

Name of Course	Biochemistry and Microbiology (Written)
Marks	100 Marks (50 + 50 Marks)
Introduction	<p>Biochemistry is the branch of science that deals with the chemical processes and substances that occur in living organisms. It is an essential subject for understanding the molecular basis of life and the biochemical reactions that take place in the human body. In this course, students will learn about the basic biochemical principles, the chemical nature and functions of various biomolecules such as carbohydrates, lipids, proteins, and nucleic acids. The course will also cover the role of vitamins, hormones, and enzymes, as well as the acid-base and electrolyte balance in the human body.</p> <p>Biotechnology and genetic engineering will also be introduced in this course, providing students with a basic understanding of how biotechnological techniques can be used to develop new products and processes.</p> <p>Microbiology is the study of microorganisms such as bacteria, viruses, fungi, and parasites. In this course, students will learn about the nomenclature and classification of microorganisms, the culture media, bacterial cultures, staining methods, and methods for studying viruses. The course will also cover the microbiology of air, water, and soil, as well as sterilization and disinfection methods used in pharmacy.</p> <p>Furthermore, students will learn about fermentation processes, immunity, autoimmunity, tolerance, antigens, antibodies, antigen-antibody reactions, hypersensitivity, and allergy. Vaccines and sera will also be discussed in the course, providing students with an understanding of the different types of vaccines and their aims. Overall, the Biochemistry and Microbiology course is essential for students pursuing careers in medicine, pharmacy, or other related fields.</p>
Learning Outcome	<p>BIOCHEMISTRY:</p> <p>Upon completion of the Biochemistry course, students should be able to:</p> <ul style="list-style-type: none"> • Understand the basic biochemical principles, including the chemical structure and function of biomolecules such as carbohydrates, lipids, proteins, nucleic acids, vitamins, hormones, and enzymes. • Demonstrate an understanding of the role of vitamins in human physiology, including their functions and physiological effects, and recognize the importance of maintaining a balance between fat-soluble and water-soluble vitamins. • Understand the principles of biotechnology and genetic engineering and their applications in the pharmaceutical industry. • Demonstrate an understanding of acid-base and electrolyte balance in the human body. <p>MICROBIOLOGY:</p> <p>Upon completion of the Microbiology course, students should be able to:</p> <ul style="list-style-type: none"> • Understand the scope of microbiology and the nomenclature and classification of microorganisms, including bacteria, viruses, fungi, and yeasts. • Demonstrate knowledge of the methods used to culture and stain bacteria and viruses. • Understand the microbiology of air, water, and soil, and the principles of sterilization and disinfection. • Understand the concepts of immunity, autoimmunity, and tolerance, and be able to explain antigen-antibody reactions, hypersensitivity, and allergy. • Recognize the importance of vaccines and sera in the prevention and treatment of infectious diseases, and understand the different types of vaccines available.

Curriculum

BIOCHEMISTRY (50 marks)

1. General Introduction and Basic Biochemical Principles
2. General introduction, Basic Chemistry, Nature and Classification and functions of :
 - a. Carbohydrates,
 - b. Lipids,
 - c. Proteins and Amino acids,
 - d. Nucleic acids,
 - e. Vitamins,
 - f. Hormones,
 - g. Enzymes
3. Role of Vitamins, Physiological role of Fat-soluble Vitamins (A, D, E and K) and Water- soluble
 - a. Vitamins (Thiamin, Riboflavin, Pantothenic acid, Niacin, Pyridoxal phosphate, Biotin Folic acid, Cyanocobalamin - members of B-complex family - and Ascorbic acid)
4. Introduction to Biotechnology and Genetic Engineering
5. Acid-Base and Electrolyte Balance in Human body.

MICROBIOLOGY (50 marks)

1. Introduction and Scope of Microbiology
2. Nomenclature and classification of Micro-organisms.
 - a. The Bacteria:
 - i. Classification of Bacteria.
 - ii. Culture Media, Bacterial cultures and staining
3. Methods.
 - a. The Viruses: Nomenclature and Classification of Viruses
 - b. Introduction to Fungi/Yeast/Molds:
4. Introduction to Microbiology of air, water and soil.
5. Sterilization/Disinfection.
 - a. Introduction to sterile area and clean area.
 - b. Methods and application in pharmacy
6. Fermentation. Pharmaceutical Products are produced by the fermentation process.
7. Definitions of the following:
 - a. Immunity, autoimmunity and tolerance.
 - b. Antigen.
Antibodies.
 - c. Antigen-Antibody reactions.
 - d. Hypersensitivity and allergy.
8. Vaccines and Sera:
 - a. Introduction and aims.
 - b. Types of Vaccines.

Name of Course	Biochemistry and Microbiology (Practical)
Marks	100 Marks (50 + 50 Marks)
Introduction	<p>Biochemistry is the branch of science that deals with the chemical processes and substances that occur in living organisms. It is an essential subject for understanding the molecular basis of life and the biochemical reactions that take place in the human body. In this course, students will learn about the basic biochemical principles, the chemical nature and functions of various biomolecules such as carbohydrates, lipids, proteins, and nucleic acids. The course will also cover the role of vitamins, hormones, and enzymes, as well as the acid-base and electrolyte balance in the human body.</p> <p>Biotechnology and genetic engineering will also be introduced in this course, providing students with a basic understanding of how biotechnological techniques can be used to develop new products and processes.</p> <p>Microbiology is the study of microorganisms such as bacteria, viruses, fungi, and parasites. In this course, students will learn about the nomenclature and classification of microorganisms, the culture media, bacterial cultures, staining methods, and methods for studying viruses. The course will also cover the microbiology of air, water, and soil, as well as sterilization and disinfection methods used in pharmacy.</p> <p>Furthermore, students will learn about fermentation processes, immunity, autoimmunity, tolerance, antigens, antibodies, antigen-antibody reactions, hypersensitivity, and allergy. Vaccines and sera will also be discussed in the course, providing students with an understanding of the different types of vaccines and their aims. Overall, the Biochemistry and Microbiology course is essential for students pursuing careers in medicine, pharmacy, or other related fields.</p>
Learning Outcome	<p>BIOCHEMISTRY:</p> <p>Upon completion of the Biochemistry course, students should be able to:</p> <ul style="list-style-type: none"> • Understand the basic biochemical principles, including the chemical structure and function of biomolecules such as carbohydrates, lipids, proteins, nucleic acids, vitamins, hormones, and enzymes. • Demonstrate an understanding of the role of vitamins in human physiology, including their functions and physiological effects, and recognize the importance of maintaining a balance between fat-soluble and water-soluble vitamins. • Understand the principles of biotechnology and genetic engineering and their applications in the pharmaceutical industry. • Demonstrate an understanding of acid-base and electrolyte balance in the human body. <p>MICROBIOLOGY:</p> <p>Upon completion of the Microbiology course, students should be able to:</p> <ul style="list-style-type: none"> • Understand the scope of microbiology and the nomenclature and classification of microorganisms, including bacteria, viruses, fungi, and yeasts. • Demonstrate knowledge of the methods used to culture and stain bacteria and viruses. • Understand the microbiology of air, water, and soil, and the principles of sterilization and disinfection. • Understand the concepts of immunity, autoimmunity, and tolerance, and be able to explain antigen-antibody reactions, hypersensitivity, and allergy. • Recognize the importance of vaccines and sera in the prevention and treatment of infectious diseases, and understand the different types of vaccines available.

Curriculum

BIOCHEMISTRY (50 marks)

1. Qualitative analysis of Carbohydrates, Lipids and Sterols (Cholesterol), Blood analysis
2. Quantitative analysis of Carbohydrates-Glucose (reducing sugar) and any other carbohydrate using Benedict method.
3. Analysis of normal and abnormal components of Urine - Sugar, Uric acid and Cholesterol

MICROBIOLOGY (50 marks)

1. Sterilization of Glassware.
2. Preparation of general and selective media and culturing of microorganisms.
3. Total and viable counts of microorganism.
4. Staining of Bacteria: Gram method
5. Microbiological analysis of air, water and soil.