



Dayanand Science College, Latur.

Programme Specific Outcomes (PSOs) Of M.Sc. Biotechnology

Sr. No.	PSO No.	Programme Specific Outcomes (PSOs) of M.Sc. Biotechnology
1	PSO1	It will help to acquire knowledge on the essential advancements of Biotechnology.
2	PSO2	Students will understand the emerging and advanced concept in life-sciences.
3	PSO3	It will help to acquire their applications in Industry, Medicine and Pharmaceutical research.
4	PSO4	PG students will be able to demonstrate the Principles of bioprocess engineering and their operations.
5	PSO5	Students will be able to demonstrate and understand basics of genetic engineering.
6	PSO6	Students will be able to understand Genomics, Proteomics and Metabolomics.
7	PSO7	Students will be able to gain hands on experience in protein expression and purification.
8	PSO8	Students will be able to gain hands on experience in upstream and downstream processing
9	PSO9	Students will able to enhance the knowledge about fundamental research and problems related to field of biotechnology.
10	PSO10	Students will able to gain knowledge on Environment, Animal, plant biotechnology and their applications.



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Course Outcomes (COs)

Of M.Sc. Biotechnology F.Y& S.Y

Sr. No.	Section and Paper code	Name of Paper	Course Outcomes
1	BT-I	Cell and Developmental Biology	<ul style="list-style-type: none"> To understand the basics of Cell Biology and developmental Biology. To know the communication as well as transportation in cells. To become aware about the stem cell technology.
2	BT-II	Microbiology and Virology	<ul style="list-style-type: none"> To understand the basic principles of Microbiology and Virology. To learn the cultivation methods of Microorganisms.
3	BT-III	Biochemistry	<ul style="list-style-type: none"> Structure, classification and the properties of Biomolecules Functions of biomolecules in Human health Laboratory skills for the study of biomolecules
4	BT-IV	(A) Techniques in Biotechnology (B) Plant Metabolism and Development	<ul style="list-style-type: none"> To know the basic principles, working and applications of biological techniques like Microscopy, electrophoresis, chromatography and spectroscopy. To learn the fundamental process in plant system. To understand the basic aspects of plant physiology.
5	BT-V	Molecular Genetics	<ul style="list-style-type: none"> To learn the Principles of Mendelian inheritance. To understand the Genome organization and gene regulation of Prokaryotes and eukaryotes.
6	BT-VI	Immunotechnology	<ul style="list-style-type: none"> To understand the basic concepts of Immune System Cells and organs of immune system. To learn the vaccines and development in vaccine technology
7	BT-VII	Process Biotechnology	<ul style="list-style-type: none"> To learn the microbial techniques for the Isolation, Screening, Preservations and maintenance of Microorganisms. To become aware about the designs and types of bioreactors.
8	BT-VIII	(A) Enzymology (B) Nanobiotechnology	<ul style="list-style-type: none"> To know the fundamental details of Enzymes. To learn the various methods of enzyme immobilization and enzyme kinetics. To know the use of Biotechnology at nanoscale and learn the various methods for the development of nanoparticles and IPR
9	Lab Course I	Practical's based on course BT-I and BT-II	<ul style="list-style-type: none"> Students will learn various techniques to know Cell Biology, transportation in cells and stem cell technology. Students will study isolation, characterization and cultivation methods of Microorganisms

10	Lab Course II	Practical's based on course BT-III and BT-IV	<ul style="list-style-type: none"> • Students will learn various techniques of Structure, classification and the properties of Biomolecules • Students will learn techniques like Microscopy, electrophoresis, chromatography and spectroscopy. Students will learn various instrumental techniques.
11	Lab Course III	Practical's based on course BT-V and BT-VI	<ul style="list-style-type: none"> • Students will Study Principles of Mendelian inheritance, Genome organization of Prokaryotes and eukaryotes. • Students will study Cells and organs of immune system, vaccine technology
12	Lab Course IV	Practical's based on course BT-VII and BT-VIII	<ul style="list-style-type: none"> • Students will be acquainted with the techniques in bioprocess engineering. • Students will practically study enzymes and their characterization.
13	BT- IX	Genetic Engineering	<ul style="list-style-type: none"> • Students will become aware about r-DNA technology, its advantages and disadvantages in addition to tools and techniques. • It will help in avoiding spread of misconception about GMO in society
14	BT- X	Industrial Biotechnology	<ul style="list-style-type: none"> • On completion of this course, the students shall demonstrate the knowledge about the techniques of microbial productions and acquire comprehensive knowledge on quality control and quality assessment. • Acquire knowledge in Production and purification of fungal enzymes Amylase, Pectinase and other industrial products. • Able to work in the section of quality control of Food industry. • Shall develop scientific skills to work in Pharmaceutical and Research laboratories.
15	BT- XI	Plant Biotechnology	<ul style="list-style-type: none"> • On completion of this course, the students shall Demonstrate the knowledge about the techniques of Plant Tissue Culture and acquire comprehensive knowledge on GM technology for quality characteristics and their role in crop improvement. • Acquire knowledge in metabolic engineering and industrial products. • Develop skills in molecular markers studies and their use in plant breeding. • Shall develop scientific skills to work in Plant tissue culture, Pharmaceutical and Research laboratories.
16	BT- XII	English and Science Communication Skills	<ul style="list-style-type: none"> • Students will be able to Understand and demonstrate the use proper writing techniques relevant to the present day technological demands, including anticipating audience reaction. • Students will write effective and concise letters and memos, prepare informal and formal reports, proofread and edit copies of business correspondence. • Student will develop interpersonal skills that contribute to effective personal social and professional relationships.

17	BT- XIII	Intellectual Property Right/Online certification course NPTEL /SWAYM /MOOC of equivalent credit (Minimum of 4 weeks)	<ul style="list-style-type: none"> • Students will be able to understand the procedure of patenting of biological inventions. Thesis and Manuscript writing • Plant breeder's right and Farmer are right.
18	BT- XIV	Computational Biology	<ul style="list-style-type: none"> • Students will be able to construct the phylogenetics of different sequences. • Analyze sequence and structure of bio-macromolecule data • Edit the three dimensional structure of protein using structural bioinformatics tools • Explain the properties of genetic materials and storage and processing of genetic information. • Analyze genomic data. • Explain biological phenomena based on comparative genomics
19	BT- XV	Pharmaceutical Biotechnology	<ul style="list-style-type: none"> • Students will be able to explain the strategies and various steps of new drug discovery process. • Explain the concept of pharmacodynamics and pharmacokinetics • Apply the knowledge of pharmaceutical manufacturing in the production of biopharmaceuticals like antibiotics, vaccines, proteins and hormones • Carry out the quality control procedures in the production of various biopharmaceuticals • Explain the regulatory aspects in the development of pharmaceuticals.
20	BT- XVI	Environmental Biotechnology	<ul style="list-style-type: none"> • Students will be able to Comprehend environmental issues and role of biotechnology in the cleanup of contaminated environments • Comprehend fundamentals of biodegradation, biotransformation and bioremediation of organic contaminants and toxic metals • Apply biotechnological processes in waste water and solid waste management. • Comprehend biofuels/ bioenergy systems; attributes for biofuel / bioenergy production. • Demonstrate innovative biotechnological interventions to combat environmental challenges.
21	BT- XVII (Elective)	(A) Animal Biotechnology (B) Food Biotechnology	<ul style="list-style-type: none"> • Students will be able to explain the fundamental scientific principles that underlie cell culture • Acquire knowledge for isolation, maintenance and growth of cells. • Develop proficiency in establishing and maintaining of cell lines. • Acquire knowledge in animal cloning and its applications.
22	Lab Course V	Practicals based on course BT-IX and BT-X	<ul style="list-style-type: none"> • Students will learn laboratory techniques about r-DNA technology, tools, isolation, detection of DNA • Techniques of microbial productions, Production, purification of fungal enzymes: Amylase and Pectinase.

23	Lab Course VI	Practicals based on course BT-XI and BT-XII	<ul style="list-style-type: none"> • Students will get the knowledge in metabolic engineering, industrial products, molecular markers studies, Plant tissue culture Techniques, Pharmaceutical and Research laboratories. • Techniques relevant to the present day technological demands also to develop interpersonal skills.
24	Lab Course VII	Practicals based on course BT-XIV + XV+XVI+XVII	<ul style="list-style-type: none"> • Students will learn patenting of biological inventions, Thesis and Manuscript writing • Students will learn concept of pharmacodynamics and pharmacokinetics, production of various biopharmaceuticals. • Students will learn concept of biodegradation, innovative biotechnological interventions biotransformation and bioremediation of organic contaminants and toxic metals • Knowledge in animal cloning and its applications, isolation, maintenance and growth of cells.
25	Lab Course VIII	Project/ Review Writing	<ul style="list-style-type: none"> • Students will learn research on various topics