

M.S. Ramaiah University of Applied Sciences

New BEL Road, MSR Nagar, Bangalore – 560054



**RAMAIAH
UNIVERSITY**
OF APPLIED SCIENCES

PO, PSO, PEO & CO

Programme: B.Sc. (Hons) in Biotechnology

Programme Code: 018 ✓

Programme Outcome (PO)

Programme Specific Outcome (PSO)

Program Educational Objectives (PEO)

Course Outcomes (CO)

Registrar
M.S. Ramaiah University of Applied Sciences
Bangalore - 560 054

Dean

Faculty of Life and Allied Health Sciences
M.S. Ramaiah University of Applied Sciences
Bangalore-560054

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Faculty of Life and Allied Health Sciences (FLAHS)

Programme Name: B.Sc. (Hons) in Biotechnology

Programme Outcomes (POs)

B.Sc. (Hons) Biotechnology graduates will be able to:

- PO 1. Knowledge and Understanding:** Gain knowledge of life science fundamentals and applied biotechnological aspects with an understanding of their applications towards solving real life problems.
- PO 2. Design research involving appropriate methodology and develop novel solutions leading to new Knowledge Creation:** Identify real life problems in areas of basic biology, agriculture, medicine, industry, environment and collect appropriate data for analysis; Analyse the identified problem, design a logical experimental work flow, and develop innovative, novel and long-term solutions to real life problems in basic biology, agriculture, medicine, industry, and environment; Create new knowledge including discovery of foundational principles, new methods, strategies, tools..
- PO 3. Application of modern laboratory tools, techniques:** Gain skills enabling effective use of laboratory tools, techniques and resources
- PO 4. Programming and Data analysis:** Apply programming and data analytical tools and techniques to solve scientific problems
- PO 5. Multidisciplinary approach:** Evaluate problems through multiple perspectives and apply knowledge of various disciplines to effectively define a research problem and design a study based on research
- PO 6. Communication:** Disseminate knowledge effectively through scientific writing and verbal communication.
- PO 7. Leadership and team work:** Apply professional ethics, leadership, and team building skills in profession and entrepreneurial initiatives.
- PO 8. Understand system processes and manage tasks:** Apply scientific knowledge to execute industrial projects and administration to minimize errors.
- PO 9. Social Responsibility and Ethics:** Apply ethical principles in scientific research, profession and become aware of societal responsibilities.
- PO 10. Environment and Sustainability:** Understand the impact of the scientific research on society and environment, and select judicious modes of application for sustainable development
- PO 11. Entrepreneurial Skills:** Enhancing self-employability by applying the basic and applied scientific knowledge acquired.
- PO 12. Lifelong learning:** Adapt to advancements in science and engage in independent life-long learning aimed towards up-skilling and maintaining relevance to changing times and trends in a continuous manner.


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Programme Specific Outcomes (PSO's)

- PSO 1:** Create an inclusive environment in which theories of fundamental and applied courses in Biotechnology are explored to learn along with integration of knowledge towards a better tomorrow.
- PSO 2:** Enable program audience for channelizing efforts in identifying the requirements and problems in Biotechnology in order to earn appropriate solutions for a progressive society.
- PSO 3:** Provide an environment with opportunity to obtain various abilities and skills promoting holistic development, employability and lifelong learning.

Programme Educational Objectives (PEOs)

The objectives of the programme are to enable the students to:

- PEO-1:** To prepare graduates for their professional career in Biotechnology domain towards employment and /or academic progression
- PEO-2:** To introduce graduates to a multidisciplinary approach, research-based higher order thinking to drive novel solution creation to alleviate real life problems.
- PEO-3:** To impart various abilities and skills, that enhance holistic development, and promote lifelong learning

Course Outcomes (COs)

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Course Title & Code: Macromolecular Structure and Analysis (BPC101)

After the successful completion of this course, the student will be able to:

- CO-1. List the function of different macromolecules in biological system such as carbohydrate, protein, lipid and nucleic acid.
- CO-2. Explain and illustrate the structural and functional complexity of macromolecules and their monomers with respect to their structure and functions.
- CO-3. Examine the chemical nature of enzymes and their function in biochemical reactions and explain regulation of enzyme activity.
- CO-4. Analyze the coordination between the bio molecules which maintain the biological functions such as gene expression.
- CO-5. Perform experiments to analyze and study the chemical and biochemical properties of sugars, nucleic acids, protein and enzymes.

Course Outcomes (COs)

Course Title & Code: Biophysical techniques and Instrumentation (BTC102A)

After undergoing this course students will be able to:

- CO-1. List of various biophysical techniques and define common terms in biophysical techniques
- CO-2. Explain the basic concepts and principles behind these techniques and description of different sub-types of each technique
- CO-3. Illustrate the instrumentation of each technique and understand the role of different parts of an instrument
- CO-4. Analyze the results obtained from these techniques and thus interpret its applications
- CO-5. Derive formulae and solve numerical problems in biophysical techniques
- CO-6. Calibrate and optimize the basic and analytical instruments in biotechnology lab
- CO-7. Perform experiments using these instruments, observe, analyze, interpret and report the data.

Course Outcomes (COs)

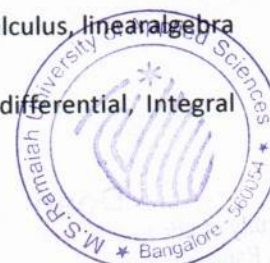
Course Title & Code: Biomathematics and MATLAB (BTC103A)

After the successful completion of this course, the student will be able to:

- CO-1. Explain the principles of trigonometry, differential, integral calculus, linear algebra and vector calculus
- CO-2. Solve simple problems associated with trigonometry, differential, integral calculus, linear algebra and vector calculus
- CO-3. Apply the appropriate methods from trigonometry, differential, Integral calculus, linear algebra and vector calculus in solving application problems of biotechnology
- CO-4. Solve real world mathematical problems associated with trigonometry, differential, Integral calculus, linear algebra and vector calculus

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- CO-5. Perform basic operations and plot graphs using built-in commands in MATLAB
- CO-6. Implement algorithms and execute programs and solve simple mathematical problems using MATLAB

Course Outcomes (COs)

Course Title & Code: Fundamentals of Biology (BTO101A)

After the successful completion of this course, the student will be able to:

- CO-1. Explain basic chemistry and the molecules of life through cellular structures to cellular respiration and photosynthesis.
- CO-2. Identify the relationship between DNA, chromosomes, cells and organisms.
- CO-3. Analyse the principles of evolution and its relevance in all fields of biology.
- CO-4. Explore biological diversity in prokaryotes and eukaryotes.
- CO-5. Assess the fundamental principles of ecology and apply their principles on solving environmental problems

Course Outcomes (COs)

Course Title & Code: English for Communication 1 (TSM101A)

After the successful completion of this course, the student will be able to:

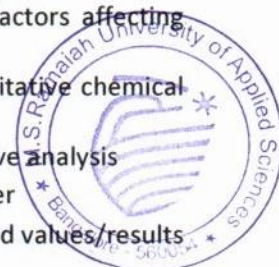
- CO-1. Identify the nuances of communication skills
- CO-2. Apply the concepts of grammar in written communication
- CO-3. Apply professional etiquette as appropriate
- CO-4. Practice extempore and basic conversation skills
- CO-5. Practice comprehension skills
- CO-6. Compose precise paragraphs as per the given topic

Course Outcomes (COs)

Course Title & Code: General Chemistry 1 (BTC104A)

After the successful completion of this course, the student will be able to:

- CO-1. Describe the structure of atoms, K_h , K_w , K_a , K_b , properties of chemical bonds and reagents, elements and electrolytes
- CO-2. Explain the principles of acid-base concept, periodicity of elements and theory of electrolytes, solubility products of the salts, concepts of bonding in organic molecules, factors affecting bonding, role of reagents in organic reactions
- CO-3. Select suitable method to carryout dissolution of solids, qualitative and quantitative chemical analysis
- CO-4. Determine the accuracy, precision, errors and standard deviations in quantitative analysis
- CO-5. Solve problems on pH, K_a , ionization energy, conductance and transport number
- CO-6. Conduct experiments as per the standard procedures and tabulate the measured values/results



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- to Interpret and draw conclusions
- CO-7. Develop a laboratory report as per the prescribed format

Course Outcomes (COs)

Course Title & Code: Principles of Microbiology (BTC105A)

After the successful completion of this course, the student will be able to:

- CO-1. Discuss the history of Microbiology and classification of microorganisms.
- CO-2. Describe the structural similarities and differences among microbes and the unique structure/function relationships.
- CO-3. Describe sterilization approaches for controlling the growth of microorganisms and biosafety regulatory framework for prokaryotes.
- CO-4. Illustrate the basic concept of Virology with comparison to bacteriology
- CO-5. Explicate the pathogenicity of microorganisms.
- CO-6. Apply the tools and techniques of Microbiology in conducting basic research.
- CO-7. Comprehend the various methods for identification of unknown microorganisms.

Course Outcomes (COs)

Course Title & Code: Organic mechanisms in Biology (BTC106A)

After undergoing this course students will be able to:

- CO-1. Elucidate the complexity of the organic mechanisms involved in carbohydrate metabolism
- CO-2. Elucidate and relate the mechanisms of amino acid metabolism
- CO-3. Illustrate the fatty acids and glycerol with relevance to their complex mechanisms of metabolism
- CO-4. Give details on the biosynthesis and metabolic processes involving nucleotides
- CO-5. Categorize the structure, function and relate the coordination of biochemical messengers

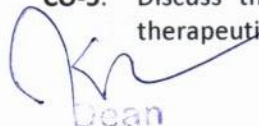
Course Outcomes (COs)

Course Title & Code: Biotechnology for Human Welfare (BTO102A)

After the successful completion of this course, the student will be able to:

- CO-1. Explain the use of enzymes, microorganisms, and plants to produce bio-based products in sectors such as textiles, food ingredients and biofuels
- CO-2. Understand the contribution of biotechnology in the field of agriculture towards ensuring higher quality, yield, nutrition and global food security.
- CO-3. Describe the contributions of animal biotechnology in developing improved livestock, poultry, and fisheries towards higher production of food, and transgenic animals for molecular pharming of therapeutics.
- CO-4. Identify factors causing environmental pollution, problems associated with waste management, and various methods of bioremediation towards safe resolution of environmental hazards.
- CO-5. Discuss the impact of biotechnology in developing enhanced diagnostic tools, novel therapeutic drugs and approaches for uplifting human health and quality of life.

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Course Outcomes (COs)

Course Title & Code: Environmental Studies (BTN101A)

After undergoing this course students will be able to:

- CO-1. Illustrate the multidisciplinary nature of environmental studies and recognize the need for public awareness
- CO-2. Explain the various natural resources and their associated problems, ecosystem, and environmental pollution
- CO-3. Analyse the concept of ecosystem and classify various types
- CO-4. Compare biodiversity at local, national and global levels
- CO-5. Discuss various social issues pertaining to environment including sustainable development and energy issues


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