SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology
Skill-Based Course: Biofertilizers & Biopesticides
Session 2019-20
Course Coordinator Report

A Skill-Based Course for UG students in the Department Microbiology, Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur was held from 16th October 2019 to 21th December 2019. The course title was "Biofertilizers & Biopesticides". It is the complete beginner to Expert Course was perfect for anyone who wants to learn Biofertilizers & Biopesticides.

The skill based certificate course syllabus for B.Sc. I, II and III appear students. Fifteen weeks certificate course in BIOFERTILIZERS AND BIOPESTICIDES. A total of 10 students were enrolled to the course. The examination of the course shall comprise of one theory paper of three hours carries 50 marks and a practical of one hour duration carries 50 marks. Internal assessment for the course based on one theory paper of 10 marks shall be conducted by university approved teachers. Internal assessment marks should be included in minimum passing marks of the students. Candidates are expected to pass separately in theory, internal assessment and practical examination.

Students require 40% marks in theory for passing including internal marks. Separate passing in practical examination is required, assignment submission is necessary to get internal marks. The structure of syllabus for certificate course along with distribution of marks is also displayed in the following table.

*Internal assessment –Based on student's attendance and performance during unit test exam and assignment/field work.

Based on assignment & activity conducted for Biofertilizer and Biopesicide production the Internal assessment marks were given. For theory and practical marks, the objective mode of examination (M.C.Q.) was conducted.

Action taken: A total of 10 students are enrolled in the course. This course aims to provide a thorough understanding of sustainable agricultural practices, focusing on the principles, applications, and benefits of these practices. Key topics include:

1. **Biofertilizers**:
    - **Concepts**: Understanding what biofertilizers are and their various types, such as nitrogen-fixing bacteria and mycorrhizal fungi.
    - **Roles**: Learning how these biofertilizers enhance soil fertility and support plant growth.
2. **Biopesticides**:
    - **Concepts**: Exploring biopesticides, including types like microbial pesticides, plant extracts, and natural enemies.
    - **Roles**: Understanding their role in pest management, including their mechanisms and applications.
3. **Field Application**:
    - **Implementation**: Applying these sustainable practices in field settings.
    - **Evaluation**: Assessing their effectiveness and impact on agricultural productivity.

The course integrates theoretical knowledge with practical experience, equipping students with the skills to implement and evaluate sustainable agricultural methods effectively. It also encourages critical thinking about the broader environmental benefits of these practices.

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

Biofertilizer Production

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology
Skill-Based Course: Biofertilizers & Biopesticides
Session 2019-20

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY

DEPARTMENT OF LIFELONG LEARNING AND EXTENSION

Gurunanak Bhavan, University Campus, Amravati Road, Nagpur - 440 033. Phone : 2530860
E-mail : doll.rtmnu@gmail.com

No.DOLLE/237/19
Dated : 16.10. 2019

To,
The Principal
Shivaji Science College,
Nagpur.
9423103043

Subject : Sanction for Conducting Short Term Courses under Jeevan Shikshan Abhiyan on No Grant Basis.

Sir/Madam,

With reference to your proposal for conducting Short Term courses indicated below under Jeevan Shikshan Abhiyan of this Department, I am to inform you that your proposal has been accepted by the Department and your College has been granted permission to conduct the course on the following conditions:

Details of the Course

Sr. No.	Name of the Course	Duration	No. of Candidates to be admitted	Fees to be Charged per Student	Fees to be Deposited With the Deptt.
1	Diploma Course in Groundwater Exploration	8 Weeks	20	1200/-	10%
2	Diploma Course in Statistical Quality Control	10 Weeks	16	850/-	10%
3	Diploma Course in Immune-Diagnostics	8 Weeks	20	2200/	10%
4	Diploma Course in Environmental and Water Management	6 Weeks	10	1000/	10%
5	Diploma Course in Mushroom Cultivation	8 Weeks		1000/	10%
6	Diploma Course in Biofertilisers and Biopesticides	14 Weeks	20	1500/	10%
7	Diploma Course in Forestry and Wild Life Management	6 Weeks	20	1500/	10%

Rules & Regulations of this Department regarding these courses should be strictly followed.

1. **This sanction is valid for this particular Batch only.**
2. Fees for the course should be charged as per the norms prescribed.
3. Expenditure on the course should be incurred as per norms.
4. Course should be started within a Month from **the date of sanction.**
   Please communicate your acceptance within **a month and submit Initial Report Along with list of students admitted.**

Dy. A.D. Bobdey
for n.a.
Mohare
03.01.2020

Your's faithfully,
pwatekar
Director

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology

NOTICE

Date: 23/09/2019

All the students are informed that **U.G. Department of Microbiology** runs Skill-Based Course: Biofertilizers & Biopesticides for the session 2019-20. Interested students of B.Sc. are requested to provide their names to the course Coordinator Dr.Pranita B. Gulhaneon or before 01/10/2019.

Science College, Congress Nagar, Nagpur. SEAL

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

U.G. DEPARTMENT OF MICROBIOLOGY, SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

AccreditedwithCGPAof3.51at'A+'GradebyNAAC,Bangalore
ACollegewithPotentialforExcellence
AnInstitutionalMemberofAPQN
RecognizedCenterforHigherLearning & Research
AMentorCollegeunderParamarshSchemeofUGC,NewDelhi
A Mentor College under Paris Sparsh Scheme of Maharashtra State

Skill-Based Course for the Session 2019-20
on
Biofertilizers & Biopesticides

Skill-Based Course: Biofertilizers & Biopesticides

Course Co-ordinator: Dr.Pranita B. Gulhane

Course Introduction

Increase in world population has put tremendous pressure on agriculture. When technologies and interventions get improved, productivity also get increased, however, still one billion people lack access to adequate food and nutrition worldwide. Biofertilizers and biopesticides are prepared from natural materials such as animals, plants, bacteria, and certain minerals widely used for controlling insects and disease-causing pathogens. Bio-fertilisers are living microorganisms of bacterial, fungal and algal origin. Depending on their mode of action and requirement of the crop, they can be applied alone or in combination. Thus biofertilizers and biopesticides are important areas to fulfill the challenges in a sustainable way.

Course Objectives

- Introduction to biofertilization production techniques and instrumentation.
- Hands-on practice in Biofertilizer production
- Data acquisition and processing
- Applications of Biofertilizer & Biopesticides in Agriculture

Registration Date: 01/10/2019

Prof. AtulBobdey
Coordinator
Dept. of Biotechnology

Prof. MahendraDhore
Principal
Science College, Nagpur

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

UG Department of Microbiology

Skill- Based Course: Biofertilizers & Biopestocides (Session 2019-20)

Course Co-ordinator: Dr.Pranita B. Gulhane

Course Introduction

Increase in world population has put tremendous pressure on agriculture. When technologies and interventions get improved, productivity also get increased, however, still one billion people lack access to adequate food and nutrition worldwide. Biofertilizers and biopesticides are prepared from natural materials such as animals, plants, bacteria, and certain minerals widely used for controlling insects and disease-causing pathogens. Bio-fertilisers are living microorganisms of bacterial, fungal and algal origin. Depending on their mode of action and requirement of the crop, they can be applied alone or in combination. Thus biofertilizers and biopesticides are important areas to fulfill the challenges in a sustainable way.

Course Objectives

1. To develop skill for the efficient production of Biofertilizers and Biopesticides.
2. To inculcate learn and earn sprit among students.
3. To replace conventional chemical fertilizers so that their use can be reduced with the resulting economic and environmental benefits.
4. To carry out large scale production of Biofertilizers and Biopesticides for farmer's use.
5. To develop awareness among people for the use of Biofertilizers and Biopesticides instead of chemical one.

Instructional Strategies: Theory class, Practical, Video clips, Models etc.

Evaluation Strategies: Oral discussions and Final MCQ examination

Course Outcomes: By the end of this course, participants will be able to

1. Understand the principles and importance of biofertilizers in biological research & agriculture.
2. Interpret the given data and draw meaningful conclusions.
3. Apply concepts in addressing biological questions related to health and disease.

Duration of course: 14 Weeks

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

UG Department of Microbiology

Skill-Based Course: Biofertilizers & Biopesticides (Session 2019-20)

Module: The Structure of Syllabus and system of evaluation

Course	Theory papers and Practicals	Marks			Total Marks
		Theory	Internal Assessment	Practical	
Certificate course in Biofertilizers and Biopesticides	1. Theory paper- Biofertilizers and Biopesticides	50	10		100
	2. Practicals based on course			40	
		Grand Total			100

Dr. Pranita B. Gulhane
Skill Based Course Coordinator

Dr. Amitabh Halder
IQAC Coordinator
Internal Quality Assurance Cell (IQAC)
S. S. E. S. A. Science College
Congress Nagar, Nagpur.

Prof. Mahendra Dhore
Principal
Principal
S. S. E. S. Amravati's Science College, Nagpur.

Science College, Congress Nagar, Nagpur. SEAL

UG Department of Microbiology

Add on Course: Metabolomics (Session 2019-20)

Syllabus of Skill-Based Course: Biofertilizers & Biopesticides

Course Units

Theory: Biofertilisers and Biopesticides in Agriculture

Unit I: Definition and Introduction of Biofertilisers and Chemical Fertilisers, History of Biofertilisers, Microbes as biofertilisers, Indian Farming Scenario, Need of biological inputs in agriculture, Scope and Necessity of Biofertilisers. Types of Biofertilisers, Advantages of Biofertilisers and Chemical Fertilisers use in Agriculture, Limitations of Fertilisers use and its remedy.

Unit II: Definition and Introduction of Biopesticides and Chemical Pesticides, History of Biopesticides, Need of Biopesticides in Agriculture, Scope of Biopesticides. Types of Biopesticidess, Advantages of Biopesticides and Chemical Pesticides use in Agriculture, Limitations of Pesticides use and its remedy.

Unit III: Introduction to vermiculture. Definition, meaning, history, economic important, their value in maintenance of soil structure, role as four r's of recycling, reduce, reuse, recycle, restore. Small Scale Vermicompost Technology by Earthworm farming for home gardens - Earthworm compost for home gardens. Vermiwash collection, composition & use

Unit IV: Algal biofertilizers - Blue green algae-distribution-occurrence. Azolla-Anabaena symbiosis-Importance- Azolla growth behavior, multiplication- sporulation etc.

Practical Sessions:

1. Preparation of culture media for microorganisms.
2. Screening of microorganisms from soil and root nodules by pour plate method.
3. Isolation of Rhizobium from root nodules.
4. Isolation of Azotobacter from rhizosphere soil.
5. Qualitative estimation of Phosphate Solubilising Bacteria from soil.
6. Qualitative estimation of Potassium solubilising bacteria.
7. Isolation of Bacillus thuringiensis from soil.
8. Preparation of Algal Biofertilizer.
9. Study of Vermiculture, Vermiwash & Vermicompost equipments, devices

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

UG Department of Microbiology

Skill-Based Course: Biofertilizers & Biopesticides (Session 2019--20)

Week-wise teaching plan:

Hours	Lectures/ Topics/ Sub topics
14 hours	**Unit I**
1	History of Biofertilizer
1	History of Biopesticides
1	Chemical Fertilizers
1	Chemical Pesticides
1	Need of biological inputs in agriculture
1	Scope and Necessity of Biofertilizers
1	Different types of Biofertilizers
1	Different types of Chemical fertilizers
1	Microbes as Biofertilizers
1	Types of microbes used
1	Preparation of Culture media
1	Different types of culture media
1	Morphological characteristics of bacteria
1	Biochemical characterization of plant growth promoting bacteria
8 hours	**Unit II**
1	Role of microbes in Biofertilizer production
1	Plant growth promoting bacteria and its role
1	Advantages of Biofertilizers and Biopesticides
1	Limitations of Biofertilizers and Biopesticide &its remedy
1	Principle of different culture media used
1	Introduction of Equipments used
1	Different types of sterilization
1	Moist heat sterilization
9 hours	**Unit III**
1	Introduction to vermiculture
1	Definition, meaning, history, economic importance
1	Value of vermiculture in maintenance of soil structure
1	Role as four r's of recycling, reduce, recycle, restore.
1	Small Scale Vermicompost Technology
1	Earthworm farming for home gardens
1	Earthworm compost for home gardens
1	Vermiwash collection
1	Vermiwash composition &use.
6 hours	**Unit IV**
1	Introduction of Algal biofertilizers
1	Blue green algae
1	Algal distribution & occurence

1	Azolla-Anabaena Symbiosis
1	Importance of Azolla growth behavior
1	Algal multiplication- sporulation
8 hours	**Practical**
1	Preparation of culture media for microorganisms
1	Screening of microorganisms from soil & root nodules
1	Isolation of *Azotobacter* from rhizosphere soil
1	Qualitative estimation of Phosphate Solubilising Bacteria from soil
1	Qualitative estimation of Potassium solubilising bacteria
1	Isolation of *Bacillus thuringiensis* from soil
1	Preparation of Algal Biofertilizer
1	Preparation & study of Vermicompost

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

UG Department of Microbiology

Skill-Based Course: Biofertilizers & Biopesticides

(Session 2023-24)

Time Table

w.e.f. 16/10/2019

S.S.[illegible]A'S SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

U.G. Department of Microbiology Time Table Session 2019-2020

Skill Based Course: Biofertilizers & Biopesticides

w.e.f. 16/10/2019

Days	Class B.Sc.	1	2	3	4	5	6	7	8	9	10	Skill Based Course
		07:30-08:18	08:18-09:06	09:06-09:54	10:00-10:48	10.48-11:36	11:36-12:24	12:44-01:32	01:32-02:20	02:20-03:08	3.12-5.36	5.36-6.20
Monday & Tuesday	Sem II	--------- MB(B1)------ SAW					MB-C10 (B1,B2) (B5,B6) SAD				Biofertilizer & Biopesticides Practical PG	
	Sem IV				---------- MB(B1,B2) SPD+SVS+VC				MB-C1 (B1,B2)VC	MB-C5 (B5, B6)MJM		
	Sem VI	--------- MB(B1)------ SVS+VC			MB-C1 (B5, B6) CJC		MB-C9 (B1, B2) SAW	---------MB (B6)--------- MK+SG				
Wednesday & Thursday	Sem II					MB-C10 (B1,B2,B5,B6) Wed-SPD MB-C6 (B1,B2,B5,B6) Thru-VC		--------- MB(B5)--------- SVK				
	Sem IV	--------- MB(B6)--------- SAW						MB-C7 (B1, B2) Wed-KB+Thru-MJM MB-C5 (B5, B6) Wed-SAW+Thru-VC				Biofertilizer& Biopesticides (Thur, Fri, Sat) PG
	Sem				----MB B2 SAW+SAD			MB-C7(B1, B2) (B5,B6)VC				
Friday & Saturday	Sem II			MB-C1 (B1,B2) Fri-SAD Sat--SAW	MB-C7 (B5, B6) KB			--------- MB(B2,B6)--------- SPS+PG+PT				
	Sem IV							MB-C7 (B1, B2) SG	MB-C5 (B5, B6) MK		PRCT MB B5 MJM	
	Sem VI	--------- MBB5--------- SD						MB-C1 (B1, B2) Fri-SAD+Sat-MK MB-B2(B5,B6) Fri+Sat-SPS				

Teaching Faculty: MJM-Mrs.M.J.Madhugiri, PG-Pranita Gulhane SAW -Savita Wankhede, SPD- Dr.Shilpa Deshmukh, SVS- Shukla Soni ND-Nupur Deshmukh, SGK-Shital Khedkar, Contributory Teachers-VC-Vaidehi Chandorkar MK-Dr.Manpreet Kaur DB-Dhanashree Badwaik SD-Sadika

Gulhane

Dr. Pranita Gulhane

Gulhane

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

ATTENDENCE SHEET (2019-20)

S.S.E.S.A`s Science College, Congress Nagar, Nagpur

Skill Course Biofertilizers and Biopesticides

Class: Biofertilizers and Biopesticides

Month: Oct + Nov + Dec

Theory/ Practical:

Name of Lecturer: Dr. Pranita B. Gulhane

Sr. No	Name of Student	17/10/19	18/10/19	19/10/19	24/10/19	25/10/19	26/10/19	01/11/19	02/11/19	07/11/19	08/11/19	09/11/19	14/11/19	16/11/19	21/11/19	22/11/19	23/11/19	28/11/19	29/11/19	30/11/19	04/12/19	05/12/19	06/12/19	11/12/19	12/12/19	13/12/19	18/12/19	19/12/19	20/12/19
1.	Aditi Warghade	P	P	P	P	P	P	A	P	A	P	P	P	P	P	P	P	A	P	A	P	P	A	P	P	P	P	P	P
2.	Abhishek Tote	A	P	P	P	P	P	P	P	P	P	A	A	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P
3.	Akask Khadge	P	A	P	P	P	P	A	P	A	P	A	P	A	A	P	P	A	A	P	A	P	P	M	P	A	A	P	A
4.	Sai Shrirame	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P
5.	Pooja Kewlani	A	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	A	P	P	A	A	P	P	A	A	P	
6.	Purva Katakwar	P	A	P	A	P	P	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P
7.	Payal Thakur	A	P	P	P	A	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	A	P	A	P	P	P
8.	Renuka Kathale	P	P	P	A	P	P	A	P	A	A	P	P	A	P	P	P	P	A	P	P	A	A	P	P	P	P	P	P
9.	Urvashi Vaishnav	A	P	P	P	P	P	P	P	P	P	A	P	A	P	P	P	P	A	A	P	P	A	P	A	P	P	P	P
10.	Vaishnavi Bagade	P	P	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	P	P	P	P
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SEAL

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Dr Pranita Gulhane

ATTENDENCE SHEET (2019-20)

S.S.E.S.A`s Science College, Congress Nagar, Nagpur

Skill Course Biofertilizers and Biopesticides

Class: Biofertilizers and Biopesticides

Month: Oct + Nov + Dec

Theory/ Practical: ✓

Name of Lecturer: Dr Pranita B. Gulhane

Sr. No	Name of Student	21/10/19	22/10/19	23/10/19	04/11/19	05/11/19	06/11/19	18/11/19	19/11/19	20/11/19	25/11/19	27/11/19	28/11/19	02/12/19	03/12/19	04/12/19	09/12/19	10/12/19	11/12/19	12/12/19	24/12/19	25/12/19
1.	Aditi Warghade	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	A	P
2.	Abhishek Tote	P	P	P	P	P	P	P	P	P	A	P	P	A	P	P	P	P	P	P	P	P
3.	Akask Khadge	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	A	A	
4.	Sai Shrirame	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
5.	Pooja Kewlani	P	A	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P	P	A	P
6.	Purva Katakwar	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
7.	Payal Thakur	P	A	P	P	A	P	P	P	P	P	P	P	P	A	A	P	P	P	P	P	
8.	Renuka Kathale	A	P	P	P	P	A	P	P	A	P	P	P	A	P	A	P	P	P	A	A	P
9.	Urvashi Vaishnav	P	P	P	A	A	P	P	P	P	P	P	A	P	A	P	P	P	P	P	P	A
10.	Vaishnavi Bagade	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
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Dr Pranita Gulhane

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology

EXAMINATION NOTICE

Date: 23/12/2019

All the students enrolled for **Skill-Based Course: Biofertilizers & Biopesticides** for the session 2019-20 are informed that Theory and Practical Exam of the course is scheduled on 02/01/2020. All the appearing students are informed to remain present in Microbiology Laboratory at 10:30 – 11:30AM AM for Theory Exam and at 12:30PM – 5:30PM for Practical Exam.

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Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

List of the Students: Skill Based Certificate Course- Biofertilizers and Biopesticides (Session 2019-2020)

Sr. No.	Name of Student	Signature
1)	Aditi Warghade	
2)	Abhishek Tote	
3)	Akask Khadge	
4)	Sai Shrirame	
5)	Pooja Kewlani	
6)	Purva Katakwar	
7)	Payal Thakur	
8)	Renuka Kathale	
9)	Urvashi Vaishnav	
10)	Vaishnavi Bagade	

SEAL

Dr. Pravija Gulhane
Department of Microbiology
Science College, Congress Nagar,
NAGPUR.

UG Department of Microbiology

Skill-Based Course: Biofertilizers & Biopesticides (Session 2019-20)

Theory Exam Multiple Choice Questions (MCQs) Pattern

Rashtrasant Tukadoji Maharaj Nagpur University

Exam Name: Skill based Certificate Course Examination, Summer- 2020

Duration: 1hr

Name of Subject: Biofertilizer and Biopesticides

Max Marks:50

Medium: English
Marks Obtained

Centre Name: Shri Shivaji Science College Congress Nagar, Nagpur

Date: 02/01/2020

Name of Student:

Year: B.Sc Group :

Note:
(1) Each question carries 2 marks
(2) No negative marking

Q.1) Which of the following is not a free living nitrogen fixing bacteria?
a) Azotobacter
b) Clostridium
c) Klebsiella
d) Xanthomonas

Q.2) Presence of which of the following elements is required for nitrogen fixation?
a) Phosphorus
b) Carbon

c) Silver
d) Oxygen

Q.3) Which of the following is not used as a biofertilizer?
a) Bacteria
b) Algae
c) Cyanobacteria
d) Fungi

Q,4) Which of the following is an aerobic nitrogen-fixing bacterium?
a) Azotobacter
b) Clostridium
c) Rhodospirillum
d) Rhodopseudomonas

Q.5) Which of the following bacteria can't fix atmospheric nitrogen?
a) Nostoc
b) Anabaena
c) Oscillatoria
d) Lactobacillus

Q.6) Which of the following serve as biofertilizer in paddy fields?
a) Bacteria
b) Yeast
c) Cyanobacteria
d) Fungi

Q.7) Among the following pairs of microbes, which pair has both microbes that can be used as biofertilizers?
a) Aspergillus and Rhizopus
b) Rhizobium and Rhizopus
c) Cyanobacteria and Rhizobium
d) Aspergillus and Cyanobacteria

Q.8) Symbiotic Nitrogen fixation is carried out by
a) Azotobacter
b) Rhizobium
c) Pseudomonas
d) none

Q.9) Aquatic fern which is an excellent biofertilizer
a) Salvinia
b) Marsilea
c) Pteridium

d) Azolla

Q.10) Which element plays an important role in nitrogen fixation?
a) Mn
b) Mo
c) Zn
d) Cu

11. For vermicomposting, this species of earthworm is not apt
(a) Perionyx excavates
(b) Pheretima posthuma
(c) Eudrilus eugeniae
(d) Eisenia fetidae

12. The process in which earthworms are used to degrade organic wastes is
(a) Compost bedding
(b) Humus forming
(c) Vermicomposting
d) None Answer:

13. Kitchen wastes and animal excreta can be minimized most profitably via
(a) vermiculture
(b) biogas production
(c) direct usage as biofertilizers
(d) storing in underground storage tanks Answer:

14. The process of covering spawned compost with a suitable material is known as
(a) cropping
(b) casing
(c) spawning
(d) composting Answer:

15. While burrowing, the anterior ends of earthworms become turgid serving as a hydraulic skeleton though they do not possess a skeleton. This is as a result of
(a) setae
(b) gut peristalsis
(c) coelomic fluid
(d) none of the above Answer:

16. This is apt for vermicomposting
(a) Algae
(b) Nitrifying bacteria

(c) Earthworms
(d) Fungus Answer

17. Vermicompost is a/an
(a) toxic material
(b) organic biofertilizer
(c) inorganic fertilizer
(d) synthetic fertilizer Answer

18. This can be the best worm for composting
(a) pink worms
(b) red wigglers
(c) maggots
(d) does not matter

19. In earthworms, trypanosome is a
(a) excretory structure
(b) a circulatory system structure
(c) fold of intestine
(d) defense mechanism
Answer: (c)

20. Which of the following nutrients is abundantly found in worm castings?
(a) Phosphorus
(b) Nitrogen
(c) Calcium and other minerals
(d) All of these Answer

21. Which of the following is incorrectly matched?

(a) Alnus – *Frankia*

(b) Alfalfa – *Rhizobium*

(c) Nitrogen fixer – *Anabaena*

(d) Mycorrhiza – *Rhodospirrilum*

22 Which of the following nitrogen fixers is found in rice fields associated with *Azolla***?**

(a) Tolypothrix

(b) Frankia

(c) Anabaena

(d) Spirulina

23 Which of the following is not a biofertilizer?

(a) Mycorrhiza

(b) Rhizobium

(c) Agrobacterium

(d) Nostoc

24 Which of the following is used as a biofertilizer for soybean crop?

(a) Nostoc

(b) Azospirillum

(c) Rhizobium

(d) Azotobacter

25. Which of the following is commonly used as a nitrogen fixer in paddy fields?

(a) Frankia

(b) Oscillatoria

(c) Azospirrilum

(d) Rhizobium

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

Answer key

1. : d
2..b
3. b
4. a
5. d
6. c
7. c
8. b
9. b
10. b
11.a
12.b
13.a
14.b
15.a
16.c
17.c
18.b
19.c
20.d
21.c
22.d
23.d
24.c
25.c

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

UG Department of Microbiology

Skill Based Course: Biofertilizers and Biopesticides (Session 2019-20)

Practical Exam Question Paper:Subject: Biofertilizers and Biopesticides

Centre: S.S.E.S.A's Science College, Nagpur

Time: 5 hrs per day

Date: 02/01/2020

Max. Marks: 40

Q.1	To Prepare Culture Media for the Isolation of Plant Growth Promoting Bacteria.	10
Q.2	To Isolate Azotobacter Species from a given Soil Sample.	10
Q.4	Viva-Voce	10
Q.5	Practical Record	10
	Total Marks	40

Science College, Congress Nagar, Nagpur. SEAL

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

UG Department of Microbiology

Skill-Based Course: Biofertilizers & Biopesticides

(Session 2019-20)

OMR Answer Sheet

Shri Shivaji Education Society, Amravati's

SCIENCE COLLEGE

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U.G. DEPARTMENT OF MICROBIOLOGY

Skill-Based Course

Course Exam Name: Biofertilizers & Biopesticides

Name of Student: Aditi Waraghade.	INSTRUCTIONS FOR FILLING THE SHEET 1. This sheet should not be folded or crushed. 2. Use only blue/ black ball point pen to fill the circles. 3. Use of pencil is strictly prohibited. 4. Circles should be darkened completely and properly. 5. Cutting and erasing on this sheet is not allowed. 6. Do not use any stray marks on the sheet. 7. Do not use marker or white fluid to hide the mark. WRONG METHODS CORRECT METHOD
Roll No.: [ ][ ][ ] **Session: 2019-20**	
Test Date: 02/01/2020 **Max. Marks: 50**	
Deepthi **Invigilator Signature** **Obtained Marks:** 42	

	A	B	C	D
1	○	○	○	●
2	○	●	○	○
3	○	●	○	○
4	●	○	○	○
5	○	○	○	●
6	○	○	●	○
7	○	○	○	●
8	○	○	●	○
9	○	○	●	○
10	○	●	○	○
11	●	○	○	○
12	○	●	○	○
13	●	○	○	○
14	○	●	○	○
15	●	○	○	○
16	○	○	●	○
17	○	○	●	○
18	○	●	○	○
19	○	○	●	○
20	○	○	○	●
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39	○	○	○	○
40	○	○	○	○
41	○	○	○	○
42	○	○	○	○
43	○	○	○	○
44	○	○	○	○
45	○	○	○	○
46	○	○	○	○
47	○	○	○	○
48	○	○	○	○
49	○	○	○	○
50	○	○	○	○

UG Department of Microbiology

Mark List: Skill-Based Course- Biofertilizers & Biopesticides (Session 2019-2020)

Exam Name: Skill-based Certificate Course Examination (Session 2019-20)

Name of Subject: Biofertilizers and Biopesticides

Centre Name: Shri Shivaji Science College Congress Nagar, Nagpur

Sr.No	Name of Student	Marks obtained out of 50(Theory)	Marks obtained out of 40(Practical)	Marks obtained out of 10(Internal)	Total Marks 100	Grade
1)	Aditi Warghade	42	36	10	88	**A+**
2)	Abhishek Tote	46	36	10	92	**O**
3)	Akask Khadge	36	37	10	83	**A+**
4)	Sai Shrirame	48	36	10	94	**O**
5)	Pooja Kewlani	50	38	10	98	**O**
6)	Purva Katakwar	46	39	10	95	**O**
7)	Payal Thakur	44	35	10	89	**A+**
8)	Renuka Kathale	42	34	10	86	**A+**
9)	Urvashi Vaishnav	48	35	10	93	**O**
10	Vaishnavi Bagade	44	36	10	90	**A+**

Science College, Congress Nagar, Nagpur. SEAL

Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

स्वातंत्र्याचा अमृत महोत्सव

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

[Established by Government of Central Provinces Education Department by Notification No. 513 dated the 1st of August, 1923 & presently a State University governed by Maharashtra Public Universities Act, 2016(Mah. Act No. VI of 2017)]

University Skill Development Centre

(under Board of Lifelong Learning and Extension)

Certificate

No. .....

Shri/Smt./Ku. Aditi Warghade *is awarded with Certificate on successful completion of the course titled* Biofertilizers and Biopesticides *in session* 2019-20 *under* ***Jeevan Shikshan Abhiyan*** *conducted for* ***45 hours*** *from* 16/10/2019 *to* 21/12/2019 *by the* ***Board of Lifelong Learning & Extension*** *in collaboration with Department of Botany,* ***S.S.E.S. Amt's Science College Congress Nagar, Nagpur, 440012.***

He/She has passed the Examination with A+ *Grade*

Total Credits Earned : 01

Principal	Course Co-ordinator	Director
SSES Amt's Science College	SSES Amt's Science College	Board of Lifelong Learning
Congress Nagar, Nagpur-12	Congress Nagar, Nagpur-12	and Extension, RTMNU, Nagpur

Feedback form

Q.1) How would you rate the overall quality of the Certificate Course - Biofertilizers & Biopesticides?

a) Excellent

b) Good

c) Average

Q.2) How well did the Certificate Course - Biofertilizers & Biopesticides meet your expectations?

a) Exceeded expectations

b) Met expectations

c) Below expectations

Q.3) How effective were the course instructors in delivering the Certificate Course - Biofertilizers & Biopesticides?

a) Very effective

b) Effective

c) Ineffective

Q.4) How likely are you to recommend the Certificate course- Biofertilizers & Biopesticides?

a) Very likely

b) Likely

c) Unlikely

Q,5) How satisfied are you with the practical sessions of the Certificate Course - Biofertilizers & Biopesticides?

a) Very satisfied

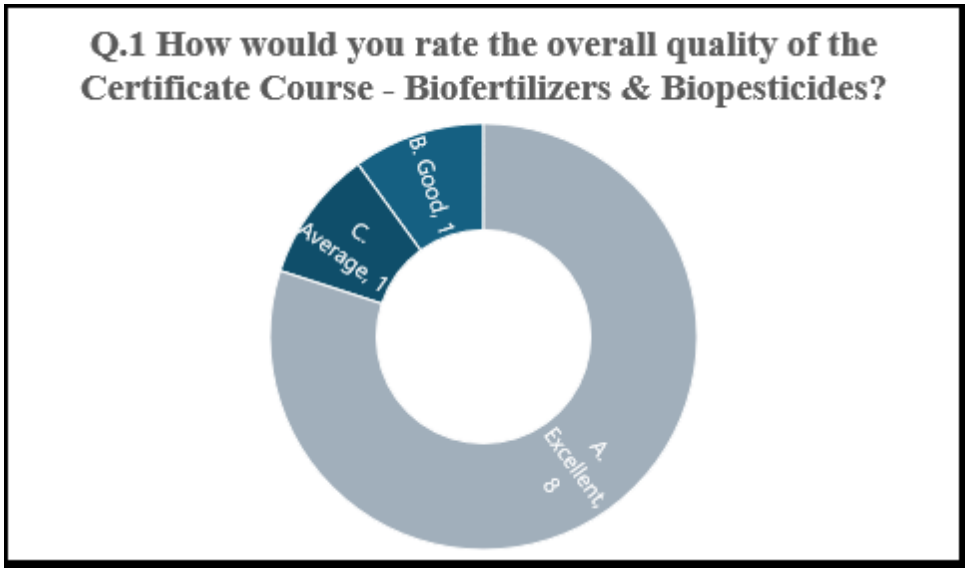
b) Satisfied

c) Dissatisfied

FEEDBACK RESPONSE

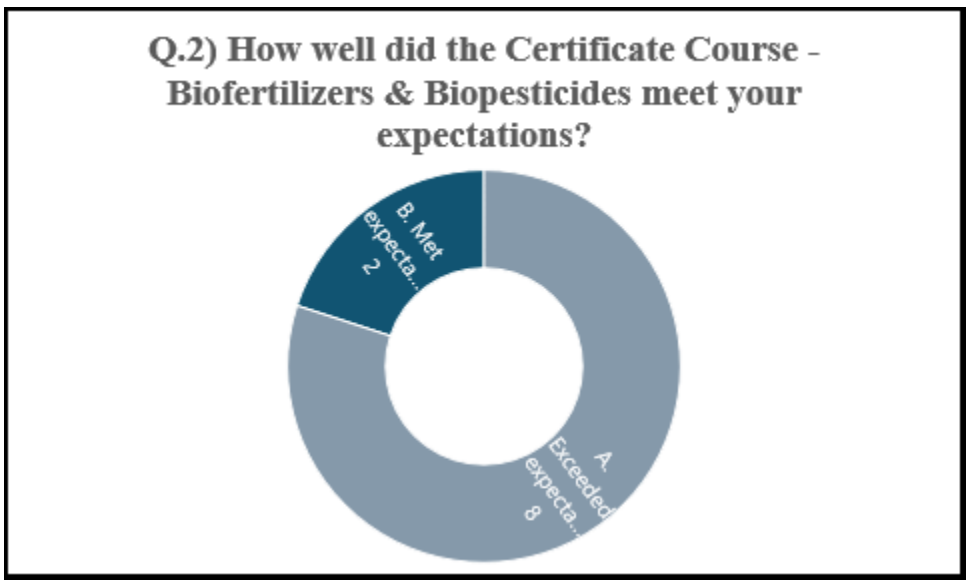
Q.1) How would you rate the overall quality of the Certificate Course - Biofertilizers & Biopesticides?

10 responses



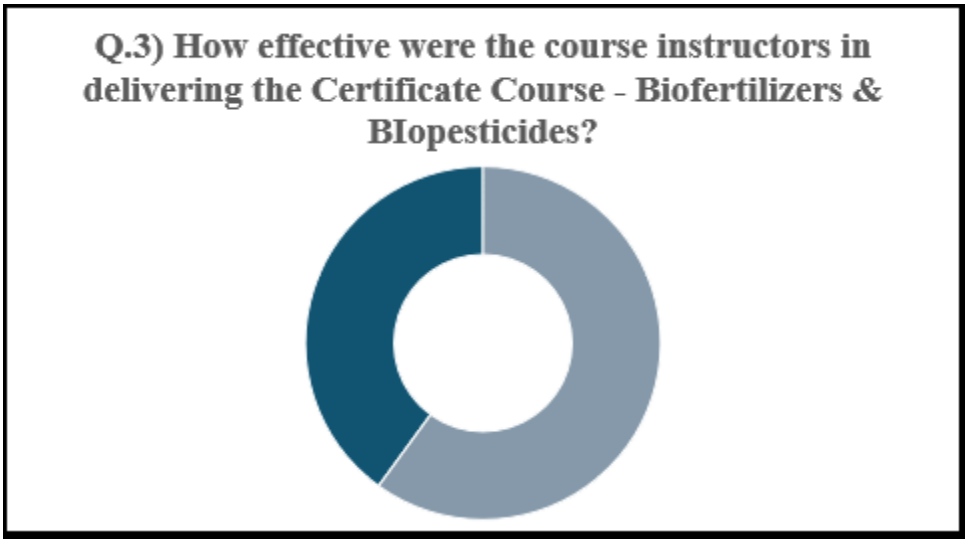
Q.2) How well did the Certificate Course - Biofertilizers & Biopesticides meet your expectations?

10 responses



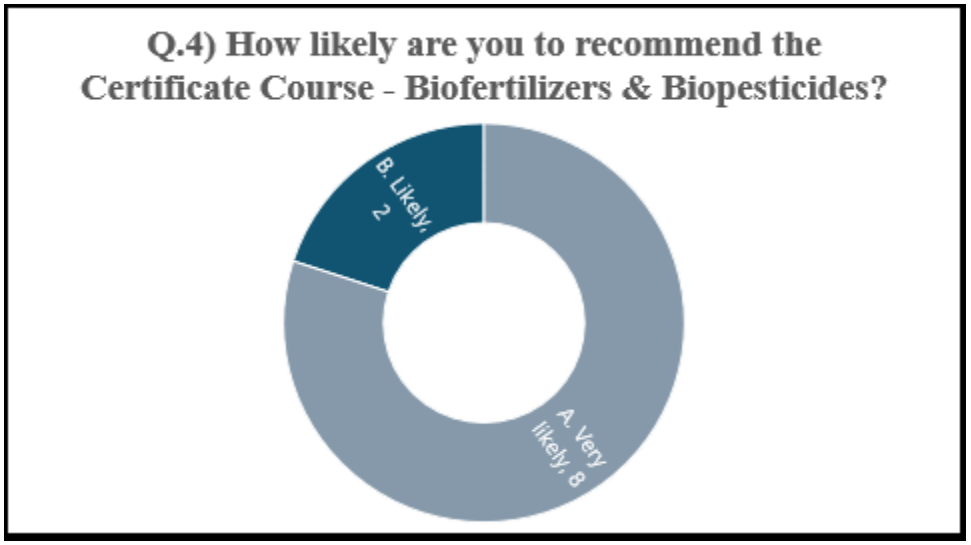
Q.3) How effective were the course instructors in delivering the Certificate Course - Biofertilizers & Biopesticides ?

10 responses



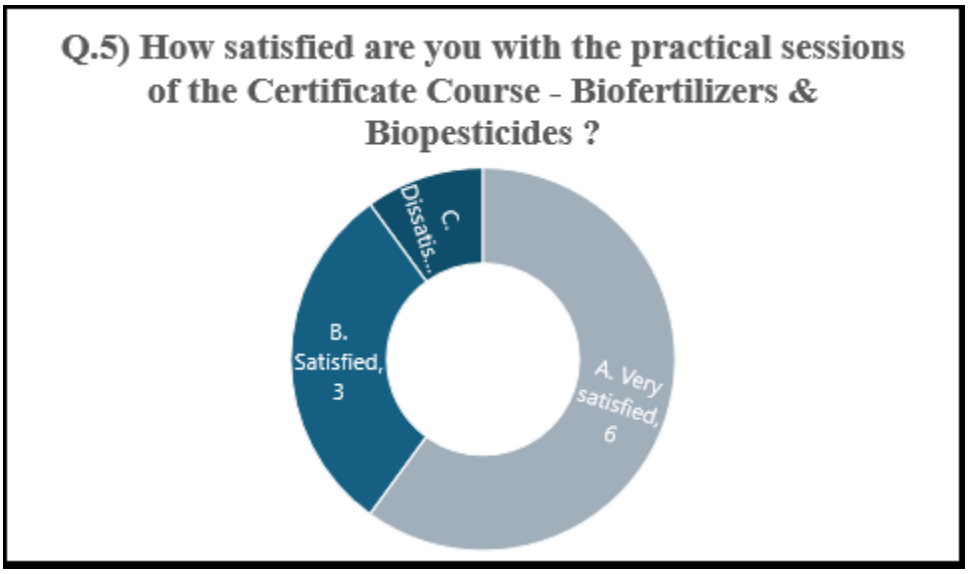
Q.4) How likely are you to recommend the Certificate course- Biofertilizers & Biopesticides?

10 responses



Q,5) How satisfied are you with the practical sessions of the Certificate Course - Biofertilizers & Biopesticides?

10 responses



Dr. Pranita B. Gulhane
Course- Coordinator
Skill-Based Course

Dr. Amitabh Halder
IQAC Coordinator
Internal Quality Assurance Cell (IQAC)
S. S. E. S. A. Science College
Congress Nagar, Nagpur.

Prof. Mahendra Dhore
Principal
Principal
S. S. E. S. Amravati's Science College, Nagpur.

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