Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce, and Science College Ahmednagar (Autonomous)

(Affiliated to Savitribai Phule Pune University, Pune)

National Education Policy (NEP)
Choice Based Credit System (CBCS)

Programme Framework and Syllabus for

Skill Enhancement Courses: Biotechnology
कौशल्य वृद्धी अभ्यासक्रम: जैवतंत्रज्ञान

Implemented from

Academic Year 2024-25

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Introduction of Skill Enhancement Courses: Biotechnology

Biotechnology plays a pivotal role in various industries, including healthcare, agriculture, environmental science, and pharmaceuticals. As this field continues to advance rapidly, there is a growing demand for professionals with specialized skills and expertise.

This course has been meticulously designed to provide students with a comprehensive understanding of key concepts, techniques, and applications in biotechnology. Throughout this program, participants will have the opportunity to:

1. Explore Fundamental Principles: Gain insight into the fundamental principles of biotechnology, including molecular biology, bioinstrumentation and microbial biotechnology. Understand how these principles form the basis for various biotechnological processes and applications.

2. Hands-On Laboratory Experience: Engage in hands-on laboratory sessions where students will learn essential laboratory techniques, such as DNA extraction, PCR (Polymerase Chain Reaction), protein purification, microbial product preparation, and their downstream processing. These practical sessions will help students to develop proficiency in conducting experiments and analyzing data.

3. Industry-Relevant Skills: Acquire industry-relevant skills that are highly sought after by employers. Learn about regulatory frameworks, quality control, intellectual property rights, and ethical considerations in biotechnology. Develop critical thinking, problem-solving, and communication skills essential for success in the biotechnology industry.

By the end of this course, participants will emerge with a solid foundation in biotechnology and the confidence to tackle challenges and pursue opportunities in this dynamic field. This course will help to advance student's career, or contribute to groundbreaking research. Also, this course equips students with the knowledge and skills needed to thrive in the field of biotechnology.

Skill Enhancement Courses: Framework and Course Distribution:
Subject: Biotechnology

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	II	5.0	SEC-01	SEC-BT 01P	Bioinstrumentation Techniques	02
2.	II	III	5.5	SEC-02	SEC-BT 02P	Molecular Biology	02
3.	II	IV	6.0	SEC-03	SEC-BT 03P	Microbial Biotechnology	02
						Total	06

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Skill Enhancement Courses: Biotechnology

Title of the Course: Bioinstrumentation Techniques								
Year: I				**Semester: II**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
SEC-01	SEC-BT 01P	00	02	02	60	15	35	50

Learning Objectives:

1. To learn Absorption spectrum of protein, absorption spectra isoelectric point of amino acids.
2. To understand the pH meter
3. Study electronic components of Bright field, compound microscope.
4. To learn electronic balance for micro measurements.
5. To study techniques like paper and thin layer chromatography.

Course Outcomes (Cos)

1. Students will learn Absorption spectrum of protein, absorption spectra isoelectric point of amino acids.
2. Students will learn and understand electronic balance for micro measurements the pH meter
3. They will learn and study electronic components of Bright field, compound microscope.
4. They will learn techniques like paper and thin layer chromatography.

Detailed syllabus:

Sr.No.	**Practicals**	**No. of Practicals**
1.	Use of various weighing balances and micropipette and their calibration	01
2.	Sterilization of glasswares and reagents using dry and moist heat	01

	respectively.	
3.	Centrifugation technique; separation of analyte by differential centrifugation	01
4.	Using a compound microscope: Learn the parts and functions of a microscope, observe prepared slides and identify basic cell structures.	01
5.	Components and working of Colorimeter and Spectrophotometer; Verification of Beer and Lamberts law	01
6.	Separation and identification of amino acids by paper chromatography	01
7.	Separation and identification of pigments by TLC	01
8.	Determination of absorption maxima λ_{max} for dye.	01
9.	Calibration of pH meter and measurement of pH	01
10.	To study separation techniques like recrystallization, distillation, sublimation	01
11.	To find out isoelectric point (pI) of amino acid	01
12.	Acid base titration by conductivity meter and pH meter	01

Suggested Reading:

1. Biophysics, an introduction. 1st edition. (2002) Cotteril R. John Willey and Sons Ltd., USA
2. Biophysics. 1st edition (2002), Pattabhi V and Gautham N. Kluwer Academic Publisher, USA.
3. Textbook of optics and atomic physics, 8th edition (1989) P.P. Khande lwal, Himlaya Publishing House, India.