

Programme	BS Biochemistry	Course Code	BC. 305	Credit Hours	2-0
Course Title	Metabolism I				
Course Introduction					
<p>This course delves into the intricate processes of carbohydrate and lipid metabolism, starting with the digestion and absorption of carbohydrates and exploring the pivotal role of glucose in metabolic pathways. Students will gain a thorough understanding of glycolysis, the TCA cycle, and the electron transport chain, along with the regulation and energetics of these pathways. The course also covers alternative carbohydrate metabolic pathways such as gluconeogenesis, the pentose phosphate pathway, and glycogen metabolism, including the synthesis and breakdown of glycogen and related disorders. In the lipid metabolism section, students will study lipid digestion, absorption, and transport, as well as the pathways involved in lipolysis, fatty acid oxidation, ketogenesis, and the biosynthesis of various lipids and cholesterol. The course also addresses the metabolism of prostaglandins, lipoproteins, steroid hormones, and bile acids, providing a comprehensive overview of metabolic processes essential for life.</p>					
Learning Outcomes					
<p>On the completion of the course, the students will:</p> <ul style="list-style-type: none"> • Acquire the knowledge about intermediary biochemical processes • Demonstrate the metabolic pathways of carbohydrates and lipids • Understand the diversity of metabolic regulation carbohydrate and lipids, and how this is specifically achieved in different cells. 					
Course Content					
<ul style="list-style-type: none"> • Digestion and absorption of carbohydrates, Glycoside hydrolases, Mechanism of glucose transport • Glycolysis and its Regulation • Fermentation, Lactic acid and Ethanol fermentation • Metabolism of other monosaccharides (Feeder pathways) • TCA cycle and its Regulation, Metabolic sources of Acetyl Coenzyme A • Reactions of Electron Transport chain, Chemiosmotic hypothesis, ATP synthesis, Inhibitors and uncouplers of ETC • Gluconeogenesis and its Regulation • Cori cycle, Glycogen metabolism and storage diseases • Glyoxalate Cycle , Pentose phosphate pathway • Ketogenesis and Ketolysis • Synthesis of starch and cellulose • Synthesis of peptidoglycan and glycoprotein • Lipid metabolism: Introduction to lipid digestion, absorption and transport, • Lipolysis: oxidation of saturated, unsaturated fatty acids, Beta oxidation its regulation and defects • Alpha oxidation of lipids, Omega oxidation, • Fatty acids synthesis • Biosynthesis, utilization and properties of triacylglycerols • Metabolism of Phospholipids, Glycolipids, Cardiolipids and Sphingolipids • Metabolism of Prostaglandins, Thromboxanes and Leukotrienes. • Metabolism of cholesterol, steroid hormones and bile acids 					
Textbooks and Reading Material					
<p>Textbooks.</p> <ul style="list-style-type: none"> • Nelson, D.L. and Cox, M.M. (2017). <i>Lehninger Principles of Biochemistry. 7th Edition.</i> W.H. Freeman, New York, 1328. 					

- Voet, D.J. Voet, G.J. and Pratt, C.W. (2014). *Fundamentals of Biochemistry. 5th Edition*. J Wiley & Sons Inc. ISBN: 9781118918401
- Berg, J.M. Tymoczko, J.L. and Stryer, L. (2007). *Biochemistry. 6th Edition*. WH Freeman & Co.
- Richard, A. H. Denise, R.F. (2014). *Biochemistry. Lippincott's Illustrated Reviews Series. 6th Edition*. Williams and Wilkins.
- Kennelly, P. J., & Rodwell, V. W. (2015). *Enzymes: Regulation of activities. Harper's Illustrated Biochemistry 30th Edition*. United States: McGraw Hill, 87-96.

Teaching Learning Strategies

- Class lecture
- Class Discussions
- Class Tutorials

Assignments: Types and Number with Calendar

- 1st Quiz in 4th Week of 5 marks
- 2nd Quiz in 10th Week of 5 marks
- 3rd Quiz in 14th Week of 5 marks
- 1st Assignment in 8th Week of 10 marks

Assessment

Sr. No.	Elements	Weightage	Details
1	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.