SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Biotechnology
Add on Course: Industrial Biotechnology
Session 2019-20

Course Coordinator Report

A free Add-On Course for UG students in the Department Biotechnology, Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur was held from 09th August 2019 to 09th October 2019. The course title was "Industrial Biotechnology". It is the complete beginner to Expert Course was perfect for anyone who wants to learn Industrial Biotechnology.

The Industrial Biotechnology course applies biotechnological techniques for industrial applications, focusing on fermentation technology, bioprocessing, and the production of biofuels. This course aims to equip students with practical skills and knowledge in bioprocess engineering, industrial-scale production, and quality control.

The course duration was 10 weeks (30 hours). Two theory classes were engaged on Friday & Saturday and one Practical was engaged in every week. The structure of marking system was 50 marks on theory paper and 40 marks on practical examination including 10 marks for internal. The question paper of theory examination was in MCQ type of 25 questions with four multiple choices. Practical examination was also taken on this course for 40 marks. Internal marks assessment was on the basis of regularity, attendance, assignment submission etc. Out of 49, 47 were present in both theory and practical examination. The result was prepared and certificates were also distributed to the students.

Action Taken-In the Industrial Biotechnology Add-On course conducted by the department, students learned how to apply biotechnological principles to industrial processes, including fermentation, bioprocessing, and the production of bio-based products. They gained practical skills in optimizing industrial operations, understanding regulatory requirements, and implementing sustainable practices. The course also emphasized real-world applications, preparing students for careers in biotechnology and related industries.

Deepthi

Ms. Deepthi Hynal
Course- Coordinator
Add on Course

Science College, Congress Nagar, Nagpur. SEAL

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Biotechnology
Add on Course: Industrial Biotechnology
Session 2019-20

To,
The Principal
SSES Amt's Science College,
Congress Nagar, Nagpur-12

Subject: For permission to conduct the add on courses in the Department of Microbiology and Biotechnology – 2019-2020

Respected Sir,

This is to request you that, the teachers of our Microbiology and Biotechnology department have prepared the syllabus and modules of the 30 hours certificate courses for the session 2019-2020.

The details of the course module, syllabus and time table is submitted here with.

Hence please permit to run the add on courses and oblige me.

Thanking you

Yours sincerely

Mrs MJMadhugar

HEAD
Department of Microbiology
Science College, Congress Nagar,
NAGPUR.

Date:- 21/06/2019

Science College, Congress Nagar, Nagpur SEAL

Permitted
MDhore

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Biotechnology

NOTICE

Date: 01/08/2019

All the students are informed that **U.G. Department of Biotechnology** runs **Add on Course: Industrial Biotechnology** for the session 2019-20. Interested students of B.Sc. are requested to provide their names to the course Coordinator Ms. Deepthi Hynal on or before 07/08/2019.

Science College, Congress Nagar, Nagpur SEAL

Ms. Deepthi Hynal
Course- Coordinator
Add on Course

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

Accredited with CGPA of 3.51 at 'A+' Grade by NAAC, Bangalore
A College with Potential for Excellence
An Institutional Member of APQN
Recognized Center for Higher Learning & Research
A Mentor College under Paramarsh Scheme of UGC, New Delhi
A Mentor College under Paris Sparsh Scheme of Maharashtra State

Add on Course for the Session 2019-20
on
Industrial Biotechnology

Course Introduction

Industrial Biotechnology applies biotechnological techniques for industrial applications, focusing on fermentation technology, bioprocessing, and the production of biofuels. This course aims to equip students with practical skills and knowledge in bioprocess engineering, industrial-scale production, and quality control.

Course Objectives

- To introduce the fundamentals of industrial biotechnology and its applications.
- To provide hands-on experience in fermentation and bioprocess engineering.
- To explore the production processes and quality control of biofuels.
- To enhance problem-solving skills related to industrial biotechnological processes.

Registration Date: 07/08/2019.

Prof. Atul Bobdey
Coordinator
Dept. of Microbiology

Prof. Mahendra Dhore
Principal
Science College, Nagpur

Ms. Deepthi Hynal
Course- Coordinator
Add on Course

UG Department of Biotechnology
Add on Course: Industrial Biotechnology
Session 2019-20

Course Co-ordinator: Ms. Deepthi Hynal

Course Introduction

Industrial Biotechnology applies biotechnological techniques for industrial applications, focusing on fermentation technology, bioprocessing, and the production of biofuels. This course aims to equip students with practical skills and knowledge in bioprocess engineering, industrial-scale production, and quality control.

Course Objectives

- To introduce the fundamentals of industrial biotechnology and its applications.
- To provide hands-on experience in fermentation and bioprocess engineering.
- To explore the production processes and quality control of biofuels.
- To enhance problem-solving skills related to industrial biotechnological processes.

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

Evaluation Strategies: Oral discussions and Final MCQ examination

Course Outcomes

- Understand the principles and applications of industrial biotechnology.
- Gain practical skills in fermentation technology and bioprocessing.
- Learn the methods of biofuel production and quality control measures.
- Develop the ability to apply biotechnological solutions to industrial problems.

- **Duration of course:** Ten weeks (30 Hours)

Science College, Congress Nagar, Nagpur SEAL

Deepthi

Ms. Deepthi Hynal
Course- Coordinator
Add on Course

UG Department of Biotechnology
Add-on Course: Industrial Biotechnology (Session 2019-20)

Module: The Structure of Syllabus and system of evaluation

Course	Theory Papers and Practical	Total Marks		
		Theory	Internal	Practical
Certificate Course in Industrial Biotechnology	Theory paper- Industrial Biotechnology * Theory examination will be of MCQ pattern having 25 questions each with equal marks.	50	10	40
	* Practical examination will be based on performance evaluation in the laboratory and hands-on-training	100		

Ms. Deepthi Hynal

Add on 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.

SEAL

UG Department of Biotechnology

Syllabus of Add-on Course: Industrial Biotechnology

(Session 2019-20)

Course Units

Unit 1: Introduction to Industrial Biotechnology

- **Topics Covered:**
- Overview of industrial biotechnology
- Historical development and significance
- Key areas of application
- Economic and environmental impacts
- **Learning Outcomes:**
- Describe the scope and significance of industrial biotechnology.
- Identify key historical milestones and their impacts.
- Recognize various applications in industry.

Unit 2: Fermentation Technology

- **Topics Covered:**
- Basics of microbial fermentation
- Types of fermenters and their design
- Upstream and downstream processing
- Scale-up and optimization of ferme
- Types of biofuels and their production methods
- Biochemical pathways for biofuel production
- Quality control and assurance in biofuel production
- Environmental and economic aspects of biofuels
- **Learning Outcomes:**
- Identify different types of biofuels and their production techniques.
- Explain the biochemical pathways involved in biofuel production.
- Understand the importance of quality control in biofuel production.

Practicals

1. **Practical 1: Microbial Fermentation**
- Objective: To perform and monitor a microbial fermentation process.
- Procedure: Setting up a fermentation experiment, sampling, and analyzing results.
2. **Practical 2: Bioreactor Operation**
- Objective: To operate a bioreactor and understand its components.
- Procedure: Setting up and running a bioreactor, monitoring parameters.
3. **Practical 3: Downstream Processing**

- Objective: To carry out downstream processing of fermentation products.
- Procedure: Filtration, centrifugation, and purification techniques.

4. **Practical 4: Biofuel Production**

- Objective: To produce biofuels and test their quality.
- Procedure: Setting up biofuel production, quality testing, and analysis.

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Add on Course

UG Department of Biotechnology
Add-on Course: Industrial Biotechnology (Session 2019-20)

Week-wise teaching plan:

Week	Hrs.	Syllabus
Week 1	1	Overview of industrial biotechnology
	1	Historical development and significance
Week 2	1	Key areas of application
	1	Economic and environmental impacts
Week 3	1	Basics of microbial fermentation
	1	Types of fermenters and their design
Week 4	2	Upstream processing
	2	downstream processing
Week 5	2	Scale-up and optimization
	2	Types of biofuels and their production methods
Week 6	2	Biochemical pathways
	2	biofuel production
Week 7	2	Quality control
	2	assurance in biofuel production
Week 8	2	Environmental aspects of biofuels
	2	economic aspects of biofuels
Week 9	1	To perform and monitor a microbial fermentation process
	1	To perform and monitor a microbial fermentation process
Week 10	1	To carry out downstream processing of fermentation products
	1	To produce biofuels and test their quality

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Ms. Deepthi Hynal
Course- Coordinator
Add on Course

UG Department of Biotechnology
Add-on Course: Industrial Biotechnology (Session 2019-20)

Time Table

w.e.f. 09/08/2019

Day	Theory
Friday	Ms. Deepthi Hynal (R. no-C6) Theory 4.00 PM – 5.00 PM
Saturday	Ms. Deepthi Hynal (R. no C6) practical, 4.00 PM – 5.00 PM
	Ms. Deepthi Hynal (R. no C6) Theory, 4.00 PM – 5.00 PM

Science College, Congress Nagar, Nagpur. SEAL

Deepthi

Ms. D. Deepthi Hynal
Course- Coordinator
Add on Course

ATTENDENCE SHEET (2019-20)

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

Add on Course: Industrial Biotechnology (Session -I)

Class: Industrial Biotechnology

Theory/ Practical:

Month: August, September & October

Name of Lecturer: Ms. D. Deepthi Thyral.

Sr. No	Name of Student	09/08/19	10/08/19	16/08/19	23/08/19	24/08/19	30/08/19	31/08/19	06/09/19	07/09/19	13/09/19	14/09/19	20/09/19	21/09/19	27/09/19	28/09/19	4/10/19	5/10/19
1.	Adase Aniket	P	A	P	A	P	A	P	A	A	P	A	P	A	P	P	A	P
2.	Admane Samiksha	A	P	A	A	A	P	A	P	A	A	P	A	P	A	A	P	A
3.	Agashe Rashmi	P	P	P	A	P	A	A	A	P	P	P	A	A	P	P	A	P
4.	Anantwar Pranjal	A	A	A	P	A	P	A	P	A	A	A	P	A	A	A	P	P
5.	Arghode Isha	P	A	P	A	P	A	A	A	A	P	A	A	P	A	A	A	P
6.	Armarkar Khushi	A	P	A	A	P	A	P	A	P	A	P	P	A	A	P	A	A
7.	Bagde Sarvesh	P	A	P	P	P	A	A	P	A	A	A	P	P	A	A	P	P
8.	Bobde Sakshi	A	P	A	A	P	A	P	A	A	P	P	A	A	P	P	A	A
9.	Borkar Vrunda	A	A	P	A	A	A	P	A	P	A	A	P	P	A	P	A	A
10.	Burchunde Mahek	P	A	P	P	P	A	A	A	P	P	P	A	A	A	P	P	A
11.	Chaudhari Nidhi	A	A	P	A	P	A	P	A	A	A	A	P	A	P	A	A	P
12.	Chauhan Anajali	P	A	P	A	P	A	P	A	A	P	P	A	A	P	A	A	A
13.	Chavhan Aarya	A	A	A	P	A	A	A	P	A	A	A	P	A	P	A	A	A
14.	Chavhan Sakshi	A	P	A	A	P	A	P	A	A	P	A	A	P	A	A	P	P

15.	Chavhan Sneha	P	A	P	P	P	A	P	A	P	P	P	A	P	P	P	P	P	
16.	Chopkar Shruti	A	A	P	P	A	A	P	A	P	A	P	P	P	A	P	A	P	
17.	Choure Muskan	P	P	A	A	P	A	A	P	A	A	P	A	P	A	P	P	A	
18.	Dave Mayank	P	A	A	P	A	P	A	A	P	A	A	P	A	P	A	P	P	
19.	Dehury Padmabati	A	P	A	P	A	P	P	A	A	P	A	A	A	A	P	A	A	
20.	Deshpande Shivani	P	P	A	P	P	A	A	P	P	P	P	P	A	P	A	A	P	
21.	Dhakate Utkarsha	A	A	A	P	A	P	P	A	A	P	A	A	A	P	P	P	A	
22.	Dhoble Vaishnavi	P	P	P	A	P	A	A	P	A	A	P	P	P	A	P	A	P	
23.	Dhoke Priyal	P	A	P	A	P	P	P	A	P	P	A	P	A	P	A	P	A	
24.	Dhote Janhvi	A	P	A	P	A	P	P	P	A	A	P	A	P	A	P	A	P	
25.	Dube Vaishnavi	P	A	P	P	A	A	P	A	P	P	A	P	A	A	P	A	P	
26.	Fulzele Sakshi	P	P	A	A	P	A	A	P	A	P	A	P	A	P	A	P	A	
27.	Gaikwad Snehal	A	P	P	P	A	P	P	A	A	P	P	P	P	P	P	A	P	
28.	Gajbe Mansi	P	A	A	P	A	P	A	A	P	A	A	A	P	A	A	P	A	
29.	Gaure Tarushi	A	P	A	A	P	P		P	A	P	P	A	A	P	P	A	P	
30.	Gorlawar Sakshi	P	A	P	P	A	A	P	A	P	A	P	A	P	A	A	P	A	
31.	Gour Aishwarya	A	P	P	A	P	P	A	A	P	P	A	P	A	P	P	A	A	
32.	Halmare Sharwari	P	A	P	A	A	P	P	A	P	A	P	A	P	A	P	P	P	
33.	Hatwar Rajashree	A	P	A	P	A	A	A	A	P	A	A	A	A	P	A	A	P	
34.	Hirapure Teneshwari	A	P	A	P	P	P	A	P	A	P	P	P	A	A	P	A	A	
35.	Jadhav Payal	P	A	P	A	P	A	P	A	P	A	A	P	P	A	A	P	A	
36.	Jadhav Ritika	A	P	P	P	A	P	A	A	P	A	P	A	A	P	A	A	P	

37.	Jaronde Vaibhav	P	A	P	P	P	A	P	A	P	A	P	A	P	A	P	P	P														
38.	Jeevaji Nazish	A	P	A	P	A	P	A	P	A	A	A	P	A	P	A	P	A														
39.	Jogi Sanket	P	P	A	P	A	P	P	P	A	P	A	A	A	A	P	A	P														
40.	Kali Vedanti	A	A	P	A	P	A	A	P	A	P	A	P	A	P	A	P	P														
41.	Kapse Prachi	P	A	P	A	A	P	P	A	P	A	A	P	A	A	P	A	A														
42.	Karpate Harshali	A	A	P	A	P	A	P	A	A	P	A	P	P	A	A	P	P														
43.	Khode Aditi	P	P	A	P	P	A	P	A	P	P	A	A	A	A	P	A	A														
44.	Kothale Khushi	P	A	A	P	A	P	A	P	A	A	A	P	A	P	A	P	P														
45.	Kshirsagar Sharvari	P	A	P	P	P	P	P	A	P	P	A	P	A	A	P	A	A														
46.	Kulkarni Kinjal	A	A	A	A	A	A	P	P	A	P	P	A	P	A	P	A	P														
47.	Kulkule Sakshi	P	P	A	A	P	P	A	P	P	A	A	P	A	P	A	P	P														
48.	Kumar Bhavish	A	P	P	A	A	A	A	P	A	P	P	A	P	A	P	A	A														
49.	Kumbhare Pratik	P	A	A	P	P	A	P	A	P	P	A	P	P	A	A	P	P														

Science College, Congress Nagar, Nagpur. SEAL

Deepthi

Ms. Deepthi Hynal

ATTENDENCE SHEET (2019-20)

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

Add on Course: Industrial Biotechnology (Session-I)

Class: Industrial Biotechnology

Theory/ Practical: ✓

Month: Aug, Sep, & October

Name of Lecturer: Ms. D. Deepthi Hynal.

Sr. No	Name of Student	03/08/19	10/08/19	24/08/19	31/08/19	7/09/19	14/09/19	21/09/19	28/09/19	05/10/19
1.	Adase Aniket	P	P	A	P	A	P	A	P	P
2.	Admane Samiksha	A	A	P	A	P	P	P	A	A
3.	Agashe Rashmi	P	P	A	P	A	A	A	P	P
4.	Anantwar Pranjal	P	A	P	A	P	P	A	P	A
5.	Arghode Isha	P	P	A	P	P	A	P	A	P
6.	Armarkar Khushi	A	A	P	A	A	P	A	A	P
7.	Bagde Sarvesh	P	P	A	P	A	P	A	P	A
8.	Bobde Sakshi	P	A	P	A	P	A	P	A	A
9.	Borkar Vrunda	A	P	A	P	A	P	A	A	P
10.	Burchunde Mahek	P	P	P	A	P	A	A	P	A
11.	Chaudhari Nidhi	A	P	A	P	A	P	P	A	P
12.	Chauhan Anajali	P	P	P	A	A	P	A	A	P
13.	Chavhan Aarya	A	A	P	A	P	A	A	P	A
14.	Chavhan Sakshi	P	P	A	P	A	P	P	A	P

15.	Chavhan Sneha	P	A	P	P	A	P	A	P	P
16.	Chopkar Shruti	A	P	P	A	P	P	A	P	A
17.	Choure Muskan	P	A	A	P	P	P	A	A	P
18.	Dave Mayank	P	P	P	P	P	A	P	A	A
19.	Dehury Padmabati	P	A	P	P	P	P	P	A	P
20.	Deshpande Shivani	P	P	A	P	P	P	P	A	A
21.	Dhakate Utkarsha	P	P	P	P	P	P	P	P	P
22.	Dhoble Vaishnavi	P	P	P	P	P	P	P	P	P
23.	Dhoke Priyal	P	P	A	P	P	P	P	P	P
24.	Dhote Janhvi	P	A	P	P	P	P	A	P	P
25.	Dube Vaishnavi	P	A	A	P	P	P	P	P	P
26.	Fulzele Sakshi	P	P	P	P	A	A	A	A	P
27.	Gaikwad Snehal	P	P	A	P	P	P	P	P	P
28.	Gajbe Mansi	P	P	P	A	P	P	A	P	A
29.	Gaure Tarushi	P	P	A	P	P	P	P	P	P
30.	Gorlawar Sakshi	A	P	P	P	P	P	A	P	P
31.	Gour Aishwarya	P	P	P	P	P	A	P	A	P
32.	Halmare Sharwari	P	A	P	P	A	P	A	P	A
33.	Hatwar Rajashree	P	P	A	P	P	P	P	A	P
34.	Hirapure Teneshwari	P	A	P	P	P	A	P	A	P
35.	Jadhav Payal	P	P	A	P	P	P	P	A	P
36.	Jadhav Ritika	P	A	P	P	A	P	A	P	P

37.	Jaronde Vaibhav	P	P	A	P	A	P	P	P	P	P																						
38.	Jeevaji Nazish	A	P	A	P	A	P	A	P	A	P																						
39.	Jogi Sanket	P	P	P	P	P	P	P	A	P	P																						
40.	Kali Vedanti	P	A	P	P	P	A	P	A	A	P																						
41.	Kapse Prachi	P	P	A	P	A	P	A	P	P	A																						
42.	Karpate Harshali	P	P	P	P	P	P	A	P	A	P																						
43.	Khode Aditi	P	A	P	A	A	P	P	P	A	P																						
44.	Kothale Khushi	P	P	P	P	P	A	P	A	P	P																						
45.	Kshirsagar Sharvari	P	P	P	P	P	P	A	P	P	P																						
46.	Kulkarni Kinjal	P	P	P	P	A	P	A	P	P	P																						
47.	Kulkule Sakshi	P	P	A	P	P	A	P	A	P	P																						
48.	Kumar Bhavish	P	P	P	P	P	A	P	P	P	P																						
49.	Kumbhare Pratik	P	P	P	P	A	P	P	P	A	P																						

Science College, Congress Nagar, Nagpur. SEAL

Deepthi

Ms. Deepthi Hynal

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Biotechnology

EXAMINATION NOTICE

Date: 11/10/2019

All the students enrolled for **Add on Course: Industrial Biotechnology** for the session 2019-20 are informed that Theory and Practical Exam of the course is scheduled on 15/10/2019. All the appearing students are informed to remain present in Biotechnology Laboratory at 10:30 – 11:30AM AM for Theory Exam and at 12:30PM – 5:30PM for Practical Exam.

Science College, Congress Nagar, Nagpur. SEAL

Deepthi

Ms. Deepthi Hynal
Course- Coordinator
Add on Course

List of the Students: Add on Course- Industrial Biotechnology

(Session 2019-2020)

Sr. No.	Name of Student	Signature
1)	Adase Aniket	Aniket
2)	Admane Samiksha	Samiksha
3)	Agashe Rashmi	Rashmi A.
4)	Anantwar Pranjal	Anantwar
5)	Arghode Isha	Isha
6)	Armarkar Khushi	Khushi
7)	Bagde Sarvesh	Bagde
8)	Bobde Sakshi	B Sakshi
9)	Borkar Vrunda	Borkar
10)	Burchunde Mahek	MBurchunde
11)	Chaudhari Nidhi	ABSENT
12)	Chauhan Anajali	Anjali
13)	Chavhan Aarya	Aarya C
14)	Chavhan Sakshi	Sakshi
15)	Chavhan Sneha	Chavhan
16)	Chopkar Shruti	Chopkar
17)	Choure Muskan	Muskan
18)	Dave Mayank	Dave M
19)	Dehury Padmabati	Padmabati
20)	Deshpande Shivani	Shivani
21)	Dhakate Utkarsha	Utkarsha
22)	Dhoble Vaishnavi	Vaishnavi
23)	Dhoke Priyal	Priyal
24)	Dhote Janhvi	Dhote.
25)	Dube Vaishnavi	Vaishnavi

26)	Fulzele Sakshi	Sfulzele
27)	Gaikwad Snehal	Snehal
28)	Gajbe Mansi	Gajbansi
29)	Gaure Tarushi	Tarushi
30)	Gorlawar Sakshi	Sakshi
31)	Gour Aishwarya	GAis
32)	Halmare Sharwari	sharwari
33)	Hatwar Rajashree	Hatwal
34)	Hirapure Teneshwari	Teneshwari
35)	Jadhav Payal	Jadhav
36)	Jadhav Ritika	ritika
37)	Jaronde Vaibhav	Vaibhav
38)	Jeevaji Nazish	Naish
39)	Jogi Sanket	Jogi
40)	Kali Vedanti	Kali
41)	Kapse Prachi	Prachi
42)	Karpate Harshali	Harshali
43)	Khode Aditi	Aditi Khode
44)	Kothale Khushi	ABSENT
45)	Kshirsagar Sharvari	Sharvari
46)	Kulkarni Kinjal	Kinjal
47)	Kulkule Sakshi	Skulkule
48)	Kumar Bhavish	Bhavish
49)	Kumbhare Pratik	Pratik

Science College, Congress Nagar, Nagpur. SEAL

Ms. Deepthi Hynal
Course- Coordinator
Add on Course

Theory Exam Multiple Choice Questions (MCQs) Pattern

1. **What is the primary goal of industrial biotechnology?**
- a) To study microorganisms
- b) To apply biotechnological techniques for industrial applications
- c) To develop new pharmaceuticals
- d) To enhance agricultural productivity
- **Answer:** b

2. **Which of the following is a common fermenter type used in industrial biotechnology?**
- a) Petri dish
- b) Erlenmeyer flask
- c) Stirred-tank bioreactor
- d) Test tube
- **Answer:** c

3. **Upstream processing in fermentation technology involves:**
- a) Product purification
- b) Fermentation medium preparation
- c) Product packaging
- d) Waste disposal
- **Answer:** b

4. **Bioprocess engineering primarily focuses on:**
- a) Genetic modification of organisms
- b) Designing and operating bioreactors
- c) Environmental biotechnology
- d) Medical biotechnology
- **Answer:** b

5. **What is the main product of microbial fermentation used in the food industry?**
- a) Antibiotics
- b) Ethanol
- c) Insulin
- d) Lactic acid
- **Answer:** d

6. **Which biofuel is primarily produced from plant oils?**
- a) Biogas
- b) Biodiesel
- c) Bioethanol
- d) Butanol
- **Answer:** b

7. **The scale-up process in bioprocess engineering involves:**
- a) Reducing production costs
- b) Increasing the production volume
- c) Improving product quality

- a) To increase production speed
- b) To ensure product meets industry standards
- c) To develop new biofuels
- d) To reduce environmental impact
- **Answer:** b

9. **Which of the following is an advantage of using bioprocessing in industry?**
- a) High production costs
- b) Low product yield
- c) Sustainable and environmentally friendly
- d) Limited scalability
- **Answer:** c

10. **The downstream processing step in fermentation involves:**
- a) Growing microbial cultures
- b) Optimizing fermentation conditions
- c) Purifying the fermentation product
- d) Designing fermenters
- **Answer:** c

11. **Bioethanol is primarily produced through the fermentation of:**
- a) Lipids
- b) Proteins
- c) Carbohydrates
- d) Nucleic acids
- **Answer:** c

12. **Which parameter is NOT typically monitored in a bioreactor?**
- a) Temperature
- b) pH
- c) Oxygen concentration
- d) Light intensity
- **Answer:** d

13. **In bioprocess engineering, the term 'substrate' refers to:**
- a) The product of the bioprocess
- b) The microorganism used
- c) The medium the organism grows in
- d) The equipment used
- **Answer:** c

14. **Which of the following is NOT a type of biofuel?**
- a) Biogas
- b) Biodiesel
- c) Bioethanol
- d) Biopolymer
- **Answer:** d

15. **The process of removing cells from a fermentation broth is known as:**
- a) Filtration
- b) Sterilization
- c) Inoculation
- d) Pasteurization
- **Answer:** a

16. **Which organism is commonly used for industrial ethanol production?**
- a) Escherichia coli

- b) Saccharomyces cerevisiae
- c) Bacillus subtilis
- d) Pseudomonas aeruginosa
- **Answer:** b

17. **Fermenters designed for large-scale production are typically:**
- a) Made of plastic
- b) Small and portable
- c) Made of stainless steel
- d) Disposable
- **Answer:** c

18. **Quality assurance in bioprocessing ensures:**
- a) Faster production times
- b) Consistent product quality
- c) Lower production costs
- d) Greater product variety
- **Answer:** b

19. **The term 'bioaugmentation' refers to:**
- a) Enhancing microbial activity by adding specific strains
- b) Reducing microbial contamination
- c) Increasing the bioprocess temperature
- d) Extending the fermentation time
- **Answer:** a

20. **Which gas is a common byproduct of anaerobic digestion in biogas production?**
- a) Oxygen
- b) Carbon dioxide
- c) Methane
- d) Nitrogen
- **Answer:** c

21. **Which of the following is a key challenge in industrial biotechnology?**
- a) High energy consumption
- b) Limited application areas
- c) Scalability of processes
- d) Lack of regulatory standards
- **Answer:** c

22. **The process of converting biomass into biofuels is known as:**
- a) Transesterification
- b) Fermentation
- c) Hydrolysis
- d) Bioconversion
- **Answer:** d

23. **In fermentation, the lag phase refers to:**
- a) The initial phase where cells adapt to the environment
- b) The phase of rapid cell growth
- c) The phase where cells die
- d) The phase of product formation
- **Answer:** a

24. The first commercially produced plant secondary metabolite using bioreactor technology is

a) Shikoin
b)Colchicines
c)Cercosporin
d)Cytokines

- **Answer:** a

25.The lowest yield of ATP is in

a)Fermentation
b)aerobic respiration
c)anaerobic respiration
d)same in a, b and c

- **Answer:** a

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Ms. Deepthi Hynal
Course- Coordinator
Add on Course

UG Department of Biotechnology

Add-on Course : Industrial Biotechnology

Session 2019-2020

Practical Exam Question Paper:

Subject : **Industrial Biotechnology**

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

Time : 5 hrs per day

Dates : 15/10/2019

Max. Marks: 40

Q.1. To Perform and monitor a microbial fermentation process	10
Q.2. To produce biofuel and test their quality.	10
Q.3. Viva-Voce	10
Q.4. Practical Record	10

Total Marks 40

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Ms. Deepthi Hynal
Course- Coordinator
Add on Course

Shri Shivaji Education Society, Amravati's

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U.G. DEPARTMENT OF BIOTECHNOLOGY

Add-on Course

Course Exam Name: Industrial Biotechnology

Name of Student: Sanvesh Bagde.

Roll No.:

Session: 2019-20

Test Date: 15/10/19

Max. Marks: 50

Deepthi

Invigilator Signature

Obtained Marks: 48

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 ○ ○ ○ ●

	A	B	C	D
1	○	●	○	○
2	○	○	●	○
3	○	●	○	○
4	○	●	○	○
5	○	○	○	●
6	○	●	○	○
7	○	●	○	○
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9	○	○	●	○
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49	○	○	○	○
50	○	○	○	○

UG Department of Biotechnology
Mark List: Add-on Course- Industrial Biotechnology
(Session 2019-20)

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)	Adase Aniket	50	34	10	94	O
2)	Admane Samiksha	48	35	10	93	O
3)	Agashe Rashmi	42	34	10	86	A+
4)	Anantwar Pranjal	48	36	10	94	O
5)	Arghode Isha	50	37	10	97	O
6)	Armarkar Khushi	48	36	10	94	O
7)	Bagde Sarvesh	48	36	10	94	O
8)	Bobde Sakshi	42	35	10	87	A+
9)	Borkar Vrunda	48	35	10	93	O
10)	Burchunde Mahek	42	34	10	86	A+
11)	Chaudhari Nidhi	AB	AB	AB	AB	AB
12)	Chauhan Anajali	50	38	10	98	O
13)	Chavhan Aarya	50	37	10	97	O
14)	Chavhan Sakshi	48	36	10	94	O
15)	Chavhan Sneha	48	36	10	94	O

16)	Chopkar Shruti	42	35	10	87	A+
17)	Choure Muskan	50	38	10	98	O
18)	Dave Mayank	50	34	10	94	O
19)	Dehury Padmabati	48	35	10	93	O
20)	Deshpande Shivani	42	34	10	86	A+
21)	Dhakate Utkarsha	48	36	10	94	O
22)	Dhoble Vaishnavi	50	38	10	98	O
23)	Dhoke Priyal	48	36	10	94	O
24)	Dhote Janhvi	50	38	10	98	O
25)	Dube Vaishnavi	50	37	10	97	O
26)	Fulzele Sakshi	48	36	10	94	O
27)	Gaikwad Snehal	46	39	10	95	O
28)	Gajbe Mansi	42	34	10	86	A+
29)	Gaure Tarushi	50	38	10	98	O
30)	Gorlawar Sakshi	48	36	10	94	O
31)	Gour Aishwarya	42	35	10	87	A+
32)	Halmare Sharwari	50	38	10	98	O
33)	Hatwar Rajashree	50	38	10	98	O

34)	Hirapure Teneshwari	48	36	10	94	O
35)	Jadhav Payal	50	37	10	97	O
36)	Jadhav Ritika	48	36	10	94	O
37)	Jaronde Vaibhav	48	36	10	94	O
38)	Jeevaji Nazish	42	35	10	87	A+
39)	Jogi Sanket	46	39	10	95	O
40)	Kali Vedanti	42	34	10	86	A+
41)	Kapse Prachi	50	38	10	98	O
42)	Karpate Harshali	48	35	10	93	O
43)	Khode Aditi	42	34	10	86	A+
44)	Kothale Khushi	AB	AB	AB	AB	AB
45)	Kshirsagar Sharvari	50	38	10	98	O
46)	Kulkarni Kinjal	50	38	10	98	O
47)	Kulkule Sakshi	50	34	10	94	O
48)	Kumar Bhavish	48	35	10	93	O
49)	Kumbhare Pratik	42	34	10	86	A+

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Ms. Deepthi Hynal
Course- Coordinator
Add on Course

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CERTIFICATE

Mr./Ku. SARVESH BAGDE is awarded with certificate on successful completion of the course entitled, Certificate course in "Industrial Biotechnology"

Session 2019-20 under Add-on course conducted for 30 hours from 09/08/2019 to 09/10/2019 by Department of Biotechnology, SSESA's, Science College, congress Nagar, Nagpur 440012.

He/She has passed the Examination with '_O_' Grade.

D. DEEPTHI HYNAL
Coordinator, Department of Biotechnology

SEAL

Prof. M. P. Dhore
Principal, Science College, Nagpur

UG Department of Biotechnology
Add on Course: Industrial Biotechnology (Session 2019-20)
Feedback form

Thank you for participating in our Add on course Industrial Biotechnology. Your feedback is crucial in helping us improve the course and enhance your learning experience. Please take a few moments to complete this feedback form.

Que. 1 **How would you rate the overall quality of the Add on Course – Industrial Biotechnology**

a) Excellent
b) Good
c) Average

Que. 2 **How well did the Add on Course – Industrial Biotechnology meet your expectations?**

a) Exceeded expectations
b) Met expectations
c) Below expectations

Que. 3 **How effective were the course instructors in delivering the Add on Course – Industrial Biotechnology**

a) Very effective
b) Effective
c) Ineffective

Que. 4 **How likely are you to recommend the Add on Course Industrial Biotechnology to others?**

a) Very Likely
b) Likely
c) Unlikely

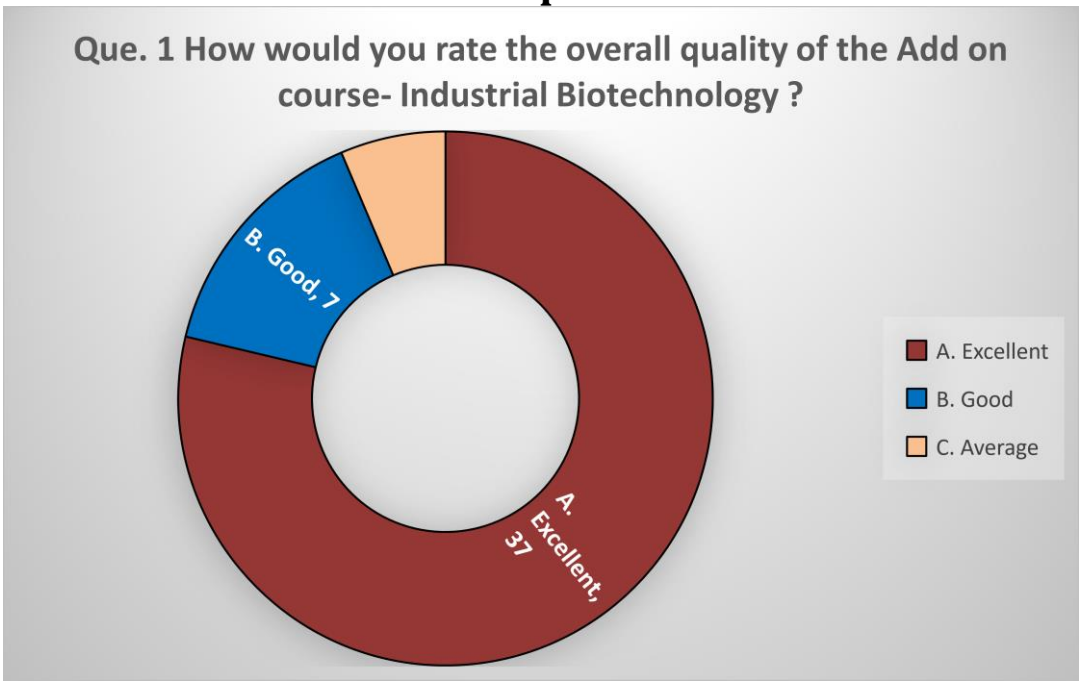
Que. 5 **How satisfied are you with the practical sessions of the Add on Course – Industrial Biotechnology**

Very Satisfied

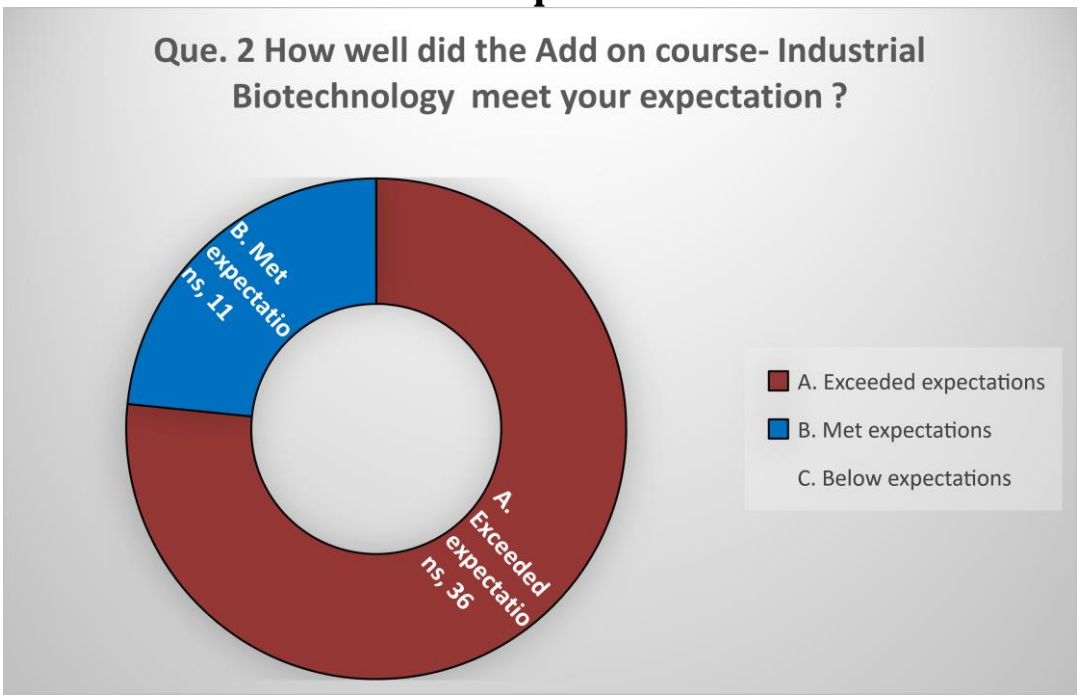
a) Satisfied
b) Dissatisfied

UG Department of Biotechnology
Add on Course -Industrial Biotechnology
(Session 2019-20)
Feedback Response

47 responses



47 responses



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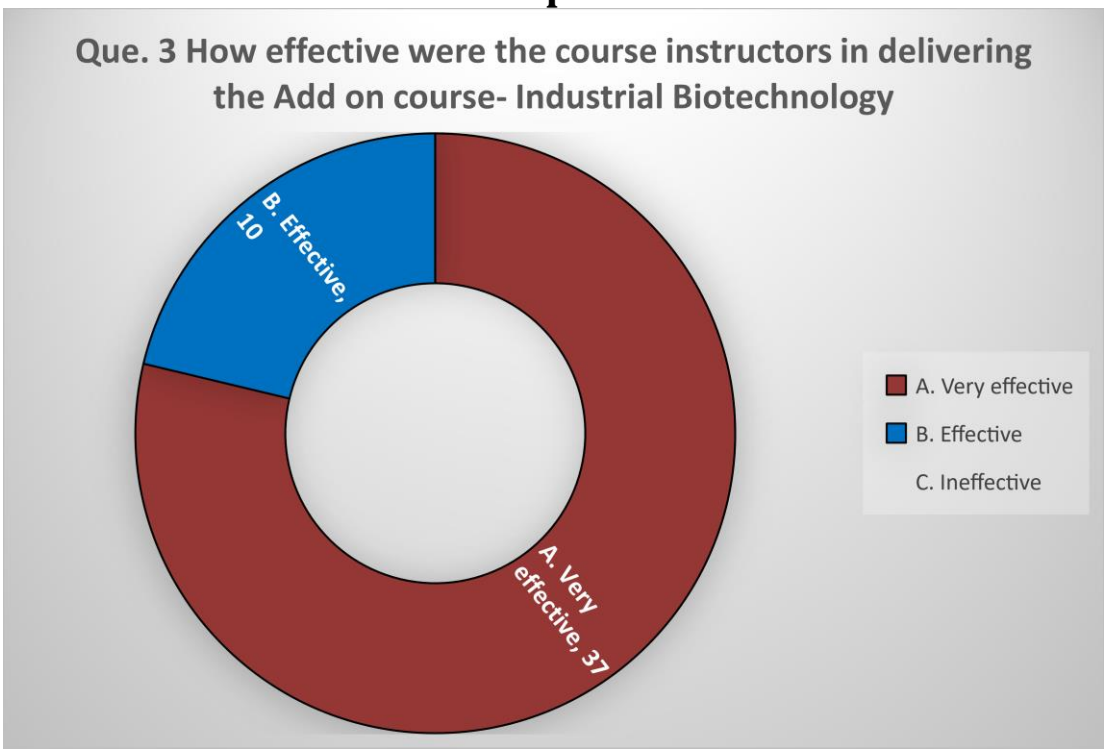
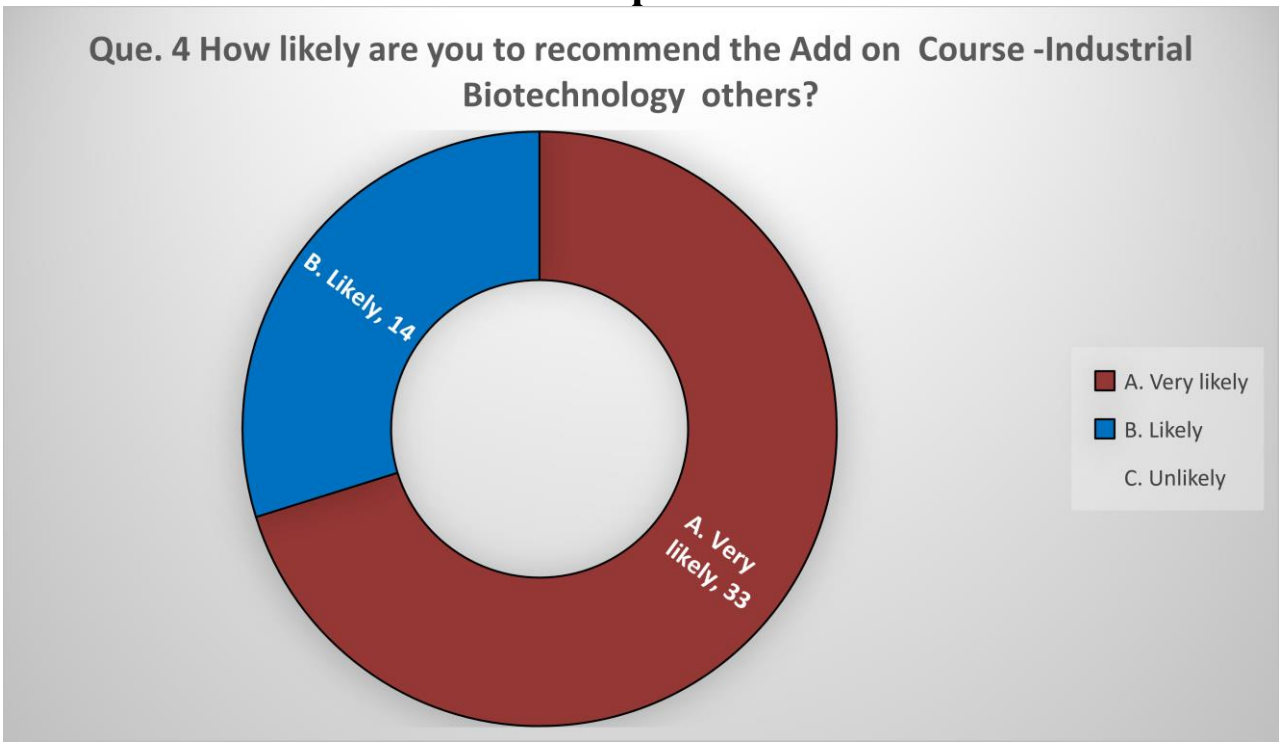


47 responses



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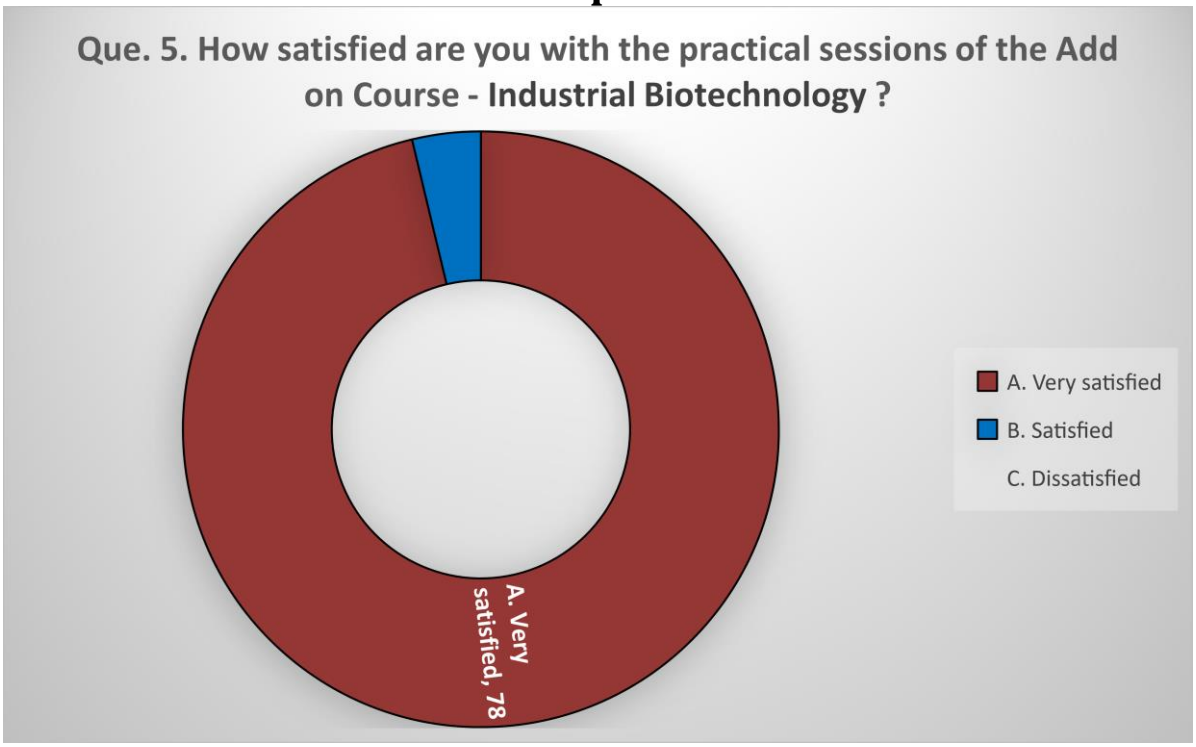

Deepthi

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Prof. Mahendra Dhore
Principal
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