



YENEPOYA

(DEEMED TO BE UNIVERSITY)

Recognized under Sec 3(A) of the UGC Act 1956

Accredited by NAAC with 'A' Grade

YENEPOYA RESEARCH CENTRE

PROGRAM AND PROGRAM SPECIFIC/COURSE OUTCOMES

POSTGRADUATE PROGRAM

MSC BIOSCIENCE

ATTESTED

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PROGRAM OUTCOMES POSTGRADUATE

PROGRAM

MSC BIOSCIENCE

(K=Knowledge, S=Skill, A=Attitude)

- PO 1 Acquire knowledge and understanding of the basic concepts of Biochemistry, Microbiology, Genetics, Cell and Molecular Biology, Immunology and Toxicology and laboratory skills as applicable to the life science sector. (K)
- PO 2 Competent enough to use the basic understanding and skills for the emerging areas of Nanobiotechnology, Stem cell Biology, Omics Technology, Bioinformatics and Genetic engineering. (S,A)
- PO 3 Acquire understandings of key concepts of research methodology including regulatory and ethical issues and application of statistics. (K,S,A)
- PO 4 Able to generate new knowledge through research projects and analyze, interpret and report the data collected through a research project. (K,S,A)

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PROGRAM SPECIFIC/COURSE OUTCOME

POSTGRADUATE PROGRAM

MSC BIOSCIENCE

BIOCHEMISTRY	CO 1	Student will be able to differentiate the biomolecules and their importance in the biological system
	CO 2	Know the importance of pH in normal physiological condition and techniques for macromolecular separation
	CO 3	Know the importance of metabolic pathways and law of thermodynamics
	CO 4	Know the importance of enzymes, enzyme kinetics and mechanism of action
	CO 5	know the nutritional values of macromolecules & vitamins and minerals and their importance in the biological systems.
Cell & Molecular Biology	CO 1	To understand a single cell, sub cellular organelles and the molecular players for sustaining and functioning of a cell.
	CO 2	Students will be able to understand the importance and maintenance of the genetic material and code through several divisions and the players involved in this function.
	CO 3	Concepts of the central dogma will be well developed. They will have a clear idea on replication, transcription and translation, post translation and functionality of the genetic material
	CO 4	Understand and differentiate the gene regulation in prokaryotes, viruses and eukaryotic cell and will be able to explain the roles of repressors and inducers in gene regulation
	CO 5	Understand the modulation of gene expression via transmission of signal from the receptor to the intracellular regions.
MICROBIOLOGY	CO 1	Able to distinguish between major classes of microorganisms belonging to prokaryotes and eukaryotes
	CO 2	To acquire skills in culturing methods, different sterilization techniques and microscopic techniques
	CO 3	To know the important metabolic pathways of different groups of microorganisms
	CO 4	Able to apply microbial genetics relevant to modern biology and able to assign microorganisms systematically into taxonomical ranks
	CO 5	Shall be able to distinguish and demonstrate the beneficial and harmful effect of microorganisms in different fields such as agriculture, medicine and biotechnology

ATTENDED

GENETICS	CO 1	Understand model systems for genetic studies. Learn about transmission genetics, mutations & chromosomal aberrations.
	CO 2	Learn Human molecular genetics, historical facts, genome analysis and mapping, mutations, transgenics.
	CO 3	Learn about the Genetics of diseases, cytogenetics, syndromes, prevalence, epigenetics, Theranostics
	CO 4	Learn about Population quantitative genetics, Genetic variation, allele frequency, genetic drift, Hardy Weinberg, Migration
	CO 5	Able to apply Diagnostics genetics, Genetic inheritance, variation at genetic level, pedigree, forensics and treatment options
ENVIRONMENT AND HEALTH	CO 1	To understand environment, biodiversity and natural resources
	CO 2	To know different types of pollutions pollutants and gap between environment and public health
	CO 3	To know various and associated health risks
	CO 4	To describe different pollution control measures
	CO 5	To know different environmental laws and regulations
Nanobiotechnology	CO 1	Understanding the concept of nanomaterials and their preparative methods
	CO 2	To acquire knowledge on polymeric science and its applications
	CO 3	Understanding the polymer synthesis using different polymerization techniques
	CO 4	Gain a knowledge on chemical characterizations of bio/polymeric nanomaterials using different analytical techniques
	CO 5	Understanding the biological application of nanomaterials for drug development
Stem Cells and Developmental Biology	CO 1	Gain a knowledge on the mammalian developmental biology in the right perspective
	CO 2	Understand the importance of energetics in mammalian development
	CO 3	Understand the cellular potencies
	CO 4	Understand the regenerative potential and translational aspect using regenerative stem cells and for cancer therapeutics
	CO 5	Global and National ethics involving various kinds of stem cell research and therapeutics
Immunology	CO 1	To understand the various component of immune system
	CO 2	To gain knowledge on mechanism of immune system and its regulation
	CO 3	Be competent to interpret the importance of immunological response

	CO 4	To acquire knowledge on various animal models used for immunological studies
	CO 5	To describe various immunological techniques
Toxicology	CO 1	Learn the basic concepts, different forms of toxicity and biotransformation mechanisms
	CO 2	Describe common pollutants and their mechanism of action
	CO 3	Know the key concepts of pharmacokinetics and pharmacodynamics, also understand the various form of drug toxicity
	CO 4	Assess the applications of toxicology in various fields - Food toxicology, Forensic toxicology, Cosmetic toxicology and Occupational toxicology
	CO 5	Understand the various techniques of toxicity evaluation and learn the guidelines for regulatory requirements
Scientific Communications	CO 1	Understanding the research practices and good laboratory practices
	CO 2	Understanding the advanced software tools, and maintenance scientific record.
	CO 3	Enhance their communication skills and provide them a platform to overcome their shortcomings and strengthen them to face the competitive world.
	CO 4	Understanding about innovations, entrepreneurship, startup companies and product development
Research Methodology	CO 1	Introductory understanding of research methodology, its significance and scientific methods used in research
	CO 2	Basic understanding on how to define a Research Problem and to derive a research hypothesis
	CO 3	Understand Ethical and regulatory bodies and their role in shaping Research
	CO 4	Learn about Intellectual Property Rights and their issues in Research
Systems Biology and Omics Technology	CO 1	To learn about the technologies to analyse genome, transcriptome and epigenome
	CO 2	Understanding the basics of proteomics experimental pipeline and data analysis
	CO 3	Be competent to perform mass spectrometry-based proteomics experiment
	CO 4	Familiarizarise with Multi-omics data integration
	CO 5	Familiarizarise with Basics of mass spectrometry-based metabolomics experimental workflow and data analysis
Genetic Engineering	CO 1	Learn about Enzymes and Vectors in Gene Cloning
	CO 2	Develop knowledge on Polymerase Chain Reaction

	CO 3	Understand the Gene Cloning Methods and its applications
	CO 4	Familiarise with Gene and Promoter isolation
	CO 5	Gain insights into the concepts of Genetic Engineering of living organisms
Bioinformatics (P)	CO 1	Learn basics of programming, search databases, phylogenetics, next gen sequencing
	CO 2	To gain knowledge on structural bioinformatics, molecular docking and protein databases
	CO 3	Perform Proteomic, Metabolomic data analysis, normalization techniques, metabolite identification
Biostatistics (P)	CO 1	To learn how to collect, organize and represent data; determine the range and variation in the data
	CO 2	To learn how to form statistical hypothesis and differentiate it from research hypothesis; testing statistical hypothesis against real-life biological data
Cell Culture Techniques (P)	CO 1	Understand the basics of animal cell culturing including infrastructure, equipment's and materials and sterile technology
	CO 2	Able to prepare mammalian cell culture media under sterile conditions
	CO 3	Able to plate the mammalian cells of established cell lines, trypsinize the cells and cryopreserve the cells followed by cell revivals
	CO 4	Able to perform a lymphocyte culture and karyotype analysis
	CO 5	Able to perform basic cell culture analytics such as cell counting using Trypan blue, MTT assays and clonogenic assays for cell proliferation

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