

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ



University of Mysore

(Estd.1916)

Ph. D. in BIOTECHNOLOGY



UNIVERSITY OF MYSORE
Department of Studies in Biotechnology
Manasagangotri, Mysuru-570 006

Regulations and Syllabus
Ph. D. in BIOTECHNOLOGY


Chairman
Department of Studies in Biotechnology
University of Mysore, Manasagangotri
Mysuru - 570 006

UNIVERSITY OF MYSORE
GUIDELINES AND REGULATIONS
LEADING TO
PH.D. IN BIOTECHNOLOGY

Programme Details

Name of the Department	:	Department of Studies Biotechnology
Subject	:	Biotechnology
Faculty	:	Science and Technology
Name of the Programme	:	Ph. D.

PH. D. PROGRAM IN BIOTECHNOLOGY

PROGRAMME OBJECTIVES

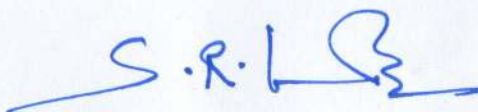
The main objective of this Ph.D. Biotechnology programme is

- To provide quality teaching and training in multidisciplinary areas of Biotechnology and nurture students to meet the needs of the society and industry.
- To cater to the national and global requirement of trained manpower in the area of Biotechnology.
- To create and sustain excellent research and teaching ambience for future leaders and innovators.
- To establish collaborations with other academic institutions at national and international levels to reinforce education and research activities.
- To train the students in technology-based entrepreneurship for socio-economic development.
- Skill development training to bridge the gap between academia and industry.

PROGRAMME OUTCOMES

The Ph.D. programme in Biotechnology is in high demand among life science programmes in the University. This Programme is open to all JRF qualified candidates by national level testing agencies, like UGC, CSIR, DBT, ICMR, etc. in addition University Entrance examination. Upon Successful completion of this programme will result in students;

- Having strong foundation in understanding of basic biology in addition to different aspects of Biotechnology.
- Having hands-on practical skills along with their respective theoretical knowledge, which will help in their research carrier in academic institutions and industries.
- Having improved skills for teaching in academic institutions.



- Having competitive skills and spirit in the field of life sciences both in India and abroad for pursuing higher education.

PEDAGOGIES

- Class room teaching with audio-visual aids, power point presentation information and communications technology in addition to black board and chalk.
- Tutorial classes with one to one interaction or with small student groups.
- Students will be presenting seminars/research papers in every semester.
- Continuous evaluation of students with regular tests/assignments/quiz.
- Viva voce examinations of the students by examiners for improving their communication/expression skills.
- Students will carry out required amount of project work on a research problem.
- Special Lectures by eminent scientists/academicians.

COURSE-I :ADVANCED RESEARCH METHODOLOGY

OBJECTIVES:

- To study the principles of Seed Quality testing, Plant Microbe interaction and Cell and Tissue culture Technology.
- To understand the principles of Biodiversity and bioprospecting and methodology and applications of the Biostatistics and bioinformatics in Life Sciences.

COURSE OUTCOMES:

The student will:

- Understand the mechanism of Analytical techniques, genetic engineering methods.
- Understand the applications of micropropagation technology, somatic embryogenesis, haploid culture, protoplast isolation and hybridization in addition to animal cell culture techniques.

Understand the medicinal plant diversity, endemic/endangered plants and their conservation strategies; Determination of bioactive potential separation and characterization of biomolecules alongwith the Biostatistics applications in Life Sciences

COURSE CONTENT

Bioanalytical methods: Good laboratory practices, Isolation, purification and characterization of proteins, analysis of biomolecules using TLC, gel filtration, adsorption chromatography, ion exchange chromatography, affinity chromatography, GLC, HPLC, electrophoretic techniques, one and two dimensional gel electrophoresis, UV/visible spectrophotometry, fluorescence spectrophotometry, NMR spectroscopy, X-ray diffraction; mass spectrometry.

Antibody production, ELISA, western blot, immunoprecipitation, and immunofluorescence, FISH, flow cytometry.

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Properties of different types of radioisotopes, detection, measurement and uses in biological assays
Enzymes: purification and characterization

Genetic engineering methods: Isolation, purification and analysis of DNA, RNA and plasmid, restriction enzymes and their applications, properties of cloning and expression vectors (plasmid, phage), cloning and expression of DNA in bacterial, animal and plant systems; generation of genomic and cDNA libraries; DNA sequencing methods, methods for analysis of gene expression at RNA, blotting techniques, PCR techniques RFLP, RAPD and AFLP techniques and their applications, genome sequencing, micro array techniques.

Cell/Tissue culture and bioprocess techniques:

Cell and tissue culture techniques: Plant and animal

Microscopy: Scanning and transmission microscopes, Inverted microscope, confocal microscopy, image processing methods in microscopy.

Bioreactors types, design, downstream processing- separation of cells, centrifugation- types. Biocontrol- identification, isolation, characterization, strain improvement, delivery methods, package and practices

Bioinformatics and Statistical Methods: Computer network, on-line control using computers, Use of database, NCBI, EMBL, DDBJ, protein structural data bank, sequence analysis of proteins and nucleic acids, structure prediction, molecular modeling, data mining methods, primer designing, web-based tools for sequence searches, BLAST and FASTA.

Population and sampling, Measures of central tendency and dispersion; Binomial, Poisson and Normal distribution; confidence interval; Errors; Hypothesis testing-Z score, 't' test, 'F' test, Chi-square test, regression analysis, correlation: LSD, multiple range test, data transformation, experimental designs.

Scientific Writing and development of Research projects:Scientific document: Maintenance of laboratory data book, Organization and writing of a research paper, shortcommunications, review articles, monographs, technical and surveyreports, authored books and edited books, dissertation and PhD Thesis.Preparing and delivering of oral and posterpresentations, avoiding plagiarism, impact factor and citation index

Funding agencies: National and international funding agencies for R & Dprojects.Preparation of R & D projects for funding: Organization of a researchproject, identification of gap areas in the subject, aims and objectives ofthe projects, possible outcome of the project, funds requirements andjustification(s).Biosafety and ethical issues, IPR, Patents and patentfiling, Patent specifications and application, characteristics ofthe disclosure for a biotechnology invention, marketing of biotechnological invention.

COURSE II REVIEW OF LITERATURE

COURSE OUTCOMES:

- Demonstrate an understanding of the purpose of the literature review.
- Apply writing, research, and critical thinking skills in developing components of the literature review.
- Create and submit a draft of the literature review.

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