

Department/ Centre/ Directorate: **Biochemistry**

(1.1.1) Curricula developed /adopted have relevance to the local/ national / regional/global developmental needs with learning objectives including program outcomes, program specific outcomes and course outcomes of all the program offered by the University

Upload description in not more than 500 words

Biochemical Techniques

This course inculcates an understanding of the biological methods and techniques used in research. The course prepares students for the challenges they encounter in their own lab classes of Masters Course and prepares them for putting their hands on bench during M.Phil/Ph.D programs. Additionally, this course integrates theory and practise to understand why and how each technique is used.

Fundamentals of Biochemistry

This course is necessary to introduce the basic understanding of biomolecules, their function and importance in the functioning of cell.

Enzymology

This course is intended mainly for students for taking degree courses which has a substantial biochemistry component. The large portion of this course may be of value to students who would opt for applied biology or medical laboratory sciences as their career.

Endocrinology

This is a very fundamental course for understanding the integration of

Biochemistry of Chronic Diseases

This course acquaints students with various chronic diseases, their mechanism and possible preventive measures. The course is intended to develop and understanding of various neurological disorders, diabetes, heart and liver diseases that are on rise in developing world.

Biomolecules

developmental events,

proliferation, growth, and differentiation, and the psychological or behavioral activities of

metabolism, growth and development, tissue function, sleep, digestion, respiration, excretion,

mood, stress, lactation, movement, reproduction and sensory perception caused by hormones.

In this course, the student recognizes the structures and functions of biomolecules

(carbohydrates, lipids, amino acids, proteins, nucleotides, and nucleic acids) that form the

basis of what we understand to be living organisms. Learn basic principles of structural and

functional relationships of biological molecules. At the end of semester the student is able to

understand and describe the relationship between chemistry and biology in a cell/organism.

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Nutritional Biochemistry

The students acquire detailed knowledge regarding the biological basis of nutrition and the

mechanisms by which diet can influence health. This includes a basic understanding of

metabolism, physiology, molecular genetics and epidemiology. The student with this course in the

programme is able to attain skills in developing research proposals for the study of human nutrition

with concepts in nutritional sciences related to diet and disease.

Metabolism and Bioenergetics

The major objectives of this course are: 1. Know the reactions of the major catabolic and

anabolic pathways of carbohydrate, lipid, and amino acid metabolism 2. Rationalize the

transfer of energy in living systems on the molecular level.

3. Understand the signalling pathways of epinephrine, glucagon, and insulin.4. Understand

the regulation of metabolic pathways. **Outcome:** Students are able to explain/describe the

synthesis of proteins, lipids, nucleic acids, and carbohydrates and their role in metabolic pathways.

The basic concepts from the course are tied to that from other courses so that at the end of the

semester the student is able to come up with a clear understanding of the physiological functioning

of the cell/organism.

At the end of the programme the student is able to apply and integrate molecular and metabolic knowledge of conditions and disease states for clinical problem solving (e.g., diabetes, carcinogenesis, mental illness, etc) and also develops a critical level of observational, analytical and problem solving skills to work on unknown mechanisms and suggest new hypotheses.

LAB COURSE –II

Objectives: Students use the biochemical techniques to plan and carry out experiments, like isolation, purification and identification of proteins, perform PAGE and SDS-PAGE protein electrophoresis, and enzyme assays (animal and plant sources). They generate and test hypotheses, analyze data using statistical methods where appropriate, and appreciate the limitations of conclusions drawn from experimental data. Trouble-shooting strategies are stressed upon in classes and labs. Assessment is done through collection, analysis, and presentation of data in course-associated lab experiments. **Outcomes:** Design and propose experimental approaches to solve biochemical questions.

Microbiology

Objectives: The course provides concepts in

physiology, biochemistry, and genetics of microorganisms, including such topics as structure, function, diversity, metabolism, and the genetics of metabolic regulation besides microbial pathogenesis where disease-causing microorganisms, including aspects of the molecular basis for pathogenesis and topics as nutrient cycling, microbial diversity, and the biotechnological application

of microorganisms to solve environmental problems are taught. **Outcomes:** Students graduating with a course in Microbiology will be able to: 1) define/explain within multiple microbiology disciplines the core theories and practices. 2) describe/explain the processes used by microorganisms for their replication, survival, and interaction with their environment, hosts, and host populations; 3) explain

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the theoretical basis of the tools, technologies and methods common to microbiology; and 4) demonstrate practical skills in the use of tools, technologies and methods common to microbiology, and apply the scientific method and hypothesis testing in the design and execution of experiments.

Physiology and Clinical Biochemistry

Objectives: The course relates to describe the function of human body, common pathophysiological mechanisms, common diseases and the chemical and biochemical methods used in their study. The teaching mission for course is to provide a foundation of physiological principles and their application in real-life situations. **Outcomes:** By the completion of the program with this course, the graduate students are expected to: **1)** Demonstrate knowledge of organ systems function. **2)** Demonstrate knowledge of cellular function. **3)** Demonstrate the ability to integrate physiology from the cellular and molecular level to the organ system and organismic level of organization. **4)** Conduct and/or evaluate laboratory experiments in physiology.

Cell Biology

This course covers the basic and advanced concepts of Cell Biology. The student's understanding is tested by interacting with them in the class, asking questions, discussing advanced concepts and holding class tests.

Molecular Biology

This course discusses the concepts of transcription and its regulation in prokaryotes and eukaryotes.

Cancer Biology:

This course covers advanced concepts of the genetics and signaling that is involved in cancer.

Biotechnology

In this course, the students acquire the concepts of the applications of various techniques and the knowledge that we obtain in different areas like Cell Biology, Molecular Biology, Biochemical Techniques etc.

Signal Transduction

This is an open elective course in which students from different departments come. The students learn advanced concepts of various signaling pathways that occur in eukaryotic organisms.

Lab courses III and IV This practical course is about Molecular Biology techniques and experiments. We discuss the concepts of the practicals, teach the methodology and discuss the results with the students. We also discuss the applications of these techniques.