School of Studies in Biotechnology

School of Studies in Biotechnology is a regular and one of the prominent schools on the Jiwaji University campus. The School offers Master's and Doctoral program in Biotechnology. Many of the students get various prestigious fellowships from abroad for Ph.D. and post-doctoral research**.** The postgraduate curriculum is updated from time to time to infuse the latest developments of the subject and to develop industry oriented curriculum.

The research areas of focus in the School include genomics, proteomics, pharmaceutical biotechnology and plant biotechnology. The School has received funding for research from various agencies such as University Grants Commission, Madhya Pradesh Council of Science and Technology, Madhya Pradesh Council of Biotechnology, Defence Research and Development Establishment etc. The school facilitates academic collaborations with various national laboratories for placement and project training. The school has proactive academic calendar of high quality academic activities like student's seminar, competitive events and continuous internal assessments etc.

The School has the state-of-art laboratory facilities so that students can acquire practical hands on experience.

01. SANYO- CO_2 incubator
02. Motic- Inverted Microscope
03. Low pressure protein purification system
04. Uv-Vis Spectrophotometer-2
05. Refrigerated Centrifuges-2
06. Ice–flaker
07. FPLC
08. Gel documentation system
09. PCR Thermo-cycler
10. -85 ^{o}C Freezer
11. Walk- In- cold room
12. Bio-Rad Electophoretic systems

Programme Outcomes (POs)

M.Sc. Biotechnology curricula offers a study program focused on specific subjects that are stimulating both regional and global facets. Students are expected to gain interdisciplinary understanding of science to help them qualify various academic competitive examinations like NET/SLET/GATE and civil services examinations by and large.

M.Sc. Biotechnology program delivers theoretical and applied knowledge focusing on applications of transformation technology in the area of drug development and plant biotechnology. This is achieved by exploring them to in house practical's related to animal and plant tissue culture. The M.Sc. studies enable studying Ph.D. level to enhance employability in aforesaid sectors.

Biotechnology is one of the value added course on the Jiwaji university campus. 15 days hands-on-training programme in the genomics and proteomics is the one of the key features of the course. Moreover, academic meetings *vis-à-vis* symposia and seminars are continuously conducted in the best interest of students. Also, School has made what's app group for exchanging academic/administrative information for quick access to the students and teachers.

Programme Specific Outcomes (PSOs)

Majority of the Biotechnology students are well placed in the country and abroad. University evaluate the programme outcome in terms of student's placement.

Consequences of learning biotechnology are expressed in terms of proficiencies as follows;

PSO1: Profound knowledge/understanding in basic scientific filed of plant biotechnology and animal cell culture.

PSO2: Conceiving of awareness related to drug development development based on intellectual skills. This assist students to apply wide range of industrial and professional occupations.

PSO3: Gain of practical aptitudes related to various technological orientations. This enables them to explore global level research opportunities for doctoral and post-doctoral studies.

PSO4: Enhancing effective communication skills after completing the programme.

PSO5: Inclination towards biotechnology intellectuals and management as an output of attending this programme.

Course Outcomes (COs)

For M.Sc. Programmes (I)

SEMESTER-I

Students after completing this course are expected to conceive following scientific knowledge;

CO1 (BT-101): Understand structure and functions of cell, helping their knowledge base in the area of cellular cross talk.

CO2 (BT-102): This course broaden their knowledge in microbial structures and function of prokaryotes and eukaryotic cells. Practical skills *viz.* microscopy, staining; sterilization; microbial techniques to isolate pure cultures of bacteria, fungi and algae expand their horizons..

CO3 (BT-103): Overview of major biomolecules like carbohydrates, lipids, proteins, amino acids, nucleic acids assist in understanding biochemistry.

CO4 (BT-104): To understand principle and applications of different bio instruments engaged in various fields of biological and medical sciences.

SEMESTER-II

Progression into this semester, students are expected to gain following subject temperament;

CO1 (BT-201): To understand the properties, structure and function of genes in living organisms at the molecular level. Perceiving knowledge in this area is very much requisite in gene manipulations.

CO2 (BT-202): Key concepts in immunology acquire the salient features of antigen antibody reaction and its uses in diagnostics studies.

CO3 (BT-203): Elucidate the basics concept of animal and environment biotechnology; animal cell culture; cytotoxicity assays; solid and biomedical waste treatment; bioremediation and phytoremediation.

CO4 (BT-204): Conceptual knowledge of function of enzymes, enzyme kinetics and their regulation, enzyme inhibition are very much needed in therapeutics.

SEMESTER-III

Achievement of this course, the students are expected to enhance followings;

CO1 (BT-301): Fermentation processes, design of bioreactors, factors affecting growth and production; techniques and the underlying principles in downstream processing broaden their practical knowledge as per industrial standpoints.

CO2 (BT-302): Tools and strategies used in genetic engineering expand their horizons vis-à-vis applications of recombinant DNA technology in transgenics, cloning and expression, developing genomic library; sequencing and mutagenesis. This is very much needed in pharmaceutical sectors.

CO3 (BT-303): Exploring students with intermediate statistical theory and methods, test of significance; ANOVA, multivariate analysis, statistical software. Concept of bioinformatics, sequence analysis, protein structure prediction, molecular modeling, sequence databases. This course content add value to their data analysis.

CO4 (BT-304): Understanding plant improvement techniques *vis-a-vis* plant tissue culture; plant cloning vectors; transgenic crops; plant genome mapping; intellectual property right open up new opportunities in industrial point of view.

SEMESTER-IV

Upon successful completion of the course, students are expected to be able to:

CO1 (BT-401): Transgenic research using genetic engineering technology to improve medical diagnostic facilities; development of various genome projects and bioinformatics tools.

CO2 (BT-402): This demonstrate practical skills with critical thinking and research analysis aptitude in the minds of students.

(II) For Ph.D. Course Work Program

Research Methodology

Students pursuing doctoral degree, after successfully concluding the course, will be capable;

CO1: To equip with a basic understanding of the underlying principles of quantitative and qualitative research methodologies.

CO2: Provide students with in-depth training on conduct and management of research from inception to completion using a wide range of techniques.

CO3: Various modes of presenting and dissemination research findings.

CO4: Enable students to be reflexive about their role as researchers.

CO5: The ethical and philosophical issues associated with research.

Computer Applications

After successfully finishing the course, the student will be able:

CO1: To cultivate specialized computational expertise;

CO2: To gain proficiency in working with different software, beneficial for them research studies

Review of Literature

Upon successfully completion of review of literature the student will be able:

CO1: To address methodologies used in past studies of the same or similar topics.

CO2: To develop knowledge in the direction new research undertakings.

Comprehensive Viva

After successfully finishing the course, the student will be able:

CO1: To express deep understanding of their research work done

CO2: Able to answer all queries related research and consequently improving their communication skills