Syllabus for Bachelor of Agriculture

AGRICULTURAL MICROBIOLOGY

Subject code: **16AS0104**

Subject Name: **AGRICULTURAL MICROBIOLOGY**

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

Objective:

1 To acquire the knowledge of role of microbes in agriculture

Credit Earned: 1+1 = 2 Credits

Course Outcomes:

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

1. Articulate and retain knowledge regarding importance of different microbes in agriculture.
2. To know the role of microbes in soil fertility and crop productivity.
3. Acquaint with the instruments used in the Agricultural Microbiology laboratory as well as isolation methods.

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)	
1	2	2	50	30	20	25	25	150

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Contents:

Unit	Topics	Contact Hours
	Theory	
1.	Introduction, Microbial world, Prokaryotic and Eukaryotic microbes.	1
2.	Bacteria: cell structure, chemoautotrophy, photo autotrophy growth.	1
3.	Bacterial genetics: Genetic recombination-transformation, conjugation and transduction, plasmids, transposon	3
4.	Role of microbes in soil fertility and crop production	1
5.	Carbon, Nitrogen, Phosphorous and sulphur cycles	2
6.	Biological nitrogen fixation- symbiotic, associative and asymbiotic.	1
7.	Azola, blue green algae and mycorrhiza	1
8.	Rhyzosphere and phyllosphere	1
9.	Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation	2

Unit	Topics	Contact Hours
	Practical	
1.	Introduction to microbiology laboratory and its equipments	1
2.	Microscope- parts, principles of microscopy, resolving power and numerical aperture	1
3.	Methods of sterilization	1
4.	Nutritional media and their preparations	1
5.	Enumeration of microbial population in soil- bacteria, fungi, actinomycetes	1
6.	Methods of isolation and purification of microbial cultures	1
7.	Isolation of *Rhizobium* from legume root nodule	1
8.	Isolation of *Azotobacter* from soil	1
9.	Isolation of *Azzospirillum* from roots	1
10.	Staining and microscopic examination of microbes	1

Reference Books:

1. Microbiology-
   Prescott, Harley and Klein , 5th ed. The Mc Graw- Hill Companies, USA
2. Fundamentals of Microbiology
   Bhattacharjee R. N., Kalyani Publishers, New Delhi
3. An introduction to microbiology
   Reddy, N. P. Eswara. and Surendra V., Kalyani Publishers, New Delhi
4. General Microbiology Vol II

Powar C. B. and Daginawala, H. F., Himalaya Publishers, Mumbai
5. Biotechnology of Biofertilizers
Kannaiyan, S. , Narosa Publisher
6. Handbook of Biofertilizers and Microbial pesticides
Vora, M. S., Shelat, H. N. and Vyas, R. V., Satish Serial Publishing House, New Delhi
7. Handbook of biofertilizers
Somani, L. L., Agrotech Pub. Academy, Udaipur
8. Microbiology- A laboratory manual
James G., Cappuccino and Natalie Sherman, 4th ed , Addison- Wesley Publication.

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 black 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 laboratory and class-room.
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.