

MAR AUGUSTHINOSE COLLEGE RAMAPURAM
Department of Biotechnology
POs, PSOs and COs of Under Graduate Biotechnology Programme

Program Outcomes

PO1	Grasp of basic and advanced knowledge on various domains of biotechnology
PO2	Ability to integrate technologies through an inter-disciplinary learning habit
PO3	Develop an independent thinking ability
PO4	Equip the students with the laboratory skills in biotechnology
PO5	Understanding of professional and ethical responsibility.
PO6	Ability to design and conduct experiments, as well as to analyze and interpret scientific data.
PO7	Recognition of the need for, and an ability to engage in life-long learning.
PO8	Ability to work in a team towards solving broad societal and national issues.

Programme Specific Outcomes

PO9	Ability to inculcate an attitude of enquiry towards developing innovative ability and enhancing entrepreneurship skills.
PSO1	Graduates in biotechnology will be eligible for pursuing higher education, M.Sc. programs in the different fields of life science
PSO2	The graduate will enable to get sufficient knowledge in principles and applications of biotechnology to be applied as a prospect.
PSO3	The graduate will be able to develop efficient and effective methodologies based on modern techniques to be used in research laboratories and industries
PSO4	Graduates will exhibit contemporary knowledge in Biotechnology and will be eligible for doing jobs in the pharmaceutical and biotechnological industries.
PSO5	The graduate will be able to apply the acquired knowledge from the program for the advancement of mankind and sustainable agriculture.

Course Outcomes

Common Course

Course Name	Course Outcomes
EN1CC01 English 1 Fine-tune Your English	On completion of the course, the student should be able to: 1. confidently use English in both written and spoken forms. 2. Use English for formal communication effectively.
EN2CC03 English 1 Issues that Matter	By the end of the course, the learner should be able to: 1. Identify the major issues of contemporary significance 2. Respond rationally and positively to the issues raised 3. Internalize the values imparted through the selections.

Core Courses

Course Name	Course Outcomes
BT1CRT01 Basic Life Sciences	This course makes the students understand the basic aspects of human physiology such as nutrition, Digestion, Respiration, Circulation Excretion, and Nervous coordination. It also gives the fundamentals of Plant physiology like absorption of water by plants, Transpiration, etc.
BT1CRT02 Methodology in Biotechnology	Students get an idea about different areas of biotechnology. It will provide basic information about the techniques in biotechnology. After completing the course, the learners will get an idea about the application side of biotechnology.
BT1CRP01 Practical Basic Biology and Chemistry	Students are trained in, standardization of the concentration of acids/alkali based on volumetric titrations, Qualitative analysis of the organic compounds, Tests for –Hydrocarbons, alcohol, aldehydes, ketones, aniline, amide, Cross-section of Anther, Pollen tube germination
SEMESTER 2	
BT2CRT03 Cell Biology	The students are trained in different aspects of cell division, regulation of cell division includes mitosis and meiosis. Study structure and different functions of cell organelles, cell signaling, characteristics of the cancer cell. They can also study different processes involved in cell death, cell signaling, and cell-cell adhesions.
BT2CRT04 Elementary Chemistry for Biology	Demonstrate mastery of cutting edge approaches Elementary Chemistry for Biology. Describe, critically evaluate, and apply current theoretical perspectives. Demonstrate proficiency in analytical and statistical procedures appropriate for Chemistry.
BT2CRT05 Evolution & Developmental Biology	Evolution & Developmental Biology Students are exposed to various theories of evolution. Students can explain the various processes and phenomena of evolution. Students can explain the process of human evolution. Various stages in the development of plants and animals can be described by the students.
BT2CRPO2 Practical- Cell Biology	Students are trained in Various cell division methods, blood cell counting, micrometric analysis, chromosome length measurement, and mitochondrial staining. They can also train in blood group analysis and total blood cell count. They are familiar with the identification of prokaryotic cells and eukaryotic cells.
SEMSTER 3	
BT3CRT06 Immunology	The students are trained in: Different immunological assays- ELISA, WIDAL, Blood grouping, radial immunoassay, immunoelectrophoresis, immunodiffusion, etc. Also, Study the Importance of the immune system in the defense mechanism of our body.
BT3CRT07 Genetics	Demonstrate mastery of cutting-edge research approaches in genetics/genomics, Describe, critically evaluate, and apply current theoretical perspectives in genetics, Demonstrate proficiency in analytical and statistical procedures appropriate for genetic analyses.
BT3CRT08 Biostatistics and Computer applications	Course outcomes: The objective of this course is to provide an understanding of the students on statistical concepts to include measurements of location and dispersion, probability, probability distributions, sampling, estimation, hypothesis testing, regression, and correlation analysis, and computer applications
BT4CRP03 Practical Immunology	Students are trained in: different immunological assays- Widal test, radial immune assay, blood grouping, immunoelectrophoretic, staining of bar

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and Genetics	body, polytene chromosome, etc. They are also familiar with antigen-antibody precipitation reactions as well as agglutination reactions.
SEMESTER 4	
BT4CRT09 Molecular Biology	The Course gives the student sufficient knowledge about the Structure and properties of genetic material and the molecular aspects of DNA replication, transcription, translation, and DNA repair mechanisms. Students also become familiar with the mechanism of Regulation of Gene expression and transposable elements.
BT4CRT10 Enzymology	At the end of the course, students should be able to, CO1. classify an enzyme, based on its functions and describe the methods of isolation and purification of the enzyme. CO2. define and explain the enzyme structure, mechanism of action, the role of coenzymes, and the factors that affect enzyme activity. CO3. explain enzyme kinetics and describe the regulation of enzyme activity. CO4. describe the principle and mechanism of enzyme inhibition. CO5. identify the commercial applications of enzymes
BT4CRT11 Biophysics and Bioinformatics	The objective of this course is to provide an understanding to the students of the fundamental concepts of biophysics. Explain the integration of physical theory into biological processes. Identify/Justify the biophysics tools for biological study/research. And also exposed to the concepts of biology, computer science, and mathematics. existing software effectively to extract information from large databases and to use this information in computer modelling
BT4CRP04 Practical Molecular biology and Enzymology	At the end of the course, students should be able to, 1. Estimate activity of a given enzyme. 2. determine the effect of pH, Temp., metal ions, and inhibitors on enzyme activity. 3. perform immobilization enzymes. 4. Isolate and separate DNA from a given sample.
SEMSTER 5	
BT5CRT12 Recombinant DNA Technology	Briefing the applications of genetic engineering. Students are trained about the tools and techniques used R DNA technology. Illustrating the pros and cons of genetic engineering. Familiarizing advanced sequencing tools.
BT5CRT13 Environmental Biotechnology	The subject aims to introduce specific examples and cases, and explain how chemical, biological and molecular sciences can be applied to identify and address issues of environmental concerns. Application of biotechnology in environmental management, Concepts and strategies of Metagenomics and Biofuel production will be discussed with an emphasis to cleaner and sustainable environment.
BT5CRT14 Animal Biotechnology	Course Outcome: The students are trained in: Important animal cell culture methods, uses and importants of different cell lines, study the production of cell culture-based vaccines, insulin, recombinant proteins etc.

	Applications of transgenic animals
BT5OPT01B Open Course Biotechnology for Sustainable Development	The student is exposed to the theory and basic techniques for the production of biofertilizers, biopesticides, composts and mushroom. The techniques involved in the production of biogas, biopesticides, biofilms and biosurfactants, Conversion of waste to cost effective materials, composting methods. Basic knowledge of the natural resources, its usage and applications.
BT5CRP05 Practical rDNA technology and Environmental Biotechnology	Students are trained to develop hands on experience in DNA isolation procedures along with their quantitation. Demonstration of transformation procedure. Characterization of waste water and sludge.
SEMESTER6	
BT6CRT15 Plant Biotechnology	<ul style="list-style-type: none"> •Understanding the concepts and principles of Plant tissue culture. •Critical application of genetic engineering in Plant improvement, selection, breeding and biomolecule production. •Learning methods to conserve germplasm under In vitro. •Understanding of biotechnological processes has also applicative value in agriculture and in ecology.
BT6CRT16 Industrial Biotechnology	Demonstrate mastery of cutting-edge research approaches in Industrial biotechnology, Describe, critically evaluate, and apply current theoretical perspectives in industrial, Demonstrate proficiency in analytical and statistical procedures appropriate for industrial analyses.
BT6CBT01A Choice Based Course Bioinformatics	The objective of this course is to provide an understanding the students on knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics. existing software effectively to extract information from large databases and to use this information in computer modelling.
BT6CRT16 Practical Industrial Biotechnology and Plant Biotechnology	Course Outcomes. Students are trained in: Characterizing waste water, bacteriological analysis of water, Secondary screening of Industrially important microorganisms, fermentative production, immobilization, plant tissue culture techniques
BT6CRP07 Project	<p>Project work aimed to attain communication skills, team work and research skills.</p> <ul style="list-style-type: none"> • Each student will attain following learning outcomes from this degree course: • Demonstrate a depth of knowledge in the subject. • Complete an independent research project, resulting in at least a thesis publication, and research outputs in terms of publications in high impact factor journals, conference proceedings, and patents. • Demonstrate knowledge of contemporary issues in their chosen field of research. • Demonstrate an ability to present and defend their research work to a panel of experts.

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COMPLEMENTARY COURSES

1. BIOCHEMISTRY

Course Name	Course Outcomes
SEMESTER 1	
BC1CMT01 Elementary Biochemistry	To introduce the student basic principle of different types of chemical interactions in biological systems, an understanding on the basics of membrane biochemistry, importance of biochemistry of blood and to have a basic understanding of biochemical separation techniques.
Practical 1 Elementary Biochemistry	To resolve quantitative problems concerning preparation of solutions and buffers and to have an understanding of basic separation techniques.
SEMESTER 2	
BC2CMT02 Biomolecules	To describe structural characteristics of simple organic biomolecules and their biologically important derivatives indicating the constituent units, linkage between them etc
BC2CMP01 Practical -2 Biomolecules	To provide the students an opportunity to develop their qualitative skills and to have a sound knowledge on basic protocols for identification of biomolecules.
SEMESTER 3	
BC3CMT03 Enzymology and Metabolism	To introduce the student basics of enzyme catalysis and explain the major pathways of carbohydrate, protein and lipid metabolism.
Practical 3 Enzymology and Metabolism	To make the student understand the basic steps involved in extraction and determination of enzyme activity.
SEMESTER 4	
BC4CMT04 Nutritional and Clinical Biochemistry	To explain and schematize the nutritional and biological importance of vitamins and minerals. Explain the clinical significance of organ-based function tests and describes the biochemical basis of some important metabolic disorders
BC4CMP02 Practical -4 Nutritional and Clinical Biochemistry	To introduce the student protocols of quantitative analysis of biomolecules using colorimetric technique and to familiarize qualitative analysis of body fluids

2. MICROBIOLOGY

Course Name	Course Outcomes
SEMESTER 1	
MB1CMT01 Fundamentals of Microbiology-1	The students are trained in brief idea on ultrastructure of prokaryotes and eukaryotes, different fields of microbiology, principle and working of different types of microscope, different staining techniques especially differential staining, negative staining etc
SEMESTER 2	
MB2CMT02 Fundamentals of Microbiology-II	It is expected that the student on completion of this course have a sound knowledge on Bacterial growth, nutrition, cultivation, and their control by disinfectants and antibiotics. Students also become familiar with bacterial genetics and microbial metabolism.
MB2CMP03 Microbiology Practical-I (Semester 1&2)	Students are trained in: bacterial isolation and enumeration methods, microbial contamination detection in various food sample, air, soil etc. identification and culturing of various fungus in different medias like SDA and PDA. Students are also familiar with morphological observation of different fungus like Aspergillus, Rhizopus, Penicillium Mucor etc.
SEMESTER 3	
MB3CMT04 Applied Microbiology	The students are trained in important aspects of Food microbiology such as food spoilage and Preservation. This course also provides an overall, introductory view on Industrial microbiology , soil microbiology, Aero microbiology and water analysis and purification.
SEMESTER 4	
MB4CMT05 Medical Microbiology	The students are trained in different properties of gram positive and gram-negative bacteria including their morphological and pathogenical characters, also study various diagnosis methods of bacterial infection and its treatments. Introduction to virology and mycology, A brief study on various viral, fungal diseases diagnosis and treatment.
MB4CMP06 Microbiology Practical-II (Semester 3&4)	Students are trained in: bacterial isolation and enumeration methods, microbial contamination detection in various food sample, air, soil etc. identification and culturing of various fungus in different medias like SDA and PDA. Students are also familiar with morphological observation of different fungus like Aspergillus, Rhizopus, Penicillium Mucor etc