Government of Maharashtra
ISMAIL YUSUF COLLEGE OF ARTS, SCIENCE & COMMERCE
(Affiliated to University of Mumbai)
Jogeshwari Station Road, Jogeshwari - East, Mumbai - 400 060
Email: principaliyc@rediffmail.com Website: www.ismailyusufcollege.in

B.Sc. (Biotechnology) Programme Outcomes

PSO No.	Program Specific Outcomes(PSOs) Upon completion of this programme the student will be able to
PSO1	**Academic competence:** (i) Demonstrate comprehensive knowledge, imparted by highly qualified and competent faculty, and develop interdisciplinary skills in the fields of Biotechnology. (ii) Acquire good experimental and laboratory skills applied in biotechnology and allied subjects in well-equipped and state of the art laboratories. (iii) Understand the scope and applications of biotechnology and acquire competence in the domain of Biotechnology to enable bright future prospects.
PSO2	**Personal and Professional Competence:** (i) Demonstrate conceptual learning through systematic thinking and self-study and life- long learning that helps to solve scientific problems in the field of Biotechnology. (ii) Apply appropriate tools and techniques in biotechnology, to design and perform experiments proficiently and become competent to pursue higher studies or join the industry sector. (iii) Acquire good oral and written communication skills. (iv) Discuss the upcoming fields of Biotechnology. (v) Experience opportunity to participate in/manage/curate many co and Extracurricular activities for overall development.
PSO3	**Research Competence:** (i) Acquire an ability to identify, formulate, analyze and solve scientific problems in various areas of Biotechnology and allied fields. (ii) Demonstrate appropriate skills in design of experiments with proper scientific approach. (iii) Develop ability to apply scientific research methodology and achieve ethical research aptitude.
PSO4	**Entrepreneurial and Social competence:** (i) Employ skills and knowledge acquired in skill imparting and entrepreneurial courses in upcoming fields of Biotechnology (ii) Develop a sense of environmental, social, ethical and professional responsibility.

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COURSE OUTCOMES

FYBT - SEMESTER I

Title of the course	Course credit	Course outcome
Basic Chemistry I	**2**	To acquaint the students with basic concepts of Chemistry like Classification and Nomenclature of Chemical compounds and to impart hands-on skills in preparation of Buffers and Solutions.
Basic Chemistry II	**2**	To acquaint students with Concepts of Stereochemistry and to impart knowledge of Titrimetric and Volumetric Estimations and handling of basic Analytical Techniques like Chromatography and Calorimetry
Basic Life Sciences-I : Biodiversity and Cell Biology	**2**	To acquaint students with concept of Biodiversity and Cell Biology and to impart skill in handling and culture of Microorganisms
Basic Life Sciences-II : Microbial Techniques	**2**	To acquaint students with basic techniques in Staining and Sterilization and to impart the knowledge of growth of microorganisms
Basic Biotechnology-I : Introduction to Biotechnology	**2**	To acquaint students with various fields of Biotechnology and their applications and to impart the knowledge of Food Technology and Fermentation Techniques
Basic Biotechnology-II : Molecular Biology	**2**	To acquaint students with DNA Replication, Repair and Genetic Engineering and to Impart the knowledge of molecular Biology Techniques
Societal Awareness	**2**	To acquaint the students with concepts of Societal Awareness and to impart knowledge of Society and make students aware about the Problems in Society

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FYBT - SEMESTER II

Title of the course	Course credit	Course outcome
Chemistry-I : Bioorganic Chemistry	2	To acquaint students with Bioorganic Molecules and to impart the knowledge of Classification, Structure and Characterization of Biomolecules
Chemistry-II : Physical Chemistry	2	To acquaint students with concepts in Thermodynamics, Kinetics and Redox Reactions and to impart skills in Kinetics and Chemical Reactions
Life Sciences-I : Physiology and Ecology	2	To acquaint students with Physiological Processes in Plants and Animals and to impart the knowledge of Physiology and Ecology
Life Sciences-II : Genetics	2	To acquaint students with concepts in Genetics and to impart skills in Techniques in Genetic Analysis and Population Genetics
Biotechnology-I : Tissue Culture & Scientific Writing and Communication Skills	2	To acquaint students with Techniques of Plant and Animal Tissue Culture and to impart the skills of PTC, ATC and Science Communication
Biotechnology-II : Enzymology, Immunology and Biostatistics	2	To acquaint students with concepts in Enzymology, Immunology and Biostatistics and impart the skills in Enzyme Kinetics, Immunological Techniques and Biostatistics
Globalization, Ecology and Sustainable Development	2	To acquaint the students with concepts of Globalization, Ecology and Environment and to impart knowledge of Globalization make students aware about the Problems in Society

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SYBT - SEMESTER III

Title of the course	Course credit	Course outcome
Biophysics	2	Develop an understanding of the different aspects of classical Physics. Be able to relate principles of Physics to applications and techniques in the field of Biology such as Microscopy, Spectroscopy and Electrophoresis.
Applied Chemistry –I	2	1. Develop an understanding of the different aspects of Organic and Green Chemistry. 2. Discuss role of Organic Compound sin Biology and Synthesis of Organic Compounds. 3. Discuss role of Green Chemistry and its application in Industry.
Immunology	2	1. Understand the role of different types of Cells, Effector Molecules and Effector Mechanisms in Immunology. 2. Understand the principles underlying various Immune techniques.
Cell Biology and Cytogenetics	2	1. Develop an understanding of the Cytoskeleton and Cell Membrane. 2. Discuss the structure of Chromosomes and types of Chromosomal Aberrations. 3. Discuss the principles underlying Sex Determination, Linkage and Mapping.
Molecular Biology	2	1. Discuss the mechanisms associated with Gene Expression at the level of Transcription and Translation. 4. Discuss the mechanisms associated with Regulation of Gene Expression in Prokaryotes and Eukaryotes

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Bioprocess Technology	2	5. 1. Develop an understanding of the various aspects of Bioprocess Technology. Develop skills associated with screening of Industrially Important Strains. Understand principles underlying design of Fermenter and Fermentation Process.
Research Methodology	2	1. Understand basic principles of Research Methodology and identify a Research Problem. 6. Understand a general definition of Research Design. Identify the overall Process of Designing a Research Study from its inception to its Report.

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SYBT - SEMESTER IV

Title of the course	Course credit	Course outcome
Biochemistry	2	1. Discuss the Metabolic Pathways of Carbohydrates, Amino Acids, Lipids and Nucleotides. 2. Explain the Role of Energy Rich Molecules in Metabolism.
Applied Chemistry –II	2	1. Develop an understanding of the different aspects of Analytical Chemistry. 2. Gain knowledge of Natural Product Chemistry and related acquired skills. Gain an understanding of basic concepts in Polymer Chemistry and Nanomaterials.
Medical Microbiology	2	1. List the factors playing a role in causing a disease. 2. Discuss the various aspects of Systemic Infections including Causative Agents, Symptoms and Prophylaxis. 3. Gain the technical capability of handling, isolating and identifying various Bacteria.
Environmental Biotechnology	2	1. Gain an understanding of the causes, types and control methods for Environmental Pollution. 2. Application of different life forms in Environmental Remediation.
Bioinformatics and Biostatistics	2	1. Gain an understanding of the basic concepts of Bioinformatics and Biostatistics. 2. Understand the tools used in Bioinformatics. 3. Apply the various Statistical Tools for Analysis of Biological Data.

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Molecular Diagnostics	2	1. Gain an understanding of the basic Principles used in Molecular Diagnosis. 2. Gain critical thinking and analytical skills to understand new Diagnostic Methods. 3. Apply the knowledge and skills gained in the course should be useful in developing new Diagnostic Kits.
Entrepreneurship Development	2	1. Develop an Understanding of the systematic process to select and screen a Business Idea. 2. Design strategies for successful implementation of ideas. 3. Write a Business Plan.

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TYBT SEMESTER V

Title of the course	Course credit	Course outcome
Cell Biology	2.5	1. Gain knowledge about the cell multiplication and death at molecular level. 2. Understand the molecules involved in cell signaling. 3. Gain an understanding of the basic concepts of events during fertilization and early embryonic development. 4. Gain insight into the biology of cancer cells.
Medical Microbiology and Instrumentation	2.5	1. By the end of the course the student will be able to: 2. Learn the different type of virus cultivation 3. Understand the development and mode of action of antimicrobial, antifungal and antiviral drugs. 4. Get an insight into the various spectroscopic methods used in biological studies. 5. Understand the principle and applications of chromatographic and tracer techniques.
Genomics and Molecular Biology	2.5	1. By the end of the course the student will be able to: 2. Use molecular biology tools and techniques in the field of biotechnology. 3. Gain knowledge regarding recent developments in genome sequencing and editing. 4. Understand the basis of gene cloning and development of transgenic animals and plants.
Marine Biotechnology	2.5	1. By the end of the course the student will be able to: 2. Gain insight in the field of marine biotechnology.

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TYBT SEMESTER VI

Title of the course	Course credit	Course outcome
Biochemistry	2.5	1. By the end of the course the student will be able to: 2. Understand the biosynthetic pathways and regulation of biomolecules like carbohydrates and lipids. 3. Learn the various functioning of endocrine gland secretions with their associated disorders. 4. Understand the functioning of vitamins and minerals in the body and gain an insight in the concept of nutrition.
Industrial Microbiology	2.5	1. By the end of the course the student will be able to: 2. Gain insight in the various processes involved in production of commercially available dairy products. 3. Have an in depth understanding of downstream processes. 4. Understand and gain insight in the various processes involved in production of commercial products. Understand the importance of GMP and its relevance in bioprocesses.
Basic pharmacology and Neuro chemistry	2.5	1. By the end of the course the student will be able to: 2. Understand the mechanisms of drug delivery and action in the body. 3. Get an understanding in the concepts of bioavailability and distribution. 4. In depth knowledge on toxic substances and poisons 5. Understand the biochemistry of nerve impulses and brain functioning
Environmental Biotechnology	2.5	1. By the end of the course the student will be able to: 2. Get an insight on the different traditional and new sources of renewable energy. 3. Understand the principles and practices involved in treatment of industrial effluent 4. Gain an insight in the management and treatment of wastewater. Understand the disposal of waste from different industries

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