TEACHING PLAN: MANURE, FERTILIZERS AND SOIL FERTILITY MANAGEMENT

SCHOOL: SOHSS		ACADEMIC SESSION: 2023 – 2024		FOR STUDENT'S BATCH: 2021-2025	
1	Course Code	ASS-301			
2	Course Title	MANURE, FERTILIZERS AND SOIL FERTILITY MANAGEMENT			
3	Credits	3 (2+1)			
4	Learning Hours	Contact Hours: 72; Assessment: 24; Guided Study: 28; Total hours: 100			
5	Course Objective	1. To learn about the importance of organic manures 2. To provide knowledge of integrated nutrient management and role of plant nutrients 3. To know the various methods of soil testing and learn about nutrient use efficiency 4. To learn the recommended dose of various fertilizers in various crop			
6	Course Outcomes	1. Knowledge of different manure and fertilizers used in different crops according to soil condition 2. To understand essentiality of plant nutrients and mechanism of nutrient transport to plant and factor affecting nutrient availability. 3. To be able about procedure of soil testing and establish soil testing laboratory in future as an entrepreneur.			
7	Outline Syllabus:				
7.01	Paper Code	Unit		Reference Number	Teaching Methods
7.02	ASS-301	UNIT-I	a) Introduction and importance of organic manures b) properties and methods of preparation ofbulky and concentrated manures c) Green/leaf manuring d) Fertilizer recommendation approaches.	ICAR Course, New Delhi PP:4-35	Lecture and ppt
		UNIT-II	a) Integrated nutrient management. b) Chemical fertilizers: classification, composition and properties of major nitrogenous. c) classification, composition and properties of phosphatic, potassic fertilizers. d) secondary & micronutrient fertilizers, Complex fertilizers.	ICAR Course, New Delhi PP:36-58	Lecture and ppt

		UNIT-III	a) Nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order. b) History of soil fertility and plant nutrition. c) Criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients. d) Mechanisms of nutrient transport to plants, factorsaffecting nutrient availability to plants.	ICAR Course, New Delhi PP:59-83	Lecture and ppt
7.03	**ASS-301**	UNIT-IV	a) Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. b) Soil fertility evaluation, Soil testing. Criticallevels of different nutrients in soil. c) Forms of nutrients in soil, plant analysis, rapid plant tissuetests. Indicator plants d) Methods of fertilizer recommendations to crops. Factor influencingnutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.	ICAR Course, New Delhi PP:84-123	Lecture and ppt

8	**Course Evaluation**	
8.1	**COURSE ASSESEMENT: 30%**	
8.1.1	**Attendance**	**5 %**
8.1.2	**Homework**	**5 %**
8.1.3	**ClassTest**	**5 %**
8.1.5	**Presentation**	**5%**
8.1.6	**Any other**	**20%**
8.2	**MTE**	**10%**
8.3	**End-term examination: 50%**	
9	**Text Books & References**	
9.1	**Text book**	1. E-Course of ICAR, New Delhi
9.2	**Reference**	1. Introductory Soil Science (2013) by D.K. Das, Kalyani Publishers, New Delhi 2. Manures and Fertilizers (2009) by P. C. Das, Kalyani Publishers, New Delhi 3. Fundamentals of Soil (2000) by V.N. Sahai, Kalyani Publishers, New Delhi
9.3	**Video References**	Subscribe the https://youtu.be/TjbxOEEOCh0

Mapping of Outcomes v. Topics

Outcome no. → Syllabus topic↓	1	2	3	4
Paper Code.Unit I (a)	✓			
Paper Code. Unit I (b)		✓		
Paper Code. Unit I (c)		✓		
Paper Code.Unit II (a)			✓	
Paper Code. Unit II(b)	✓	✓		
Paper Code. Unit II(c)		✓		
Paper Code.Unit III (a)			✓	
Paper Code. Unit III(b)	✓			
Paper Code. Unit III(c)	✓			
Paper Code.Unit IV (a)	✓		✓	✓
Paper Code. Unit IV(b)	✓		✓	✓
Paper Code. Unit IV(c)	✓		✓	✓

QUESTION BANK

DESCREPTIVE QUESTION

1. Briefly describe the NADEP method of composting?
2. Define the vermicomposting.Name the earthworm species used for vermicomposting.Give the per cent content of plant nutrients in vermicompost?
3. Briefly describe the method of vermicomposting?
4. What do you mean by sewage and sludge?What are the different methods of sewage treatment?
5. Define green manuring .What are the type of green manuring?
6. Give the name of concentrated organic manure and per cent content of N P K in them?
7. Which important gas is produced in bio-gas plant?How this gas is produced?
8. What is the average plant nutrients of N P K in F Y M ,compost, and oil cakes?
9. What are the sources of secondary plan nutrients Describe the soil conditions conducive for deficiency of secondary nutrients?
10. Name coated N-fertilizers.How the N-efficiency of urea can be increased.Mention the characteristics of nitrification inhibitors?
11. How the superphosphate is formed .Give the reaction when it is added to the soil?
12. Define and classify the biofertilizers.Give the specification of Rhizobium boifertilizers.
13. Name the bacteria who fix the atmospheric nitrogen in none leguminous crops.What is the method of application of bio –fertilizers in the crops
14. Write the name of phosphate solubilizing micro organisms.How they solubilizes the insoluble form of phosphorus into soluble form.
15. Describe the technique of green manuring .What are the characteristics of green manure crops?

16. Give the list of leguminous crops used as green manure crops their botanical name ,sowing season ,av.yield ,nitrogen per cent and N added Kg/ha.
17. Give the list of crops suitable for different type of sewage application .How much the total sewage generation per annum in our country. What does the sludge contain Nitrogen,phosphorus and potassium?
18. Describe the Indore method of composting and its impact on soil fertility?
19. Describe the manufacturing process of Muriate of potash and its reaction in soil?
20. Give the name of phosphorus fertilizer which is insoluble in water and reaction taking place when it is applied in acid soil?
21. What do you mean by phosphorus fixation? How superphosphate get converted into insoluble form?
22. Give the name of essential plant micronutrients. Mention their sources, chemical formulae and per cent content?
23. Mention the different species of Rhizobium which fixes atmospheric nitrogen and mention the amount of nitrogen fixed by them. Describe the advantages of Rhizobium biofertilizer?
24. What is azolla? Name the different species of Azolla used as biofertilizer.What is the method of application of azolla?
25. What is the available form of potassium? Classify the potassic fertilizers. Describe the manufacturing process of potassium sulphate and reaction in soil?
26. Define complex fertilizers. How the monoammonium and diammonium phosphates are manufactured? Give the nature of nitrophosphates and reaction in soil?
27. Classify insecticides based on chemical nature. What is the mode of action of organophosphorus insecticides? List its advantages?
28. Define botanical insecticides and classify them. Describe its advantages?
29. Give the list of micronutrients fertilizers , their per cent content of micronutrients and method of application?
30. What are the different forms of phosphorus available to plants ?Classify the phosphatic fertilizers describing their chemical nature and per cent content of phosphorus?
31. Give a sketch of construction of Gobar Gas plant. Describe its advantages and effect of manure of gobar gas plant on soil fertility. Give the per cent content of different plant nutrients present in manure?
32. Classify the nitrogenous fertilizers. Describe their important characteristics and per cent content of nitrogen?
33. What is fertilizers control order? Give the specification of urea, ammonium sulphate, muriate of potash and sulphate of potash?
34. What is the manufacturing process of sulphate of potash? Give its nature and properties and reaction in soil?

PROJECTS/ASSIGNMENT (To be given to group of students)

1. Assignment
2. Field Visit
3. MOOC Courses