DEPARTMENT OF BOTANY

VALUE ADDED COURSE

BIOINOCULANTS FOR COMMERCIALIZATION

HOURS: 30

Course outcomes:

At the end of the course, students will be able to:

CO.1.Recognize the concept and significance of bio-fertilizers.

CO.2.Practice the skills for mass production of different bio-fertilizers.

CO.3.Explain the concept and significance of bio-pesticides.

CO.4.Demonstrate the skills on mass production of different bio-pesticides.

CO.5.Get exposure on quality maintenance and marketing strategies of bio-fertilizers.

Unit I: **6 hrs**

Concept and significance of bioinoculants. Types of bioinoculants.General account on asymbiotic, symbiotic nitrogen fixing bacteria, phosphate solubilizing bacteria and mycorrhizae.

Unit II: **6 hrs**

Mass cultivation and application of cyanobacteria, *Azospirillum*, *Azotobacter*, *Rhizobium*, *Azolla*and *Mycorrhizal*bioinoculants.

Unit III: **6 hrs**

Concept and significance of biopesticides. Types and their application.Bioherbicides and bioinsecticides.Integrated pest management.

Unit IV: **6 hrs**

Mass production and application of herbal, bacterial, fungal and viral biopesticides. Methods of making bio-compost, vermicompost and its application.

Unit V: **6 hrs**

National andInternational scenario of bioinculants. Quality control, storage and marketing, small and large-scale strategies of bioinoculants.

Text Books:

1. Dubey RC, A Text book of Biotechnology, 5th Edition, Chand & Company Pvt Ltd, New Delhi, India, 2014.
2. Kumaresan V, Biotechnology, 6th Edition, Saras Publications Pvt Ltd, Nagercoil, Tamil Nadu, India, 2013.
3. SubbaRao NS, Biofertilizers in Agriculture and Forestry, 3rd Edition. CBS Publishers and Distributors Pvt Ltd, New Delhi, India, 2019.

VALUE ADDED COURSE
FORENSIC BOTANY

HOURS: 30

Course outcomes:

At the end of the course, students will be able to

CO.1.Relate the concept and applications of forensic botany.

CO.2.Determine the value of plants from forensic point of view.

CO.3.Recognize forensic importance of botanical specimens.

CO.4.Categorize various botanical specimens for forensic evidences.

CO.5.Justify cases based on classic and modern botanical evidences.

Unit I: **6 hrs**

Introduction to forensic botany and its importance. General plant classification based on morphology, anatomy, systematics and palynology.

Unit II: **6 hrs**

Various types of planktons and diatoms and their forensic importance. Isolation and identification of pollen grains.Identification and matching of various types of wood, timber varieties, seeds and leaves.

Unit III: **6 hrs**

Various types of poisonous plants and their toxins – *Abrusprecatorius*, *Aconitum sps.*,*Cinchona sps.*, *Atropa belladonna*, *Gloriosasuperba*, *Jatrophacurcas*, *Neriumindicum*, *Nicotianatabacum*, *Ricinuscommunis* and *Thevetianeriifolia*. Abused drug yielding plants – *Opium*, *Cannabis*, *Coco*, Tobacco, *Datura* and *Psilocybin* mushroom.

Unit IV: **6 hrs**

Collection and preservation of botanical evidences: Botanical samples, outdoor crime scene consideration. Analysis of samples, DNA analysis, typing and barcoding.

Unit V: **6 hrs**

Classic forensic botany cases: Case histories by using plant anatomy and systematics, palynology, plant ecology, limnology, plant molecular biology and Drug enforcement. Introduction to quarantine and narcotic bureau.

Text Books:

1. Coyle HM, Forensic Botany: Principles and applications to criminal casework, 1st Edition, CRC Press Pvt Ltd, Taylor and Francis Group, United Kingdom, 2004.
2. Hall DW and Byrd J, Forensic Botany: a practical guide. 1st Edition, Wiley-Blackwell publishers Pvt Ltd, United States, 2012.
3. James SH, Nordby JJ, Bell S, Forensic Science: An Introduction to Scientific and Investigative Techniques, 4th Edition, CRC Press Pvt Ltd, Taylor and Francis Group, United Kingdom, 2015.