Course Description Form

1. Course Name:
Biochemistry II (Theoretical+ Practical)
2. Course Code:
Phcls24_326--
3. Semester / Year:
2nd Semester/3rd year
4. Description Preparation Date:
01/02/2025
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
Name: Assist. Prof. Dr. Jehan Abdulwahab Email: dr.jehan.biochem@uomosul.edu.iq Name: Lecturer Dr. Zaid Muwafaq Younus Email: z.m.younus@uomosul.edu.iq Name: Lecturer Dr. Sameer Mohammed Mahmood Email: sm.mahmood@uomosul.edu.iq Name: Lecturer. Mayada Husam Email: Mayadaaljammas@uomosul.edu.iq Name: Lecturer Dr. HibaRadhwan
Practical
Lecturer: Marwah Husameldeen Email: marwaalmola@uomosul.edu.iq Lec. Dr. Hiba Radhwan Email: hiba.Radhwan@uomosul.edu.iq Lec. Fatima Haitham Email: fatma17@uomosul.edu.iq Name: Assis. Lec. Atyaf Talal Mahmood Email: atyaf.alchalabi@uomosul.edu.iq Assis. Lec. Abeer Mudhaffar Email: abeer.hatem@uomosul.edu.iq
8. Course Objectives

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 reactio accompanied the metabolism of carbohydrates, proteins, and lipids

9. Teaching and Learning Strategies

Strategy	Lecturing Seminars Homework Quiz

	Practical laboratory demonstrations, clinical blood tests, and general urine examination.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3+2	Biomedical importance Free energy Coupling of endergonic and exergonic reactions The role of ATP Adenylyle kinase interconvertes adenine nucleotides	Bioenergetic	Theoretical lectures Laboratory experiments	Paper-based exams
2	3+2	free energy changes can expressed in terms of red potential, oxidases use oxygen as a hydrogen acceptor, many dehydrogenases depend nicotinamide coenzymes hydroperoxidases use hydrogen peroxide or an organic peroxide as substrate	Biologic oxidation	Theoretical lectures Laboratory demonstration.	Paper-based exams
3	3+2	Respiratory Chain Complexes The Chemiosmotic Theory ATP Synthase Amount of energy produced via oxidative phosphorylation vs. substrate level phosphorylation Inhibitors of The Respiratory Chain Respiratory Chain Control and the Action of Uncouplers Transfer of reducing equivalents through the inner mitochondrial membrane	The respiratory ch and oxidat phosphorylation.	Theoretical lectures Laboratory demonstration.	Paper-based exams
4	3+2	Introduction Levels of organization of metabolic pathways Regulation of the Flux of Metabolites through Metabolic Pathways Clinical Aspects	Overview metabolism		

5	3+2	Reactions of the Citric Acid Cycle Energetics of the Citric Acid Cycle Roles of the B vitamins in the Citric Acid Cycle Anaplerotic reactions Regulation of the Citric Acid Cycle	Citric acid Cycle	Theoretical lectures Laboratory demonstration	Paper-based exams
6	3+2	Reactions of the Glycolysis The Fates of Pyruvate Glycolysis and Pyruvate dehydrogenase Regulation Clinical Aspects	Glycolysis	Theoretical lectures Laboratory experiments	Paper-based exams
7	3+2	Biomedical importance Glycogenesis, Glycogenolysis The regulation of glycogenesis and glycogenolysis	Metabolism of glycogen	Theoretical lectures Laboratory demonstration	Paper-based exams
8	**Mid-term exam**				
9	3+2	Biomedical importance Gluconeogenesis reactions Regulation of gluconeogenesis Cori cycle	Gluconeogenesis	Theoretical lectures Laboratory demonstration	Paper-based exams
10	3+2	Biomedical importance PPP reactions Uronic acid pathway Fructose metabolism Galactose metabolism Metabolism of amino sugars	Pentose phosphate pathway and other pathways of hexose metabolism	Theoretical lectures Laboratory demonstration	Paper-based exams
11	3+2	Biomedical importance Lipogenesis reactions The source of acetyl-coA and NADPH Elongation of fatty acids Regulation of lipogenesis Biosynthesis of unsaturat fatty acids.	Biosynthesis of fatty acids	Theoretical lectures Laboratory demonstration	Paper-based exams
12	3+2	Biomedical importance Carnitine cycle	Oxidation of fatty ac	Theoretical lectures	Paper-based exams

		Reactions of fatty acid oxidation Energy production from fatty acid oxidation Oxidation of unsaturated fatty acids Ketogenesis The regulation of ketogenesis		Laboratory demonstration	
13	3+2	Biomedical importance Biosynthesis of acylglycerols Biosynthesis of alkylglycerols Degradation of acylglycerols Biosynthesis of sphingolipigs Biosynthesis of glycolipi	Metabolism of acylglycerol and sphingolipids	Theoretical lectures Laboratory demonstration	Paper-based exams
14	3+2	Biomedical importance Structure of lipoproteins Metabolism of lipoproteins Storage and hydrolysis o triacylglycerol	Lipid transport and storage	Theoretical lectures Laboratory demonstration	Paper-based exams
15	3+2	Cholesterol synthesis, transport, and excretion	Cholesterol	Theoretical lectures Laboratory demonstration	Paper-based exams
16	3+2	Tansamination Assimilation of free ammonia Modification of the carbon skeletons of existing amino acids synthesis of hydroxyproline, hydroxylysine, and selenocysteine	Biosynthesis of the Nutritionally Nonessential Amino Acids	Theoretical lectures Laboratory demonstration	Paper-based exams
17	3+2	Introduction Deamination Urea cycle reactions, regulation, and disposal of urea Metabolic Disorders of Urea cycle.	Catabolism of Protei & of Amino Acid Nitrogen	Theoretical lectures Laboratory demonstration	Paper-based exams
18	3+2	Specific keto acid products of deaminated amino acids	Catabolism of the Carbon Skeletons of Amino Acids	Theoretical lectures	Paper-based exams

		One-carbon units metabolism Metabolic diseases of dmino acids catabolism		Laboratory demonstration	
19	3+2	Conversion of Amino Acids to Specialized Products	Conversion of Amino Acids to Specialized Products	Theoretical lectures Laboratory demonstration	Paper-based exams
20	3+2	Introduction Biosynthesis of Heme: reactions, regulation, and disordes Catabolism of Heme	Porphyrins & Bile Pigments	Theoretical lectures Laboratory demonstration	Paper-based exams
21	**Students' seminars**				

11. 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

100 M total

12. 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#/