril. Chemistry  
Gupta A. K. and Varshney M. L., Kalyani Publishers Pvt. Ltd., New Delhi
3. Soil Fertility Management  
Nagornny V. D. and Raghav J. S. Rept. 2015, Kalyani Publishers Pvt. Ltd., New Delhiss

### Instructional Method:

- a) The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs *etc.*
- b) The internal evaluation will be done on the basis of continuous evaluation of students in the class-rooms
- c) Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory
- d) Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.