Course Description Form

1. Course Name:
Biochemistry II (Theoretical+ Practical)
2. Course Code:
Phcls25 326--
3. Semester / Year:
Second semester/2025-2026
4. /Description Preparation Date:
15/1/2026
5. Available Attendance Forms:
Students' signature on attendance sheet
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hours Theoretical + 2 hours Practical (75) /4 units
7. Course administrator's name
Theoretical
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Course Objectives The course teaches the biochemical processes by wh all living organisms sustain life. Metabolism is the s of all chemical processes occurring within living c and organisms.	The course detailed the biochemical reactions accompanied the metabolism of carbohydrates, proteins, and lipids

1. Teaching and Learning Strategies

Strategy	Lecturing Seminars Homework Quiz Practical laboratory demonstrations, clinical blood tests, and general urine examination.

2. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	**3+2**	A1: Students will be able to understand the concept of bioenergetics and the role of ATP in supporting normal physiological functions and its biomedical importance. A1: Students will be able to explain the relationship between endergonic and exergonic reactions in biological systems. B2: Students will develop self-learning skills by linking energy metabolism to disease conditions.	Bioenergetic	Theoretical lectures. Laboratory experiments	Paper-based exams
2	**3+2**	A1: Students will be able to explain the mechanism of the respiratory chain and oxidative phosphorylation in cellular energy production. A1: Students will relate respiratory chain inhibitors and	Respiratory Chain Oxidative Phosphorylatic	Theoretical lectures. Laboratory demonstration .	Paper-based exams

		uncouplers to pathological conditions. B3: Students will apply this knowledge to understand drug actions and toxic effects related to energy metabolism.			
3	**3+2**	A1: Students will understand the overall organization and integration of metabolic pathways. A1: Students will explain clinical aspects related to metabolic dysregulation. B2: Students will enhance self-learning skills through studying metabolic disorders.	Overview of Metabolism	Theoretical lectures. Laboratory demonstration.	Paper-based exams
4	3+2	A1: Students will be able to describe the reactions and energetics of the citric acid cycle. A1: Students will explain the role of B vitamins in the cycle and the effects of their deficiency. B3: Students will relate citric acid cycle disturbances to clinical conditions.	Citric Acid Cycle		
5	3+2	A1: Students will understand the reactions of glycolysis and the metabolic fates of pyruvate. A1: Students will explain the regulation of glycolysis and its clinical significance.	Glycolysis and Oxidatio Pyruvate	Theoretical lectures. Laboratory demonstration.	Paper-based exams

		B2: Students will develop self-learning skills through analysis of clinical cases.			
6	3+2	A1: Students will explain glycogenesis and glycogenolysis and their role in blood glucose regulation. A1: Students will relate glycogen storage diseases to biochemical defects. B3: Students will apply this knowledge in pharmaceutical care of patients with glucose disorders.	Metabolism of Glycogen	Theoretical lectures. Laboratory experiments.	Paper-based exams
7	3+2	A1: Students will understand gluconeogenesis and its role in maintaining blood glucose levels. A1: Students will explain the Cori cycle and its clinical importance. B3: Students will use this knowledge to provide appropriate pharmaceutical advice.	Gluconeogenesis and Blo Glucose Control	Theoretical lectures. Laboratory demonstration.	Paper-based exams
8	**Mid-term exam**				
9	3+2	A1: Students will explain the pentose phosphate pathway and its biomedical importance. A1: Students will relate PPP defects to oxidative stress-related diseases. B2: Students will enhance self-learning through independent study of alternative glucose pathways.	Pentose Phosphate Pathw	Theoretical lectures. Laboratory demonstration.	Paper-based exams

10	3+2	A1: Students will understand fatty acid biosynthesis and its regulation. A1: Students will explain the relationship between lipogenesis and metabolic diseases. B3: Students will apply this knowledge in nutritional and health counseling.	Biosynthesis of Fatty Aci	Theoretical lectures. Laboratory demonstration .	Paper-based exams
11	3+2	A1: Students will explain fatty acid oxidation and energy yield. A1: Students will understand ketogenesis and its regulation in health and disease. B3: Students will relate fatty acid oxidation to clinical conditions such as fasting and diabetes.	Oxidation of Fatty Acids	Theoretical lectures. Laboratory demonstration	Paper-based exams
12	3+2	A1: Students will understand lipoprotein structure and lipid transport mechanisms. A1: Students will relate lipid metabolism disorders to cardiovascular diseases. B3: Students will apply this knowledge in patient counseling.	Lipid Transport and Stora	Theoretical lectures. Laboratory demonstration .	Paper-based exams
13	3+2	A1: Students will explain amino acid pools and protein turnover.	Protein and Amino Acid Metabolism	Theoretical lectures.	Paper-based exams

		A1: Students will understand regulation of protein degradation. B2: Students will enhance self-learning skills in protein metabolism disorders.		Laboratory demonstration.	
14	3+2	A1: Students will explain transamination and ammonia assimilation reactions. A1: Students will understand the synthesis of nonessential amino acids and specialized derivatives. B1: Students will recognize these reactions in a laboratory environment.	Biosynthesis of Nonessential Amino Acids	Theoretical lectures. Laboratory demonstration.	Paper-based exams
15	3+2	A1: Students will explain deamination reactions and the urea cycle. A1: Students will relate urea cycle disorders to clinical manifestations. B3: Students will apply this knowledge in monitoring patient therapy.	Catabolism of Proteins ar Amino Acid Nitrogen	Theoretical lectures. Laboratory demonstration.	Paper-based exams
16	3+2	A1: Students will understand the metabolic fate of amino acid carbon skeletons. A1: Students will explain diseases	Catabolism of Carbon Skeletons of Amino Acid	Theoretical lectures. Laboratory demonstration.	Paper-based exams

		related to amino acid catabolism. B2: Students will develop self-learning skills in studying inherited metabolic disorders.			
17	3+2	A1: Students will explain the conversion of amino acids into specialized biologically active compounds. A1: Students will relate these products to neurotransmitter and hormone synthesis. B3: Students will apply this knowledge to improve healthcare services.	Conversion of Amino Ac to Specialized Products	Theoretical lectures. Laboratory demonstration .	Paper-based exams
18	3+2	A1: Students will explain heme biosynthesis and regulation. A1: Students will relate defects in heme metabolism to jaundice and porphyria. B3: Students will use this knowledge to interpret clinical cases. C1: Students will adhere to ethical principles when dealing with patients suffering from blood disorders.	Porphyrins and Bile Pigments	Theoretical lectures. Laboratory demonstration .	Paper-based exams
19	**Students' seminars**				
3. Course Evaluation					
• 20 M Theoretical assessment; (paper-based mid-term exam + quiz + attendance + seminar)					

- 20 M practical assessment (attendance + quiz + practice)
- 60 M paper-based theoretical final exam

Total 100 M

4. Learning and Teaching Resources	
Required textbooks	Harper's Illustrated Biochemistry 29th edition
Main references (sources)	Lippincott-biochemistry-6th-edition 2014
Electronic References, Websites	https://pbthru.com/biochemistry-basics https://www.lecturio.com/medical-courses/biochemistry-basics.course#/