BIOFERTILIZERS
[30L]
[Credits 2]

Course Description: The course emphasizes empowering with the right knowledge to make regarding bio-fertilizers and its benefits in agriculture.
Course Objectives: To facilitate the students to understand the basics of biofertilizers, make them ready for industry as entrepreneurs.
Course learning outcomes: The students will gain the ability to distinguish the types of biofertilizers and methods of application in farmers' field.

Unit I: **[04 Hrs.]**
General account about the microbes used as biofertilizer – Rhizobium – isolation, identification, mass multiplication, carrier-based inoculants, Actinorrhizal symbiosis.

Unit II: **[08 Hrs.]**
Azospirillum: isolation and mass multiplication – carrier based inoculant, associative effect of different microorganisms.Azotobacter: classification, characteristics – crop response to Azotobacter inoculum, maintenance and mass multiplication.

Unit III: **[04 Hrs.]**
Cyanobacteria (blue green algae), *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, blue green algae and *Azolla* in rice cultivation.

Unit IV: **[08 Hrs.]**
Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.

Unit V: **[06 Hrs.]**
Organic farming – Green manuring and organic fertilizers, Recycling of biodegradable municipal, agricultural and Industrial wastes – bio-compost making methods, types and method of vermicomposting – field application.

REFERENCE BOOKS:

- Dubey, R.C., 2005 A Text book of Biotechnology S.Chand & Co, New Delhi.
- John Jothi Prakash, E. 2004. Outlines of Plant Biotechnology. Emkay -Publication, New Delhi.
- Kumaresan, V. 2005, Biotechnology, Saras Publications, New Delhi.
- Sathe, T.V. 2004 Vermiculture and Organic Farming. Daya publishers.
- Subha Rao, N.S. 2000, Soil Microbiology, Oxford & IBH Publishers, New _Delhi.
- Vayas,S.C, Vayas, S. and Modi, H.A. 1998 Bio-fertilizers and organic _Farming Akta Prakashan, Nadiad

Mode of Evaluation:
Continuous Internal Assessment (No end semester examination)
(Poster presentation / Project/ Presentation/ Assignment/ Quiz)
Total Mark: 100

NURSERY MANAGEMENT
[30L]
[Credits 2]

Course Description: The course includes the scope and techniques to develop and extend plant nursery.
Course Objectives: To learn management practices for wholesale container and field production nurseries.
Course learning outcomes: The student will study Nursery tools, implements, techniques and their uses.

Unit I: Nursery **[04 Hrs.]**
Definition, objectives, and scope and building up of infrastructure for nursery, planning and seasonal activities - Planting - direct seeding and transplants.

Unit II: Seed **[06 Hrs.]**
Seed Structure and types - Seed dormancy; causes and methods of breaking dormancy - Seed storage: Seed banks, factors affecting seed viability, genetic erosion – Seed production technology - seed testing and certification.

Unit III: Vegetative propagation **[06 Hrs.]**
Air-layering, cutting, selection of cutting, collecting season, treatment of cutting, rooting medium and planting of cuttings - Hardening of plants – green house - mist chamber, shed root, shade house, and glass house.

Unit IV: Gardening **[08 Hrs.]**
Definition, objectives, and scope - different types of gardening – landscape and home gardening - parks and its components - plant materials and design – computer applications in landscaping - Gardening operations: soil laying, manuring, watering, management of pests and diseases and harvesting.

Unit V: Sowing/raising of seeds and seedlings. **[06 Hrs.]**
Transplanting of seedlings - Study of cultivation of different vegetables: cabbage, brinjal, lady's finger, onion, garlic, tomatoes, and carrots - Storage and marketing procedures.

REFERENCE BOOKS:

- Agrawal, P.K. 1993, Handbook of Seed Technology, Dept. of Agriculture and Cooperation, National Seed Corporation Ltd., New Delhi.
- Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
- Edmond Musser & Andres, Fundamentals of Horticulture, McGraw Hill Book Co., New Delhi.
- Janick Jules. 1979. Horticultural Science. (3rd Ed.), W.H. Freeman and Co., San Francisco, USA.
- Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
- Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.

Mode of Evaluation:
Continuous Internal Assessment (No end semester examination)
(Poster presentation / Project/ Presentation/ Assignment/ Quiz)
Total Mark: 100