Biochemistry

National Academic Reference Standard (NARS)

Biochemistry is an advanced, interdisciplinary field that encompasses the biological sciences, chemistry and physics. The aim of biochemistry is the application of the concepts, theories, facts and techniques of both biology and chemistry to the study of living systems and understanding of life's processes at a molecular scale. In addition, biochemistry determines the function of cell components and explores how these components interact and integrate into biological systems and how they affect the overall functions of cells and living systems. Biochemistry is also concerned with the study of the complex cellular reactions and generation of the energy to power cellular activity, communication and co-ordination between and within cells. The study of biochemistry provides the concepts, knowledge and principles necessary for biochemists to understand how bio-molecules such as carbohydrates, proteins, nucleic acids, lipids, vitamins and hormones function in such processes. Particular emphasis is given to the chemical bases of inheritance and disease, the experimental design and the proper control of the conditions as well as the standard operation of modern techniques. This is covered through the study of a wide variety of subjects including; chemistry, cell biology, macromolecules, molecular biology and molecular genetics as well as metabolism and enzymology. Thus, biochemistry graduates can be employed in different public and private sectors including research centers (biotechnological, medical, forensic, fishery and agricultural), food and beverage industries, manufacturing and processing, pharmaceutical, health and beauty care organizations, pollution control, hospitals, laboratory services as well as in sales.

3.1. The Attributes of a Biochemist

In addition to the general attributes of the basic science graduates, the biochemist must be able to:

3.1.1. Be acquainted with the molecular basis and chemistry of the processes that take place in cells and organisms.

3.1.2. Work safely in a laboratory environment and possess the basic competencies necessary for a range of practical biochemical techniques.

3.1.3. Apply statistical skills in manipulation and presentation of biochemical data.

3.1.4. Analyze biochemical data to characterize biomolecules and assess the activity of biochemical processes.

3.2. Knowledge and Understanding

In addition to the general knowledge acquired by the basic science graduates, a biochemist must be able to demonstrate knowledge and understanding of:

3.2.1. The fundamentals of sciences relevant to biochemistry especially chemistry, physics and mathematics.

3.2.2. The basic knowledge of the molecular biosciences, including biochemical processes, genetics, molecular biology and cell biology.

3.2.3. The principles and limitations of practical techniques, and methods related to biochemical investigations.

3.2.4. The structures, assemblies and functions of biological macromolecules and how they conduct and control the biochemical processes.

3.2.5. Mechanisms of the key metabolic reactions involved in the biochemical processes as well as the relation between biochemistry and cellular and organismal processes.

3.2.6. The key processes involved in the control of arrangement and expression of genes.

3.2.7. The important biochemical features that is distinguish plants from animals

3.3. Practical and professional skills Graduates of Biochemistry Program must be able to:

3.3.1. Use advanced biochemical techniques and methods relevant to the molecular biosciences in a safe, logistical and ethical manner.

3.3.2. Conduct standard laboratory procedures involved in biochemical analysis and synthetic work as well as industrial applications.

3.3.3. Consider variations inherent in dealing with biological materials such as sample size, accuracy, calibration and precision.

3.3.4. Use computational packages and statistics in data handling and manipulation of biochemical information.

3.4. Intellectual skills

Graduates of Biochemistry Program must be able to:

3.4.1. Use computational soft-wares in simulation studies to understand, confirm and optimize his/her practical techniques.

3.4.2. Integrate and link information across different approaches studied in different areas of biochemistry.

3.4.3. Classify and elucidate mechanisms of biochemical processes.

3.4.4. Analyze biochemical data to identify and determine biochemical structures.

4. Curriculum Structure and contents:

4.A Program duration Three Years

4.B Program structure

4.B.1 Number of contact hours per Term:

Level - 1	First term:	Lectures	12	Lab.	15	Credit	18		
	Second term:	Lectures	12	Lab.	15	Credit	18		
Level - 2	First term:	Lectures	13	Lab.	14	Credit	18		
	Second term:	Lectures	13	Lab.	15	Credit	18		
Level - 3	First term:	Lectures	12	Lab.	15	Credit	17		
	Second term:	Lectures	14	Lab.	12	Credit	18		
Level - 4	First term:	Lectures	16	Lab.	6	Credit	18		
	Second term:	Lectures	15	Lab.	6	Credit	17		
Overall	Contact hours	Lectures	107	Lab.	98	Credit	142		
4.B.2 Number of contact hours		Compulsory	98	Optional	26				
4.B.3 Number of contact hours of basic sciences courses:				No.	101	%	94.3%		
4.B.4 Number of contact hours of courses of social sciences and humanities:				No.	6	%	5.7%		
4.B.5 Number of credit hours of specialized courses:				No.	62	%	50%		
4.B.6 Number of credit hours of other courses:				No.	62	%	50%		
4.B.7 Practical/field training (Summer training)				6 weeks					
4.B.8 Programme levels (in credit hours system):				148hrs					