B.Sc. IV Year **Semester – VIII**

BBO –E802
DSE-11: AGRICULTURAL MICROBIOLOGY

MM : 100
Time : 3 hrs
L Credit
4 4

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 aware 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 method to control the pests.
- Develop biofertilizer or biopesticide in the lab conditions.
- Isolate *Rhizobium* from the root nodule of leguminous plants.

UNIT – I **(16 Lectures)**

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.

UNIT – II **(14 Lectures)**

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.

UNIT - III **(16 Lectures)**

Biofertilizers & PGPRs

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

UNIT - IV **(08 Lectures)**

Secondary Agriculture Biotechnology

Biomanure, biogas, biofuels– advantages and processing parameters.

UNIT - V **(06 Lectures)**

GM crops

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

Suggested Reading

1. Singh and Purohot, Microbial Ecology, AGROBIOS
2. Atlas. Microbial Ecology, Pearson Education ISBN13: 9788129707710.
3. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, 4th edition. Singapore, Singapore: John Wiley & Sons.
4. Agrios, G.N. (1997). Plant Pathology, 4th edition. Cambridge, U.K.: Academic Press.
5. Pelzar, 1963. Microbiology, Tata Mc Graw Hill, New Delhi

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

The Practicals based on BBO E802 shall 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. Demonstration of phosphate solubilisation by given organism.
4. Production of ammonia from organic compounds i.e., ammonification.
5. Isolation of *Azotobacter* from garden soil.
6. Isolation of *Rhizobium* from soil/root nodules.
7. Demonstration of bacterial commensalism.
8. Demonstration of bacterial synergism.
9. Demonstration of bacterial/fungal antagonism.

27/5/2022

27/5/22