

Kalinga University

Science

Master Of Science (Biotechnology)

PO

S. No.	Program Outcome (PO) Description
1	Prepares the students for immediate entry to the workplace with sound theoretical, experimental knowledge.
2	Overall, the course offers advanced informations in biotechnology which enables the students to understand the concepts in biochemistry, molecular biology, microbiology, genetic engineering and related industrial technology.
3	Students will be able to design, execute, record and analyse the results of experiments in field of molecular biology, genomics. Recombinant DNA technology, biochemistry, microbiology and genetic engineering.
4	Students will be able to work effectively in a group in the classroom, laboratory, industries and field- based situations.
5	Become efficient in using standard operating procedures and will be well versed with the regulations for safe handling and use of chemicals.
6	Learn about IPR and biosafety issues related to experiments in field of biochemistry, microbiology and genetic engineering.
7	Recombinant DNA technology, biochemistry, microbiology and genetic engineering.
8	Students will be able to work effectively in the area of health and pharmaceuticals, biochemicals, biofuels, environment related, food and dairy, cosmetics, biopolymers and related multidisciplinary fields.
9	Understand the impact of the technological solutions developed through biotechnology in contexts of society and the environment, and demonstrate the knowledge need for sustainable development in judicious use of biotechnology tools and technique.
10	Modeling based problem solving approaches to address complex agricultural problems understanding the limitations and technical feasibility.

11	Identify the relevant researchable issues based on survey of the literature, formulate a proposal and analyze complex Biological problems for arriving substantiated conclusions using integrated approach.
12	Usage of modern tools and techniques: Develop modern tools and techniques, apply appropriate scientific procedures, and follow prediction and modeling-based problem-solving approaches to address complex problems understanding the limitations and technical feasibility.

PSO

S. No.	Program Specific Outcome (PSO) Description
1	Critical Thinking- Students will demonstrate an understanding of major concepts in all disciplines of biology, biochemistry, biotechnology microbiology and bioinformatics. Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
2	Effective Communication- Development of various communication skills such as reading, listening, speaking, etc., which will help in expressing ideas and views clearly and effectively. Social Interaction- Development of scientific outlook not only with respect to science subjects but also in all aspects related to life.
3	Effective Citizenship- Imbibe moral and social values in personal and social life leading to highly cultured and civilized personality.
4	Ethics- Follow the ethical principles and responsibilities to serve the society. Environment and Sustainability- Understand the issues of environmental contexts and sustainable development.
5	Self-directed and Lifelong learning- Students will be capable of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development.

CO

S.No.	Course Code	Course Name	Course Outcome (CO's) - Description
1	MBT101	Cell Biology Advance	CO1: On successful completion of the subject the student should have understood Basic cell properties and their role, Basic Structure and metabolism of Biomolecule.
2	MBT102	Biochemistry Advance	CO1: After the course completion students will have knowledge of major bio-molecules carbohydrates, lipids, proteins, amino acids. CO2: Conceptual knowledge of Proteins and its classification. They will develop Understanding of bio-molecular concept and their importance.
3	MBT103	Microbiology	CO1: After the course completion student will have knowledge on Landmark discoveries in Microbiology and different domains classification of living organisms, Familiarity with general characters of prokaryotic and Eukaryotic microorganisms for conventional and molecular characterization using modern methods, Knowledge of cellular organization, life cycle and economic importance of prokaryotic (Eubacteria, Archaea, Cyanobacteria) and Eukaryotic (Algae, Fungi and protozoans).
4	MBT104	Bio- Physical Chemistry & Instrumentation	CO1: After the completion of this course student gain knowledge of the fundamental concepts in physics and chemistry that underlie biological processes, will learn the principles that govern bio molecular interactions and appreciate how established methods of research and enquiry are employed to analyze the different aspects of these interactions. CO2: Hand on training of the general equipment's used in microbiology laboratory CO3: Comprehend the major spectrophotometry and titrimetric approaches of quantification in biological and environmental samples.
5	MBT105A	Research Methodology	CO1: Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling. CO2: Have basic knowledge on qualitative research techniques CO3: Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis CO4: Have basic awareness of data analysis-and hypothesis testing procedures CO5: Understand about research tools.
			CO1: Understand the principles and ethics of science journalism.

6	MBT105B	Science Journalism	CO2: Develop skills in researching and reporting scientific topics accurately and effectively. CO3: Learn how to critically analyze scientific research and communicate complex scientific concepts to a general audience. CO4: Gain proficiency in interviewing scientists and experts to gather information for news articles or features. CO5: Develop storytelling techniques to engage readers and communicate scientific information in a compelling manner.
7	MBT201	Molecular Biology Advance	CO1: After completing the course the students will be able to: Describe the structure and function of DNA and RNA in a cell. CO2: Elucidate central cell biological processes and how they are regulated (for example: replication and protein synthesis and gene expression). CO3: Explain DNA repair and recombination in terms of mutation and evolution. Understand how molecular cell biology forms the foundation of biotechnology CO4: After course completion, students can apply the knowledge in further studies and higher education.
8	MBT202	Computer Applications and Biostatistics	CO1: After the course completion Students should be able to Gain broad understanding in mathematics and statistics. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.
9	MBT203	Immunology Advance	CO1: On successful completion of the subject the students will be able to transfer knowledge of immunology into clinical decision-making through case studies presented in class. At The course will provide sound knowledge of how immune system deals with various pathogens, different processes and cell types involved in prevention of disease.
10	MBT204	Bioinformatics and Nanobiotechnology	CO1: After the course completion the students will be able to understand the concepts and specific features of the subject that is further perceived as application across the disciplines of Computational and Biosciences. CO2: In addition to have established knowledge in scientific writing, on how to give a scientific presentation, how to evaluate a scientific paper, and research ethics and as well as to apply their learned skills in the techniques within the chosen area of research. CO3: To fulfill needs of the industry for the manpower with the specific skills sets related to Bioinformatics. Learn about the background on Nanoscience.

			CO4: Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment. CO5: Apply their learned knowledge to develop Nanomaterials
11	MBT205A	Entrepreneurship	CO1: Understand the principles and concepts of entrepreneurship. CO2: Develop skills in identifying and evaluating business opportunities. CO3: Learn how to conduct market research and analyze competition. CO4: Gain knowledge of business planning and strategy development. CO5: Develop skills in financial management, including budgeting and forecasting.
12	MBT205B	Intellectual Property Rights	CO1: Understand the concept of intellectual property and its importance. CO2: Gain knowledge of the different types of intellectual property rights, such as copyrights, trademarks, patents, and trade secrets. CO3: Learn about the legal frameworks and international conventions governing intellectual property rights. CO4: Understand the process of acquiring and protecting intellectual property rights. CO5: Develop skills in conducting intellectual property searches and audits.
13	MBT301	Genetic Engineering	CO1: After the completion of this course, Develop capability to quantify enzymes and determine kinetic parameters along with microbial genetic modification strategies , to perform different gene transfer methods in microbes, Hand on training of the general equipment's used in microbiology laboratory □ Comprehend the major spectrophotometric and titrimetric approaches of quantification in biological and environmental samples
14	MBT302	Animal Biotechnology & Plant Biotechnology	CO1: After the course completion Students will be able to gain fundamental knowledge in animal and plant biotechnology and their applications
15	MBT303	Environment Biotechnology	CO1: To transform into original researchers and undertake cutting-edge research and teaching for an in depth understanding of the complex environmental issues; predict the environmental change and provide scientifically sound and socially acceptable solutions; develop as sustainability managers to guide manufacturing industries, non-government organizations (national and international), policy-making bodies; and act as a catalysts to bridge the gap between science and society in achieving ecosystem restoration, conservation and management of biodiversity including well-being of the society at large

16	MBT304A	Enzymology	CO1: Upon successful completion of this course, students should be able to: Explain relationship between the structure and function of enzymes; explain how enzymes are able to increase speed of an biochemical reaction in sense of thermodynamics, kinetics and molecular interactions; use catalytic strategies in interpreting mechanisms of enzymatic action; interpret and explain significant mechanisms of regulation of enzymatic action and specifies importance of enzymes in regulation of metabolism; apply appropriate methods for determination of catalytic parameters and activity of enzymes and resolve problems considering kinetics and thermodynamics of enzymatic reactions; analyze options for applying enzymes and their inhibitors in medicine and various industries; apply theoretical, practical during processing experimental results and their correct interpretation
17	MBT305B	Genomics and Proteomics Advance	CO1: Understand the principles and concepts of genomics and proteomics.
			CO2: Gain knowledge of advanced techniques used in genomics and proteomics research.
			CO3: Learn about high-throughput sequencing technologies and their applications in genomics.
			CO4: Develop skills in analyzing and interpreting genomic and proteomic data.
			CO5: Understand the role of genomics and proteomics in personalized medicine and precision healthcare.
18	MBT401	Agriculture Biotechnology	CO1: After the completion of syllabus, students will acquire knowledge about the range of approaches to manipulate and improve plants, animals and microorganisms. Agricultural Biotechnology graduates will demonstrate the ability to develop, interpret, and critically evaluate modern approaches to scientific investigation. Agricultural Biotechnology graduates will understand the relationship between society and science and the justification for biotechnological manipulation of plants, animals, and microorganisms.
19	MBT402	Industrial Biotechnology	CO1: By the end of the course the student will be able to: Develop an understanding of the various aspects of Bioprocess Technology, skills associated with screening of Industrially Important Strains, Understand principles underlying design of Fermentor, Fermentation Process and downstream processing.
			CO1: Theoretical and practical knowledge in the different area of biotechnology to start their carrier in research through Ph.D. and other R & D programmes.

20	MBT403	Dissertation supported by paper	C02: Research topics selected from different fields like animal biotechnology, microbiology, environmental biotechnology, genetic engineering, plant biotechnology, virology, nanotechnology.
			C03: Students developed understanding about the literature reading and dissertation writing.
			C04: Students trained to find the resources needed to perform the research process and presented their findings.



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