B.Sc. IV Year **Semester – VIII**

BIM –E802
DSE-11: AGRICULTURAL MICROBIOLOGY

MM : 100
Time : 3 hrs
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Sessional : 30
ESE : 70
Pass Marks : 40

Total Hours: 60

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 aspects of microbes in soil fertility.
- Explain or suggest different biocontrol methods to 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

DSE 11 SEMESTER VIII / BIM-E852 (LAB COURSE CC-11)

The practicals based on BIM E802 will be performed.

1. To perform isolation of fungal pathogens (*Fusarium* sp., *Macrophomina phaseolina*, *Phytophthora* sp. from soil.
2. Demonstration of production of amino acid by soil fungi.
3. Detection of siderophore produced by given organism.
4. Production of ammonia from organic compounds i.e., ammonification.
5. Isolation of *Azotobacter* from garden soil.
6. Isolation of *Azospirillium* from soil/roots.
7. Demonstration of bacterial commensalism.
8. Demonstration of bacterial synergism.
9. Demonstration of bacterial antagonism.
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