

M.Sc. curriculum includes both 3-credit courses (theory) (at least 4 in each semester) and 6-credit courses (Practical/Dissertation) in every semester. Ph.D. curriculum includes two 4-credit courses

(i) Course outcome (CO)– It is expected at the end of a course that each student passes with a minimum of 55% marks in all subjects. The outcomes for each course are as follows:

(a) BIOCHEM 0701: Proteins – Structure, Folding and Engineering

CO1 - Insight into protein structures and folding mechanism

CO2- Understanding of protein structure-function relationship

CO3 – Prediction and modeling of protein structures and their validation

CO4 – Understanding of types, methods and strategies of protein engineering

CO5 – Applications of protein engineering in academia and industry

(b) BIOCHEM 0702: Essentials of Cell Biology

CO1 - Understanding essential functions of the cell and its organelles.

CO2 - Developing concepts of protein trafficking, signal transduction, cell-cell communication and related diseases.

(c) BIOCHEM 0703: Membrane Biology

CO1 –Studying the cellular membrane structure and functions.

CO2 –Understanding the significance of transport mechanisms and their alterations in disease conditions.

CO3 –Insight into cell-cell fusion and cell-virus fusion events and its applications in developments of anti-viral drugs.

(d) BIOCHEM 0704: Immunology and Immunotechniques

C01- Insight into the components of immune system

C02- Understanding the functions and mechanisms of action of different components of the immune system

C03- Understanding the development of the immune cells

C04- Understanding the diseases associated with the immune system and strategies to combat any infection or altered self.

C05- Using this knowledge in the processes of immunization, antibody engineering, vaccine development, transplantation and cancer therapy.

(e) BIOCHEM 0801: Enzymes and Techniques in Biochemistry

C01- Understanding of enzyme kinetics, structure, regulation, mechanism of action

C02 – Insight into the various theories for enzyme action and experimental evidences

C03 – Applications of enzymology in research, medicine, biotechnology, agriculture

C04 – Understanding of tools and techniques used to investigate enzymes

(f) BIOCHEM 0803: Molecular Biology : Gene Structure, Expression and Regulation

C01- Understand the concept of genome and transcriptome

C02- Understand the mechanisms of gene expression through transcription

C03- Understand the mechanisms of translation and protein synthesis in prokaryotes and eukaryotes,

C04- Understand the modulation and regulation of these mechanisms

C05- Applying this knowledge in their work for cloning, protein expression and production of proteins, and development of inhibitors

(g) PMBB 0804: Bioinformatics

CO1 – Introduction to fundamentals of computers, types of operating systems, concept

of networking

CO2 – Introduction to biological databases, their identification and data mining

CO3 - Understanding principles of algorithms that drive bioinformatics softwares

CO4 – Knowledge of retrieval of data, analysis of data, comparison of sequences

CO5 – Prediction of structures of nucleic acids and proteins

CO6 – Annotation of data, generation and analysis of high-throughput data

(h) BIOCHEM 0802: Seminar Paper - I

CO1 - Introduction to new developments in life sciences research

CO2 – Understanding of a particular field through self-reading of research papers

CO3 – Preparation of power point presentations

CO2 - Enhancement of oratory and written skills.

(i) BIOCHEM 0901: Cellular Signalling

CO1 - Understand the concepts of various cellular signal transduction pathways

CO2 –Insight into the mechanisms of cellular responses under varying conditions

CO3 – Understand the defects in the signaling processes related to various diseases.

(j) BIOCHEM 0902: Recombinant DNA Technology and Applications

C01- Understanding the mechanisms for isolation and manipulation of DNA and RNA. C02- Understanding the use of restriction and modification enzymes

C03- Use of plasmids and methods for cloning

C04 - Understanding the methods for creation of cDNA libraries, their applications and use.

C05 - Understanding the methods for protein production and their application in industrial production systems.

(k) BIOCHEM 0904: Molecular Biology : Genome Replication, Repair and Eukaryotic Transcription

CO1- Understanding the concepts and significance of DNA Replication, Repair and Eukaryotic Transcription.

CO2- Learn about the important discoveries related to Replication, Repair and Eukaryotic Transcription and their implications in medical field.

CO3- Enhancement of analytical and research problem solving skills.

(l) BIOCHEM 0903: Seminar Paper - II

CO1 - Introduction to new developments in life sciences research

CO2 – Understanding of a particular field through self-reading of research papers

CO3 – Enhancement of oratory and written skills.

CO4 – Skills to work as a team to present a specific area of research

CO5 – Art of defending results and findings

(m) BIOCHEM 1001: Developmental Biology

CO1- Gain knowledge about the significant processes of development.

CO2- Learn about various model organisms and their applications in research,

CO3- Understanding modern implications of developmental biology in comprehension and treatment of human diseases.

(n) BIOCHEM 1002: Advanced Techniques in Genomics

CO1- Insight into the latest technologies available for genome sequencing, their principles and applications

CO2- Insight into the latest technologies available for gene expression studies including microarrays and real time PCR.

CO3-Understanding phage display technology and its applications.

CO4- Insight into the methods to study protein interactions and their applications in research and industry.

(o) BIOCHEM 0803: Microbial Pathogenicity

CO1- Insight into the principles of pathogenicity and virulence by microbes.

CO2- Understand quantitative measures of virulence and several parameters that relates

to human diseases.

CO3- Gain knowledge of various human pathogens, their mechanism of action and adaptation.

CO4- Learn about various diagnostic procedures, new vaccines and mechanism of antibiotic resistance.

(p) BIOCHEM 1003: Proteomics and Metabolomics

CO1 - Understand various proteomics and metabolomics techniques

CO2 – Understand the applications of proteomics and metabolomics tools in research

CO3 – Understand the usefulness of these techniques for biomarker discovery and drug discovery

(q) BIOCHEM 0905 and BIOCHEM 1004: Dissertation

CO1 – Handling of a research project in a laboratory in the department

CO2 - Development of experimental and analytical skills,

CO3 - Exposure to various techniques and research methods

CO4 – Develop competence to read and understand published research articles and literature

CO5 – Development of troubleshooting skills.

(r) BIOCHEM 0705 and BIOCHEM 0805 - Practicals

CO1 –Introduction to diverse tools, techniques, methods and protocols that are basic to the biochemical understanding of life.

CO2 - Providing hands-on-training in several basic experiments in biochemistry

CO3 - Exposure to sophisticated instruments.

CO4 - Understanding the importance of controls in experiments

CO5 - Learning the art of design, execution and analysis of experiments

CO6 – Knowledge of record keeping and presentation of data.

Program outcome (PO) –It is expected that each student is independent in their thought processes after the course and can make a choice of their subsequent career.

Program specific outcomes (PSO) –

PSO1. Training in Biochemistry emphasizing on solid background of basic concepts

PSO2. Providing knowledge of rapid advances in the field.

PSO3. Hands-on-experience in the forefront areas of Biochemistry

PSO4. Training in the art of critically reviewing scientific literature

PSO5. Development of oratory (public speaking), creative thinking and writing skills

PSO6. Introduction to cutting edge research projects

PSO7. Ability to apply biochemical principles to understand various complex processes in life sciences

PSO8. Introduction to strategies to combat various human diseases

PSO9. Introduction to ethical principles of biochemistry

(ii) The mechanism of communication is mostly through group discussions and one-on-one interactions. The CO and PO outcomes will also be part of the departmental website.