

Curriculum and Syllabus for the Biochemistry Discipline (Cardiovascular Module)

Credits: 0.43 Theoretical Credits

Session	Syllabus and Curriculum
1	Clinical Enzymology: Causes of Increased and Decreased Serum Activity of Intracellular Enzymes, Essential Criteria for the Clinical Application of Enzymes, and Clinical Significance of Alkaline Phosphatase and Acid Phosphatase
2	Clinical Significance of Enzymes: 5'-Nucleotidase, Gamma-Glutamyl Transferase (GGT), Aminotransferases (Transaminases), Lactate Dehydrogenase (LDH), Creatine Phosphokinase (CPK/CK), Cholinesterase, Aldolase, Amylase, Lipase
3	Lipid and Lipoprotein Metabolism: Digestion and Absorption of Dietary Lipids, Chylomicron Metabolism, and Metabolism of VLDL, LDL, and HDL
4	Fatty Acid Biosynthesis Pathway, Beta-Oxidation of Fatty Acids, Cholesterol Biosynthesis, Ketone Body Synthesis, and Disorders of Metabolic Pathways

References:

- ✓ **Textbook of Biochemistry, Thomas Devlin, Last Edition**
- ✓ **Harper's Illustrated Biochemistry , Last Edition**
- ✓ **Clinical Biochemistry, Tietz, Last Edition**

Syllabus for the Biochemistry Lab Course (Cardiovascular Module)

Credits: 0.22 Practical Credits

Session	Syllabus and Curriculum
1	Quantification of Hormones by Enzyme-Linked Immunosorbent Assay (ELISA)
2	Measurement of Serum Triglycerides or Cholesterol

- **Curriculum and Syllabus for the Biochemistry Discipline (Gastrointestinal Module)**
Credits: 0.43 Theoretical Credits

Session	Syllabus and Curriculum
1	Nucleotide Metabolism: De Novo Purine Biosynthesis Pathway, Purine Salvage Pathway, Regulation of Purine Biosynthesis, Purine Catabolism, and Disorders of Purine Metabolism
2	Nucleotide metabolism: De novo pathway of pyrimidine biosynthesis, Salvage pathway of pyrimidine biosynthesis, Regulation of pyrimidine biosynthesis pathway, Pyrimidine catabolism, Diseases of pyrimidine metabolic pathway
3	Metabolism of non-protein nitrogenous compounds: heme biosynthesis, diseases related to heme biosynthesis, porphyria, heme catabolism, diseases of heme catabolism
4	Integration of metabolic pathways: importance of key and regulatory sites in metabolic pathways, importance of different tissues in metabolic pathways, metabolic pathways in the liver, metabolic pathways in adipose tissue, metabolic pathways in muscle tissue, metabolic pathways after eating, metabolic pathways in the fasting state, metabolic pathways after prolonged starvation

References:

- ✓ **Textbook of Biochemistry, Thomas Devlin, Last Edition**
- ✓ **Harper's Illustrated Biochemistry , Last Edition**
- ✓ **Clinical Biochemistry, Tietz, Last Edition**
- **Syllabus for the Biochemistry Lab Course (Respiratory System Module)**
- **Credits: 0.22 Practical Credits**

Session	Syllabus and Curriculum
1	Complete Urinalysis (Physical, Chemical, and Dipstick Examination)
2	Complete Urinalysis (microscopic examination)- Serum uric acid measurement

- Curriculum and Syllabus for the Biochemistry Discipline (Respiratory Module)
- Credits: 0.43 Theoretical Credits

Session	Syllabus and Curriculum
1	Introduction to Bioenergetics and Oxidative Phosphorylation: Thermodynamic Laws, Free Energy Changes, Reduction Potential, Electron Transport Chain, Chemiosmotic Theory, and Inhibitors of the Electron Transport Chain
2	Carbohydrate Metabolism: Digestion and Absorption, Glycolysis Pathway, Pyruvate Oxidation, and the Krebs Cycle
3	Gluconeogenesis, Glycogenesis, Glycogenolysis, Fructose Metabolism, and Galactose Metabolism
4	Amino Acid Metabolism: Digestion and Absorption, General Reactions of Amino Acid Catabolism, the Urea Cycle, Specific Catabolic Pathways for Aromatic, Branched-Chain, and Sulfur-Containing Amino Acids, Biosynthesis of Non-Essential Amino Acids, and Biosynthesis of Amino Acid-Derived Compounds

References:

- ✓ Textbook of Biochemistry, Thomas Devlin, Last Edition
- ✓ Harper's Illustrated Biochemistry , Last Edition
- ✓ Clinical Biochemistry, Tietz, Last Edition

- Syllabus for the Biochemistry Lab Course (Respiratory System Module)
- Credits: 0.22 Practical Credits

Session	Syllabus and Curriculum
1	Measurement of Serum Calcium or Phosphorus
2	Blood Glucose Measurement and its Clinical Significance in Diabetes Mellitus
3	Measurement of Serum Urea (Uremia - Diacetyl Monoxime Method) or Serum Creatinine

Syllabus for Molecular and Cellular Biochemistry (Unit 1)

Credits: 0.95 Theoretical Credits

Session	Syllabus and Curriculum
1	Introduction to Biochemistry - Water: Structure, Hydrogen Bonding, Henderson-Hasselbalch Equation, and Acids & Bases
2	Buffers: Definition of a Buffer, Major Physiological Buffer Systems, and Definition & Clinical Significance of Acidosis and Alkalosis
3	Amino Acids: Structure, Physicochemical Properties, Classification, Essential and Non-Essential Amino Acids, and Titration
4	Proteins: Primary, Secondary, Tertiary, and Quaternary Structure - Protein Folding and Denaturation - Structure and Function of Myoglobin and Hemoglobin - Structure, Function, and Clinical Significance of Collagen
5	Carbohydrates: Definition, Structure, Physicochemical Properties, Monosaccharide Derivatives, and Disaccharides
6	Homopolysaccharides, Heteropolysaccharides, Glycoproteins, and Clinical Significance
7	Lipids: Structure, Types, and Physicochemical Properties of Fatty Acids; and Classes of Lipids (Triacylglycerols, Esterified and Free Cholesterol, Phospholipids, Sphingolipids)
8	Lipoproteins: Liposomes, Micelles, and Emulsions; Apolipoproteins; and Classes of Lipoproteins and Their Clinical Significance

References:

- ✓ **Textbook of Biochemistry, Thomas Devlin, Last Edition**
- ✓ **Harper's Illustrated Biochemistry , Last Edition**
- ✓ **Clinical Biochemistry, Tietz, Last Edition**

Syllabus for the Biochemistry Lab Course

Credits: 0.22 Practical Credits

Session	Syllabus and Curriculum
1	Introduction to Laboratory Equipment, Safety, Waste Disposal, and Micropipette Operation
2	Qualitative testing of carbohydrates (Benedict-Silvanoff-Barford-Bial-Polysaccharides tests)
3	Qualitative testing of amino acids and proteins (xanthoprotei-Millon-Hopkinskohl-Biore tests)
4	Chromatography (sugars and serum proteins) - Electrophoresis (sugars and serum proteins)

Syllabus for Molecular and Cellular Biochemistry (Unit 2)

Credits: 0.95 Theoretical Credits

Session	Syllabus and Curriculum
1	Enzymes: Definition - Classification - Structure - Nomenclature - Active site - Mechanism of action of enzymes - Determination of enzyme activity - Factors affecting enzyme function - Michaelis-Menton reaction
2	Enzyme inhibitors - Isoenzymes - Types of ordered and unordered enzyme reactions - Regulation of enzyme action and their clinical significance
3	Vitamins: Definition - Classification - Structure - Coenzyme Role - Water-soluble Vitamins
4	Fat-soluble vitamins - vitamin deficiency disorders and their clinical significance
5	Nucleic acids: Components of nucleic acids (DNA-RNA) - nucleosides - nucleotides
6	The structure of DNA and its types - The structure of RNA and its types
7	Replication: The process of prokaryotic replication, repair, and its clinical significance
8	Replication: The process of eukaryotic replication, repair, and its clinical significance

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Syllabus for the Biochemistry Lab Course

Credits: 0.22 Practical Credits

Session	Syllabus and Curriculum
1	Enzyme kinetics (temperature-pH-concentration of inhibitors)
2	Spectrophotometer (Beer-Lambert law) - Flame photometer (sodium-potassium measurement)
3	Qualitative testing of amino acids and proteins (xanthoprotei-Millon-Hopkinskohl-Biore tests)
4	Analysis of Serum Proteins: Classes and Clinical Correlations