

Semester	VI
Course	Major-4
Paper Title	METABOLISM AND INTEGRATIVE PHYSIOLOGY
Paper Code	
No of Credits	4
Theory /Practical /Composite	Full Theory
Minimum No. of preparatory hours per week a student has to devote	4
Number of Modules	2
Syllabus	<p>MODULE A [25 Marks]</p> <p>Unit-I: Amino acid metabolism: Amino acid biosynthesis; biosynthetic families of amino acids; regulation of amino acid biosynthesis; amino acids as precursors of biomolecules; amino acid degradation; urea cycle;</p> <p>Unit-II: Lipid metabolism: beta-oxidation of fatty acids; degradation of unsaturated fatty acids; synthesis; synthesis of unsaturated fatty acids; role of acetyl CoA in fatty acid metabolism.</p> <p>Unit-III: Nucleotide metabolism: de novo synthesis; salvage pathway; regulation of nucleotide biosynthesis; DHFR, thymidylate synthesis and anti-cancer drugs; nucleotide metabolism and related pathological conditions.</p> <p>MODULE B [45 Marks]</p> <p>Unit-IV: Metabolic disorders: (i) Metabolic integration in health and disease (clinical case studies) (ii) Inborn errors of metabolism.</p> <p>Unit-V: Integrative physiology and diagnostics: (i) Concept of Integrative physiology, role of feedback loops (ii) Dynamic integration of physiological systems in health and disease (Clinical case studies) (iii) Stress physiology (iv) Chronobiology (v) Histopathological and haematological examination, concept of biomarkers (vi) Postmortem examination and forensics</p> <p>Unit-VI: Pharmacology and toxicology: (i) Concept of xenobiotics (ii) Basic mechanism of drug action (iii) Drug toxicity and drug abuse (iv) Nanotechnology in medicine.</p>

Learning Outcomes	<p>The course aims:</p> <ol style="list-style-type: none"> 1. To impart a fundamental understanding of metabolic processes and their integration within physiological systems, emphasizing regulatory networks and homeostasis across organ systems, with specific examples of metabolic diseases as supporting case studies. 2. To impart a basic understanding of cross-system interactions and dynamic integration of physiological systems in health and disease, with specific examples as supporting case studies. 3. To emphasize on the basic principles of medical diagnostics and disease diagnostics, with special emphasis on histopathology, haematological tests, postmortem analyses and nanotechnology. 4. To provide fundamental concepts of biochemical toxicology with specific emphasis on various pharmacological aspects. 5. Understand the physiological processes involved in protein digestion, absorption, and intracellular protein turnover 6. Explore the diverse roles of amino acids as precursors 7. Outline the pathways of nucleotide biosynthesis
Reading / Reference List	<p>Module A:</p> <ol style="list-style-type: none"> 1. Lehninger Principles of Biochemistry - Cox & Nelson 2. Biochemistry - Voet and Voet 3. Biochemistry – Berg, Tymoczko & Stryer 4. J.E. Hall. Guyton and Hall Textbook of Medical Physiology. 5. K. Barrett, S. Barman et al. Ganong's Review of Medical Physiology. 6. C.C. Chatterjee. Human Physiology 7. Hodgson, E. A Textbook of Modern Toxicology, 4th ed. Wiley. 8. Burchiel, S.W. & Luster, M.I.. Molecular Mechanisms in Toxicology. Academic Press. 9. Timbrell, J. Introduction to Toxicology, 5th ed. CRC Press. 10. Relevant scientific literature <p>Module B:</p> <ol style="list-style-type: none"> 1. Lehninger Principles of Biochemistry - Cox & Nelson 2. Biochemistry - Voet and Voet 3. Biochemistry – Berg, Tymoczko & Stryer
Evaluation	<p>Theory CIA- 30 Semester Exam- 70</p>

<p>Paper Structure for Theory Semester Exam</p>	<p>Module A (55 marks) 1 Compulsory Question of 5 marks. Any 5 out of 7 questions; each of 10 marks, with subparts not less than 2, not more than 6</p> <p>Module B (15 Marks) Any 3 out of 5 questions; each of 5 marks, with subparts (not less than 1, not more than 5)</p>
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