B.Sc. III Year **Semester – VI**

BIM -S602
SEC-4: AGRICULTURAL MICROBIOLOGY

MM : 100
Time : 3 hrs
L Credit
4 4
Total Hours: 60

Sessional : 30
ESE : 70
Pass Marks : 40

Learning objectives:

- Students will learn about positive or negative interaction of microorganisms with soil.
- To impart in-depth information on soil and agriculture.
- To know the importance of biofertilizers and biopesticides.
- To make the students to know about various techniques involved in biofertilizers and biopesticides production.

Learning outcomes:

At the end of course students will be able to

- Describe the positive and negative aspect of microbes in soil fertility.
- Explain or suggest different biocontrol methodto control pests.
- Develop biofertilizer or biopesticide in lab conditions .
- Isolate *Rhizobium* from the root nodule of leguminous plants.

UNIT - I

Soil Microbiology: Soil as microbial habitat, soil profile and properties, soil formation, diversity and distribution of microorganisms in soil; mineralization of organic & inorganic matter in soil-mineralization of cellulose, hemicelluloses, lignocelluloses, lignin and humus, phosphate, nitrate, silica, potassium. **(16 Lectures)**

UNIT - II

Microbial Control of Soil Borne Plant Pathogens(Biopesticides): Biological control; biocontrol mechanisms; microbial preparations used as biocontrol agents against plant pathogens, insects, weeds, commercial biofungicides

(14 Lectures)

UNIT - III

Biofertilizers & PGPRs: Plant growth promoting bacteria, biofertilizers – symbiotic (*Bradyrhizobium, Rhizobium, Frankia*), Non Symbiotic (*Azospirillum, Azotobacter*, Mycorrhizae, MHBs, Phosphate solubilizers, algae), Novel combination of microbes as biofertilizers, PGPRs and its application.

(16 Lectures)

UNIT - IV

Secondary Agriculture Biotechnology: Biomanure, biogas, biofuels– advantages and processing parameters.

(08 Lectures)

UNIT - V

GM crops: Advantages, social and environmental aspects; methods of preparation; Bt crops, golden rice.

(06 Lectures)

Suggested Reading

1. DubeyR.C.*A Textbook of Biotechnology*. 5th ed., S. Chand & Co, Ram Nagar, New Delhi, p. 1034. ISBN 81-219-2620-3
2. Singh and Purohot, Microbial Ecology, AGROBIOS
3. Atlas. Microbial Ecology, Pearson Education ISBN13: 9788129707710

17.4.21

BIM -S603
SEC-4: PROJECT WORK

DSE 2/SEC 4 SEMESTER VI BIM-E651 (LAB COURSE)

1. Blood group determination by slide agglutination method.
2. Demonstration of bacterial plasmid isolation.
3. Demonstration of Genetic recombination in bacteria.
4. UV induced auxotropic mutant production, isolation replica plate technique.
5. Determination of nitrate production in nitrite broth soil cultures.
6. Isolation of *Fusarium*sp. from soil.
7. Isolation of *Macrophominaphaseolina* from soil.
8. Isolation of Rhizobia from root nodule.
9. Isolation of *Azotobacter*.
10. Isolation of antibiotic resistant bacteria by gradient plate technique.
11. Estimation of DNA by diphenylamine method.
12. Predict the microorganism on the basis of reaction on TSI slant
13. Perform citrate utilisation test.
14. Determination of titre by slide agglutination method.

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