

M.Sc. degree in Biochemistry at RTM Nagpur University allows specialization in the areas of Biochemistry, Molecular biology, Research Methodology, Immunology, Toxicology, Nutritional Biochemistry, Clinical Research and Enzymology, and it is intended for students desiring research-oriented careers in the chemical, biochemical or biotech industry, academic institution or research institutes or entry into Ph.D. programs.

PROGRAM SPECIFIC OUTCOMES (PSOs) –M.Sc. BIOCHEMISTRY

PSO1: Students who graduate with a Master of Science in Biochemistry will demonstrate an understanding of structural and functional inter-relationship of macromolecules to derive applied technological, therapeutic and industrial benefits.

PSO2: They will have in-depth knowledge of fundamental processes and cellular mechanisms involved in perpetuation of life.

PSO2: This course will provide thorough knowledge of techniques applied in the fields of Molecular biology, Enzymology, Clinical Biochemistry, Toxicology, Immunology and Biotechnology.

PSO3: Students will learn to apply the scientific methods to the process of experimentation, Hypothesis testing, research investigations and result interpretations.

PSO4: Develop the ability to understand and practice the ethics surrounding scientific Research.

PSO5: Realize the importance of scientific research for societal benefits and national challenges.

PSO6: This course will enable them to aspire for higher studies in the field of biological sciences, jobs in research and development units of pharma sector, scientific and academic institutions.

COURSE SPECIFIC OUTCOMES:

The various specialized papers of the course are designed to obtain following course specific outcomes for the students:

- CSO1. Students will be able to understand protein structure, organization, bonds and forces that contribute to the conformation of proteins and the interaction of proteins with other biomolecules.
- CSO2. They will learn the cellular processes involved in protein synthesis, protein sorting to various organelles.
- CSO3. Gain the understanding of protein designing for industrial, therapeutic and clinical benefits.
- CSO4. Students will have the understanding of concepts of plant biochemistry with special emphasis on photosynthetic processes, hormonal regulation of plant growth, stress physiology and metabolic aspects and applied significance of tissue culture
- CSO5. Students will acquire the understanding of principles of enzymology, mechanisms and strategies for biological catalysis
- CSO6. Integrate the different levels of biological organization, from molecules to cells to organisms and understand basic and advanced molecular biology concepts and techniques.
- CSO7. Students would be able to effectively utilize the scientific literature and computational tools for research.
- CSO8. They will demonstrate the ability to do laboratory work to resolve scientific hypothesis by designing experiments to test hypotheses.
- CSO9. Students can organize and communicate scientific information clearly and concisely, both verbally and in writing.
- CSO10. The student will be able to clinically assess the laboratory indicators of physiologic conditions and will know the biochemical and molecular tools needed to accomplish preventive, diagnostic, and therapeutic intervention on hereditary and acquired disorders

- CSO11. The students will be able to describe immunological response and how it is triggered and regulated.
- CSO12. The students will be able to identify the cellular and molecular basis of immune responsiveness and learn diagnostic immunological techniques.
- CSO13. Students will learn how cellular components coordinate to communicate, regulate cellular process through signaling mechanisms.
- CSO14. Students will be able to explain/describe regulation at the epigenetic, transcriptional, translational, and post-translational levels including RNA stability, protein folding, modification, and degradation. Regulation by non-coding RNAs will be tied to the developmental and physiological functioning of the organism.
- CSO15. Subject specific elective will enable them to learn the concepts of toxicology or Nutritional biochemistry depending upon the choice of elective. Both the papers have been included to impart in-depth knowledge of two very important applied biochemistry branches of commercial and social significance.
- CSO16. Student will learn fundamentals of genetic engineering and the applied biotechnological aspects with special emphasis on fermentation and biochemical engineering.
- CSO17. The course enables the students to use advanced techniques in biochemical and genetic research which are at the centre of current research.
- CSO18. Have knowledge about assessment and management of ethical clinical trial programs. Demonstrate competency in biopharmaceutical clinical trial research designs and regulatory affairs.
- CSO19. Demonstrate competencies in evaluating clinical research data and communicating results. Manage innovative products through the discovery processes and into the clinical trial phases.
- CSO20. Plan and develop experimentally designed projects from concept to professional prototype.
- CSO21. Apply theoretical knowledge, conceptual skills and techniques to the development of solutions for biochemical problems.
- CSO22. Apply initiative and judgment in planning, problem solving and decision making in practice or future study.

