

**DEPARTMENT OF LIFE SCIENCES**

**SYLLABUS  
FOR  
VALUE ADDED COURSE  
(PG LEVEL)**

**BIOFERTILIZER**



**RAMA DEVI WOMEN'S UNIVERSITY**

**Vidya Vihar, Bhubaneswar-751022**

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# BIOFERTILIZER

**SBCC Code:** BF

## **Course Objectives:**

To demonstrate the low cost media preparation and impart training of ecofriendly agricultural inputs in biofertilizer production.

**Unit-1:** Introduction, Chemical fertilizers and its demerits, History and concept of Bio fertilizers, status scope and importance of Bio fertilizers, Classification of Bio fertilizers, Advantages of Biofertilizers and its environmental impacts.

**Unit -2:** Structure and characteristic features of bacterial Bio fertilizers: Nitrogen fixation, Nitrogen Biofertilizers (Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium and Frankia; Cyanobacterial biofertilizers- Anabaena, Nostoc, Azolla), Phosphate solubilizing Microorganisms, fungal biofertilizers- Mycorrhizae.

**Unit -3:** Production technology: Strain selection, Strain Improvement, mass production of carrier based and liquid bio fertilizers (Bacterial and Fungal). FCO specifications and quality control of bio fertilizers, Biofertilizers -Storage, shelf life, quality control and marketing. Factors influencing the efficacy of bio fertilizers

## **Practical**

1. Isolation of Nitrogen Fixing Bacteria from soil (Rhizobium, Azospirillum, Azotobacter)
2. Isolation and culture of Phosphate and sulphate Solubilizing bacteria
3. Isolation and culture of Cyanobacteria (Anabaena from Azolla; Nostoc from soil)
4. Laboratory scale production of Bacterial, algal, and fungal Biofertilizer.

## **Learning Outcomes**

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

1. Ability to distinguish the types of biofertilizers and methods of application in field.
2. Development of integrated management for best results using nitrogenous and phosphate biofertilizers.

## **Reference Books**

Motsora, M.R., P. Bhattacharya and Beena Srivastava (1995). Biofertilizer Technology, Marketing and Usage-A Source Bookcum-Glossary  
Subbarao, N.S. 1993. Biofertilizers in Agriculture and Forestry ( Oxford and IBH Pub. Co., New Delhi), General Microbiology- Dubey and Maheswari

DEPARTMENT OF LIFE SCIENCES

SYLLABUS

FOR

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INTEGRATED PEST MANAGEMENT



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# INTEGRATED PEST MANAGEMENT

**SBCC code: IPM**

## **Objective**

1. To explore the basic themes and methods of pest management.
2. To understand the challenges that modern pest management programs face
3. To gain an appreciation for management techniques that balance the need for pest control

**Unit-1** Insects, their abundance and diversity in nature; insects as pests in agriculture, reasons for outbreaks causing crop loss; concept of pest status, types of pests; methods of sampling and surveillance of pests; Principles of pest management, history/definition etc. IPM and its concepts.

**Unit-2-** Components of IPM: legal approach, ecological management, diverting pest population away from the crop; managing insects with resistant plants; history, mechanism of resistance and use of plants as resistant means in pest management. Pest management by modifying insect development and behavior; insect growth regulators like repellants, attractants, inhibitors.

**Unit -3** -Sterile insect technique. Biological control; using predators, parasitoids and microbes. Botanical pest management; chemical means of pest management. Integration of different IPM techniques; pros and cons. Adoption of IPM; pros and cons. Importance of AESA in pest management. Successful implementation of IPM in cereals, pulses and commercial crops, oilseed, vegetable crops and fruit crops

## **Practicals**

Case studies, video lectures, seminars, field visits etc

## **Learning Outcomes**

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

1. Define the IPM concept and its components
2. Describe the themes and methods of pest management
3. Describe the challenges faced by modern pest management programs
4. Demonstrate different techniques of pest management
5. Enumerate the successful application IPM in different crops.

## Reference Books

1. Integrated Pest Management: Potential, Constraints and Challenges (Text) edited by Opendra Koul, G S Dhaliwal, G W Cuperus CABI Publishing.
2. Insect Pest Management by David Dent - CABI Publishing.
3. Insect Pest Management and Ecological Research by Gimme H Walter - Cambridge University Press.

**DEPARTMENT OF LIFE SCIENCES**

**SYLLABUS**

**FOR**

**VALUE ADDED COURSE**

**(PG LEVEL)**

**SCIENTIFIC MANUSCRIPT WRITING:**

**FROM PAPER TO PUBLICATION**



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# **SKILLED BASED COURSE ON SCIENTIFIC MANUSCRIPT WRITING: FROM PAPER TO PUBLICATION**

**SBCC Code:**SMW

Course Overview: Publishing articles in peer-reviewed high impact factor journals is increasingly important for students who intend to pursue careers in academic and research. In this course, we will introduce students to the different types of scientific articles and provide an outline of how to write an original research and review article. This course is designed around a system to help post graduate students and PhD research scholars in any field of science to develop their skills on scientific manuscript writing. The course combines weekly classes, workshop sessions involving students, scholars and experts and manuscript preparation and presentation by students.

## **Detailed Syllabus**

### **Module 1:**

Introduction to Scientific Writing, Structure of a research article, Scientific writing style, how to write a title, abstract and list keywords? Providing Authors and Affiliations, writing 'Methods' section, designing effective tables and graphs, Describing the 'Results' section.

### **Module 2:**

Art of scientific writing, Choosing the right journal for publication, how to submit papers in journals? highlight your research, Common mistakes, error in Language, sharing policy, Reviews, commentaries, responding to peer-review, Submitting a revised manuscript,

### **Module 3:**

Tools for Reference Management, Introduction to Mendeley, Publication and Ethics, Data duplication, checking paper for Plagiarism, Conflict of Interest, Acknowledging the funding agency, Contribution of authors, conducting a peer review, Sharing and collaborating

**Practicals:** Workshop, Seminar, Hands on practice, Paper Writing, Use of Softwares, Team Teaching, Submission of review papers, Submission of Abstracts for conference and seminars

## **Referred Books**

1. Style and Ethics of Communication in Science and Engineering by Jay D. Humphrey; Jeffrey W. Holmes
2. A Field Guide for Science Writers by Deborah Blum (Editor); Mary Knudson (Editor); Robin Marantz Henig (Editor)
3. The Handbook of Technical Writing by Gerald J. Alred; Charles T. Brusaw; Walter E. Oliu