DEVI AHILYA VISHWAVIDYALAYA, INDORE

School of Biotechnology

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Program outcome and course outcome

Program specific outcomes (PSOs)

M.Sc. Biotechnology

1. Students will gain and apply knowledge of Biotechnology comprised of science and Engineering components to solve problems related to field of biotechnology.

2. Students will be able to design, perform experiments, analyze and interpret data for investigating complex problems in the area of biotechnology

3. Graduates will be able to decide and apply appropriate tools and techniques in biotechnological manipulation.

4. Graduates will be able to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological engineering practices.

5. Graduates will be able to understand the need and impact of biotechnological solutions on environment and societal context keeping in view need for sustainable solution.

6. Graduates will be able to undertake any responsibility as an individual and as a team in a multidisciplinary / cross cultural environment.

7. Students will develop oral and written communication skills.

Course Outcomes:

Biochemistry

To provide the insights of the building blocks of living cells that ultimately form the organisms.

Cell & Developmental Biology

This provides detailed understanding of various processes including cell division, signal transduction pathways and regulation of overall structure and function of the cells.
It also focuses on the developmental processes at molecular level in model organisms.

Molecular Biology

This course provides detailed understanding of the DNA replication, Transcription, translation and protein folding and sorting as well as their regulation, respectively.

Analytical Techniques

This course is to provide and exposure of the mechanisms of the tools and techniques used for Biological research.

Computer applications, bioinformatics and Biostatistics

To meet the challenges of advance biological research problems, various computer based tools and basics of biostatistics are required and this course addresses all those criteria.

Immunology

This is to provide the mechanisms of immunity and the role of various immune cells in normal maintenance of immunity and alterations that cause different disorders.

Genetics

This course deals with the concepts of inheritance and its relation with generic defects and genetic counseling.

Genetic Engineering

This is advance course to develop understanding of tools and designs through which engineered organisms can be modified for Human welfare.

Enzyme & Enzyme Technology

This is an advance course to which not only provide basics of enzymes activities, but also provide how to develop new enzymes and tactics important for various industries.

Environmental biotechnology

This course addresses the issues of environmental changes pollution and talk about the biotechnological solutions.

Genomics & Proteomics

This is intensely target the employability of students. It provides details of various high throughput technologies used for gene expression, genome sequence, and genome editing, protein biochemistry, and isolation, purification and characterization strategies.

Cancer Genetics

To cater the need of society and corroboration with the student placements in higher studies; especially in International institutes this course is very important. It is intensely focused on the advance understanding of the molecular mechanisms of development and progression of cancer and development of therapeutics to treat this devastating disease.

Bioprocess engineering & Technology

This provides industrial applications of biotechnology and provides an idea how to convert lab scale production to industry scale.

Plant biotechnology

This course makes understanding of the tools and techniques of genetic engineering/ modification based agronomic development.

Microbiology and industrial applications
This course provides the use of microbial sources for large scale production of commercially important products.

IRR & Biosafety
This course will develop profession ethics among students of biology and their social responsibilities. It also develops the sense of responsibility and rights of intellectual properties and information of the rules and guidelines.

Metabolic Engineering
It is an advance course and it will provide the techniques to modify the metabolic networks of living cells to produce commercially important products as well as to cure disease phenotypes.

Stem cell biology
This course will provide the detailed knowledge of stem cell formation, techniques and tools of stem cell development and differentiation, regenerative medicines, banking etc. It has high employability component.

Pharmacogenomics
This course will provide the techniques and strategies to reduce the drug attrition rate from clinical trials. Also focuses on pharmacokinetics, dynamics, drug efficacy & safety concerns. It has high employability components in clinical trials and pharmaceutical industries.

Seminars/ Research skill development
Logistic thinking, creative art and articulation are the basic need to become a good scientist. This session enhance scientific skills in all the above mentioned domains through preparation and delivery of presentations and by writing SOPs and research projects.

Program specific outcomes (PSOs)

M.Sc. Genetic Engineering

1. Students will gain and apply knowledge of Biotechnology comprised of science and Engineering components to solve problems related to field of biotechnology.

2. Students will be able to design, perform experiments, analyze and interpret data for investigating complex problems in the area of biotechnology

3. Graduates will be able to decide and apply appropriate tools and techniques in biotechnological manipulation.

4. Graduates will be able to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological engineering practices.

5. Graduates will be able to understand the need and impact of biotechnological solutions on environment and societal context keeping in view need for sustainable solution.

6. Graduates will be able to undertake any responsibility as an individual and as a team in a multidisciplinary / cross cultural environment.

7. Students will develop oral and written communication skills.

Course Outcomes:

Biomolecules
To provide the insights of the building blocks of living cells that ultimately form the organisms.

Cell & Developmental Biology
This provides detailed understanding of various processes including cell division, signal transduction pathways and regulation of overall structure and function of the cells.

It also focuses on the developmental processes at molecular level in model organisms.

Molecular Biology
This course provides detailed understanding of the DNA replication, Transcription, translation and protein folding and sorting as well as their regulation, respectively.

Analytical Techniques
This course is to provide and exposure of the mechanisms of the tools and techniques used for Biological research.

Computer applications, bioinformatics and Biostatistics
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Immunology
This is to provide the mechanisms of immunity and the role of various immune cells in normal maintenance of immunity and alterations that cause different disorders.

Genetics
This course deals with the concepts of inheritance and its relation with generic defects and genetic counseling.

Genetic Engineering

This is advance course to develop understanding of tools and designs through which engineered organisms can be modified for Human welfare.

Enzyme & Enzyme Technology

This is an advance course to which not only provide basics of enzymes activities, but also provide how to develop new enzymes and tactics important for various industries.

Environmental biotechnology

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Program specific outcomes (PSOs)

M.Sc. Bioinformatics

1. **To equip students with the computational skills and awareness needed to process, analyse and interpret the vast amounts of biological data.**
2. **On employing existing bioinformatics resources - mainly web-based programs and databases..**
3. **The program is intended to describe not only with the programming languages but it covers the proteomics, genomics, cell and molecular biology, genetic engineering, biochemical pathways etc., relevant to the improvement and development of mankind and industrial application purposes.**
4. **To apply information technology and computational techniques to process genomic and genetic data, as well as developing novel drug discovery and diagnostic tools.**

Course Outcomes:

Basic Mathematics
To describe several areas of mathematics including linear, quadratic, exponential, logarithmic, and trigonometric functions. Students will be able to set up and solve linear systems/linear inequalities graphically/geometrically and algebraically.

Computer fundamentals and Biostatistics
To meet the challenges of advance biological research problems, various computer based tools and basics of biostatistics are required and this course addresses all those criteria

Bio-molecules
To provide the insights of the building blocks of living cells that ultimately form the organisms.

Cell and Developmental Biology
This provides detailed understanding of various processes including cell division, signal transduction pathways and regulation of overall structure and function of the cells.

Programming in C/C++
Design, implement, test, debug, and document programs in C and C++ programming language.

Molecular Biology
This course provides detailed understanding of the DNA replication, Transcription, translation and protein folding and sorting as well as their regulation, respectively.

Biological Databases and Data Analysis
To know important biological databases and relevant bioinformatics software tools. Understand some of the challenges when trying to apply this knowledge to the analysis of real datasets.

Recombinant DNA Technology
To explain the underlying mechanisms of gene cloning and to discuss the practical aspects of applying recombinant DNA technology.

Design and Analysis of algorithms
To demonstrate major algorithms and data structures and to apply important algorithmic design paradigms and methods of analysis.

Internet & Web Based Programming (CGI PERL & HTML)
To apply a structured approach to identifying needs, interests, and functionality of a website and to design dynamic websites that meet specified needs and interests.

Immunoinformatics
It aimed at introducing the science of immunology and a detailed study of various types of immune systems their classification, structure, and mechanism of immune activation and to provide information about the methods used in Immunological Bioinformatics

Genomics & Proteomics
This is intensely target the employability of students. It provides details of various high throughput technologies used for gene expression, genome sequence, and genome editing, protein biochemistry, and isolation, purification and characterization strategies.

Enzyme & Enzyme Technology
This is an advance course to which not only provide basics of enzymes activities, but also provide how to develop new enzymes and tactics important for various industries.

Machine Learning Techniques & CADD
To design and implement various machine learning algorithms in a wide range of real-world applications. In addition it also helps to understand the computer aided drug discovery

Structural Biology and Bioinformatics
To access and browse a range of structural data repositories with structure prediction, comparison , annotation and molecular dynamics

Database management System
To understand the basic concepts and applications of database systems. To learn SQL and construct queries using SQL.

Java Programming
To explain the advantages and basic features of Java and to list important OOP fundamentals and to write simple programs in java.

Metabolic Engineering & System Biology
An introductory overview of the different concepts of metabolic engineering with various examples of how systems biology and molecular biology methods have been applied to understand unique cellular metabolisms and to induce cellular production of useful compounds.

Pharmacogenomics
This course will provide the techniques and strategies to reduce the drug attrition rate from clinical trials. Also focuses on pharmacokinetics, dynamics, drug efficacy & safety concerns. It has high employability components in clinical trials and pharmaceutical industries.

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