

Programme	BS Biochemistry	Course Code	BC. 302	Credit Hours	2-0
Course Title	Metabolism II				
Course Introduction					
<p>This course covers the metabolism of proteins, amino acids, and nucleic acids, focusing on the processes of digestion, absorption, and metabolic pathways. Topics include amino acid metabolism, urea cycle, and the biosynthesis of non-essential amino acids, as well as metabolic adaptations during starvation and diabetes. The course also explores the biosynthesis, degradation, and regulation of purine and pyrimidine bases and nucleotides, along with associated diseases.</p>					
Learning Outcomes					
<p>On the completion of the course, the students will:</p> <ul style="list-style-type: none"> • Understand metabolic pathways of proteins and nucleic acids • Understand the diversity of metabolic regulations of proteins and nucleic acids • Acquire knowledge about inborn errors associated with these biochemical processes 					
Course Content					
<ul style="list-style-type: none"> • Digestion and absorption of proteins • Amino acid deamination mechanisms: Transamination: Introduction, Mechanism and Clinical significance • Transmethylation: Introduction, Enzymes and coenzymes used, Significance, Mechanism of reactions and Methyl group donor and acceptors • Transpeptidation: Introduction, Transpeptidases and Biosynthesis of peptidoglycans • Decarboxylation: Introduction, Decarboxylases, Mechanism, Classification of decarboxylation based on cofactors (biotin and thiamine) • Urea cycle and its regulation • Catabolism of carbon skeleton of amino acids: Asparagine, Aspartate, Glutamine, Proline, Arginine, Histidine, Alanine, Serine, Glycine, Cysteine and Threonine, Phenylalanine, Tyrosine, Methionine, Valine, Isoleucine, Threonine, Valine, Isoleucine, Threonine, Leucine, Isoleucine, Lysine and Tryptophan • Metabolism of biologically important amines, heme metabolism, Glutathione metabolism • One carbon metabolism: Importance and structure of folic acid, One carbon groups and their sources, Metabolism, Deficiency of folic acid and Regulation • Biosynthesis of essential amino acids and non-essential amino acids • Regulation of amino acids biosynthesis • Metabolism of Nucleic acids: Chemical nature and Synthesis of purines and pyrimidines • Degradation of purine and pyrimidines • Metabolic adaptations under starvation • Metabolic changes in well feed state, Early, intermediate and advanced stages of starvation. Diabetes Mellitus • Diseases associated with amino acid and nucleotide metabolism, 					
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. • Kim, E. B. Susan, M. B. Scott, B. and Heddwen L. B. (2015) <i>Ganong's Review of Medical Physiology. 25th Edition.</i> Mc Graw Hill. • Allan, G. (2004). <i>Clinical Biochemistry E-Book: An Illustrated Colour Text, 3rd Edition.</i> Churchill livinstone. 					

<ul style="list-style-type: none"> • Richard, A. H. Denise, R.F. (2014). <i>Biochemistry. Lippincott's Illustrated Reviews Series. 6th Edition.</i> Williams and Wilkins. • Katherine, J. D. Joseph, J. T. Danae, Q. D. (2013). <i>General, Organic, and Biochemistry. 7th Edition.</i> Brooks Cole. • James, R. M. and Trudy, M. (2012). <i>Biochemistry the molecular basis of life. 6th Edition.</i> Oxford University Press. • James, W.B. and Dominiczak, M.H. (2012). <i>Medical Biochemistry. 3rd Edition.</i> 			
Teaching Learning Strategies			
<ul style="list-style-type: none"> • Class lecture • Class Discussions • Class Tutorials 			
Assignments: Types and Number with Calendar			
<ul style="list-style-type: none"> • 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.