FIRST YEAR - SEMESTER – I

CORE COURSE- I: CELL AND MOLECULAR DEVELOPMENTAL BIOLOGY

CO1 Have an insight of the cell as the fundamental unit of life and to compare the structure of the Eukaryotic cell with the primitive prokaryotic cell

CO2 Analyse the structure and obtain a strong foundation about the functional aspects of cell organelles and cell membrane.

CO3 Study the structure and functions of Nucleic acid and discuss the molecular mechanism of Replication, Transcription and Translation and post translational modifications of proteins.

CO4 Predict the response of cells to the intra and extracellular environment by studying about the intracellular signalling pathways.

CO5 Understand the principles and molecular mechanisms involved in cellular differentiation, morphogenesis, growth and Potency of the cell

CORE COURSE II - CELL AND MOLECULAR DEVELOPMENTAL BIOLOGY – Practical

CO1 Demonstrate the operation of Light Microscope

CO2 Identify blood cells and its components

CO3 Isolate and identify plant, and animal cells.

CO4 Summarizes the concept of g a m e t e s

CO5 Develop skill to perform cell fractionations

ELECTIVE I- BIOLOGICAL CHEMISTRY

CO1 Comprehend the importance of Chemistry and Biochemistry through the concept of acids and bases, and chemical bonding.

CO2 Demonstrates the formation of different types of solutions, concentrations of solution sand preparation of buffer solutions

CO3 Recall the Structure, Classification, Chemistry and Properties of Carbohydrates and Explain Various Biochemical Cycles involved in Carbohydrate Metabolism.

CO4 Recall the Structure, Classification, Chemistry and Properties of Lipids, Nucleic acid and Explain Various Biochemical Cycles involved in Fatty acid and Nucleic acid Metabolism.

CO5 Understand the Structure, Classification, Chemistry and Properties of proteins amino acids and identify and explain nutrients in foods and the specific functions in maintaining health.

ELECTIVE I - BIOLOGICAL CHEMISTRY – Practical

CO1 Perform and estimate the amount of chemical substance present in a solution qualitatively. To analyze and detect the nature of various organic class of compounds qualitatively.

CO2 Qualitatively analyze the carbohydrates and amino acids and report the type of carbohydrate based on specific tests. Differentiate the carbohydrates based microscopic examination of the crystal.

CO3 Understand the methods of acidimetry, alkalimetry and permanganometry

CO4 Quantify Ascorbic acid in lemon by Dichlorophenol into phenol dye method, Glycine by Sorenson's formal titration method.

CO5 Estimate Glucose, Cholesterol and Proteins

SEMESTER – II

COURSE CORE III - GENETICS.

CO1 Learn about the classical genetics and transmission of characters from one generation to the next.

CO2 Obtain a strong foundation for the advanced genetics.

CO3 Explain the properties of genetic materials and storage and processing of genetic information.

CO4 Acquire knowledge about the Mutagens, Mutations, DNA Repairs and Genetic disorders in human.

CO5 Categories Eugenics, Euthenics and Euthenics and in-depth Knowledge on population Genetics

CORE COURSE IV – Genetics – Practical

CO1 Demonstrate the basic principles of important techniques in Molecular biology and Genetics.

CO2 Analyze the Polytene chromosome of the organisms

CO3 Identify Barr bodies from Buccal smear

CO4 Demonstrate the Preparations and maintenance of culture medium

CO5 Demonstrate Human karyotyping

ELECTIVE II - FUNDAMENTALS OF MICROBIOLOGY

CO1 Understand the classification of Microorganisms and structure of bacteria

CO2 Understand the various microbiological techniques, different types of media, and techniques involved in culturing microorganisms.

CO3 Categorize the methods of sterilization and identify the significance of culture media in the growth of different microbes.

CO4 Exhibit knowledge in analysing the importance of Bio insecticides, Bio fertilizers prebiotics and probiotics.

CO5 Distinguish between normal flora and pathogens and describe the role of microbes in food intoxications**.**

ELECTIVE II -FUNDAMENTALS OF MICROBIOLOGY – Practical

CO1 Describe the general Laboratory safety & Sterilization Techniques

CO2 Develop Skills in Media Preparation, Isolation & Serial Dilution Techniques and Pure Culture Techniques

CO3 Microscopically analyze the morphological features of Bacteria and fungi and define various Staining Techniques.

CO4 Perform the Motility of organisms.

CO5 Able to characterize and identify bacteria using Biochemical tests.

SEMESTER – III

CORE COURSE V- IMMUNOLOGY AND IMMUNOTECHNOLOGY

CO1 Explain the role of immune cells and their mechanism in body defense mechanism.

CO2 Demonstrate the antigen –antibody reactions in various immune techniques.

CO3 Gain new insights into Antigen -Antibody interactions and to demonstrate immunological techniques.

CO4 Gain knowledge of production of vaccines

CO5 Apply the knowledge of immune associated disease, hypersensitivity reactions.

CORE COURSE VI - IMMUNOLOGY AND IMMUNOTECHNOLOGY – PRACTICAL

CO1 Perform blood grouping and determine blood type.

CO2 Able to count WBC and RBC.

CO3 Conduct serological diagnostic tests such as ASO, CRP, RA and WIDAL test.

CO4 Acquire technical skills required for immunodiffusion and know the principle behind the techniques.

CO5 Able to Demonstrate ELISA, Handling of Laboratory animals.

ELECTIVE III – BIOINSTRUMENTATION

CO1 Practice, experiment with and apply the basic instruments in the laboratory

CO2 Predict the functionality of Beer – Lambert's law in identifying and quantifying a biomolecule.

CO3 Employ the separation techniques for separating biomolecules based on chromatography and electrophoretic techniques

CO4 Understand the clinical important isotopes and detection of isotopes

CO5 Employ the separation techniques for separating biomolecules based on centrifugal force by centrifugation.

ELECTIVE III – BIOINSTRUMENTATION Practical

CO1 Practice, experiment with and apply the basic instruments in the laboratory such as weighing balance, pH meter, shaker, incubator etc. in various research processes.

CO2 Predict the functionality of Beer – Lambert's law in identifying and quantifying biomolecules.

CO3 Employ the separation techniques for separating biomolecules based on paper chromatography.

CO4 Employ the separation techniques for separating biomolecules based on Thin layer chromatography.

CO5 Employ the separation techniques for separating biomolecules based on centrifugal force by centrifugation.

SEMESTER –IV

CORE COURSE VII- Genetic Engineering and rDNA Technology

CO1 Demonstrate the basic principles of genetic engineering techniques and illustrate the specificity of vectors for cloning and advantages

CO2 Enumerate various recombinant techniques and gene probes and molecular markers identification

CO3 Understand Gene transfer techniques by Viral and Nonviral mediated gene transfer mechanisms.

CO4 Exhibit knowledge in sequencing technologies and protein engineering techniques.

CO5 Explore the strategies of Recombinant DNA Technology in r medicine, Industry and agriculture.

CORE COURSE VIII GENETIC ENGINEERING and r DNA TECHNOLOGY PRACTICAL

CO1 Isolate the Plasmid DNA and Genomic DNA. and predict the molecular weight of DNA by agarose gel electrophoresis

CO2 Demonstrate working principles of PCR, RFLP and other important Genetic Engineering techniques

CO3 Prepare the competent cells and perform bacterial transformation

CO4 Determine the restriction digestion of DNA

CO5 Determine the restriction fragment length polymorphism.

ELECTIVE IV - BIOINFORMATICS AND BIOSTATISTICS

CO1 Acquire knowledge about the Developments and Applications of Bioinformatics.

CO2 Gain knowledge about the importance of the bioinformatics, databases, tools and software of bioinformatics and explain different types of Biological Databases

CO3 Understand the basics of sequence alignment, sequence analysis and Protein structure prediction method.

CO4 Demonstrate the basic methods of data collection, graph construction and sampling techniques and Calculate measures of central tendency

CO5 Correlate and analyse biological data through various statistical methods and interpret biological data via various probabilistic distribution methods.

ELECTIVE IV- BIOINFORMATICS AND BIOSTATISTICS PRACTICAL

CO1 Analyse the Biological databases

CO2 Able to perform BLAST and FASTA

CO3 Represent data in to graphical form

CO4 Test the level of significance of biological data and interpret the results.

CO5 Determine averages of the biological data

SEMESTER –V

CORE COURSE IX - PLANT BIOTECHNOLOGY

CO1 Explore the history of Biotechnology and state the importance of organization of plant genome

CO2 Be acquainted with the molecular basis of action of plant hormones and gene expression

CO3 Illustrate about various culture medium preparations, haploid, triploid plant production and its applications

CO4 Exploit symbiotic organisms as a vector for gene transfer to produce transgenic plants

CO5 Develop molecular technique skills for crop improvement

CORE COURSE X - ANIMAL BIOTECHNOLOGY

CO1 Understand the basic concepts of Animal cell culture and cell laboratory

CO2 Describe the media preparation, preservation, trypsinization, counting, maintenance and application of cell lines.

CO3 Discuss the strategies for gene transfer and gene expressions with their applications.

CO4 Be acquainted with genetic modification and stem cell technology in production of transgenic animals

CO5 Learn the Assisted reproductive technology and its applications

CORE COURSE XI- ENVIRONMENTAL & INDUSTRIAL BIOTECHNOLOGY

CO1 Know about the environment, its issues and management of the environment

CO2 Explain the process of waste water treatment, drinking water treatment and solid waste management in various industries

CO3 Illustrate the significance of bioreactors in bioprocess engineering and culture methods.

CO4 Explain Downstream processing, Fermented Products production and advanced methods

CO5 Speculate the role and importance of microorganisms behind the ore leaching, production of food products and Biofertilizers.

ELECTIVE VI - PLANT BIOTECHNOLOGY AND ANIMAL BIOTECHNOLOGY – PRACTICAL

CO1 Explain plant tissue culture and Illustrate Callus development

CO2 Develop technical skills in Protoplast isolation and Nucleus localization

CO3 Make use of the techniques used in preparing tissue culture medium and membrane filtration in culturing animal cells and prepare single cell suspension and evaluate cell counting and viability

CO4 Develop technical skills in isolation of DNA and RNA from plants and microorganisms

CO5 Examine the importance of trypsinization in monolayer and subculture and cryopreservation

SEMESTER- VI

CORE COURSE XIII – BIOENTREPRENEURSHIP

CO1 Students will be able to identify the challenges of being a Bioentrepreneur

CO2 Will understand the Business proposal for starting a company

CO3 Will learn about Vermicomposting and Sericulture

CO4 Will aspire to set up Mushroom Cultivation

CO5 Will learn the technique of Single cell protein Cultivation

CORE COURSE XIV - PHARMACEUTICAL BIOTECHNOLOGY

CO1 Students will understand the series of processes involved in drug development, patenting and drug approval.

CO2 Will learn about Biopharmaceuticals

CO3 Will become familiar with Biotech protein drugs

CO4 Will understand about management of drugs

CO5 Will be familiar with pharmaceutical sectors

CORE COURSE XV- ENVIRONMENTAL AND INDUSTRIAL BIOTECHNOLOGY PRACTICAL

CO1 Students can able to isolate the microorganisms and determine their growth curve, generation time.

CO2 To analyze the water samples, perform immobilization and production of Wine, Biogas and compost.

CO3 Develop skills in bio fertilizer production and microbial identification

CO4 Gain basic skills to analyze raw milk and determine the pasteurization efficacy.

ELECTIVE VII- FOOD TECHNOLOGY

CO1 Students will be able to understand the basic concepts of the food industry

CO2 Will learn about classification of food

CO3 Will learn about fruits, vegetables and horticulture

CO4 Will learn about Non vegetarian food

CO5 Will learn about food adulteration and biosensors to detect them.

ELECTIVE VIII -MEDICAL BIOTECHNOLOGY

CO1 Student will be able to obtain knowledge on Vaccines, Antibody therapy and diagnostics

CO2 Will know the Molecular basis of diseases

CO3 Will know about cytokines and interferons

CO4 Will learn about clinical trials

CO5 Will learn about ethics in clinical trials