

Vice Chancellor for Education, Ahvaz University of Medical Sciences
Center for Studies and Development of Medical Sciences Education

Course Title: Biochemistry Discipline

Field and Degree Level: Medicine - Professional Doctorate

Faculty: Medicine

Course Code: 1121828

Academic Year: 1404-1405

Prerequisite: Molecular and Cellular Biochemistry

Number of Credits: 1.5

Semester: Second Semester (First and Second Half)

Credit Breakdown: 1.5 theoretical credits

Teaching Group:

Class Day and Time: Tuesday and Wednesday, 10:00-12:00

Responsible Instructor: Dr. Babaahmadi

Email:

Office Hours: Every day from 8:00 to 14:00

Overall Course Objectives: By the end of this course, students should be familiar with the importance of oxidative phosphorylation, metabolic pathways of carbohydrates, lipids, amino acids, and non-protein nitrogenous compounds. Students should also understand the quantitative and qualitative changes of molecules and metabolites in clinical manifestations of various diseases related to each metabolic pathway. In this course, students must comprehend the importance of integrated metabolism of the three major nutrients under physiological and pathological conditions.

Specific Objectives:

1. Understanding thermodynamic laws and their application in energy-requiring and energy-yielding biochemical reactions, and the mechanism of oxidative phosphorylation.
2. Appreciating the importance of mitochondria in energy production via the electron transport chain, its inhibitors, and the regulation of the electron transport chain.
3. Understanding the stages of carbohydrate digestion and absorption, pathways of glycolysis, Krebs cycle, glycogenolysis and glycogenesis, gluconeogenesis, pentose phosphate pathway, and metabolism of fructose and galactose.
4. Recognizing the stages of lipid digestion and absorption, various methods of fatty acid oxidation, stages of biosynthesis of fatty acids, triglycerides, phospholipids, and cholesterol.
5. Understanding the structure, isolation methods, and metabolism of various plasma lipoproteins and related disorders.
6. Recognizing the stages of protein digestion and absorption, general reactions of amino acid metabolism, catabolic pathways of branched-chain amino acids and their disorders.
7. Understanding the reasons for ammonia toxicity in the brain, stages of the urea cycle, congenital urea cycle disorders, and types of hyperuricemia.
8. Appreciating the biological importance of porphyrins, stages of heme biosynthesis and its regulation, congenital disorders of heme biosynthesis, stages of heme catabolism, and types of hyperbilirubinemia (jaundice).
9. Understanding the stages of nucleic acid digestion and absorption, metabolic roles of nucleotides, stages of nucleotide biosynthesis and catabolism and related disorders, the role of the thymidylate cycle in cancer chemotherapy, and the role of drugs and chemotherapeutic compounds in nucleotide biosynthesis.

Vice Chancellor for Education, Ahvaz University of Medical Sciences
Center for Studies and Development of Medical Sciences Education

Course Description: In this course, students become familiar with the importance of oxidative phosphorylation and metabolic pathways of carbohydrates, lipids, amino acids, and non-protein nitrogenous compounds under physiological conditions, as well as the role of these pathways in related diseases.

Session	Main Topics (Concepts to be Taught)	Learner Activities	Teaching Method	Instructor Name
First	Bioenergetics and Biological Oxidation	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Babaahmadi
Second	Digestion, Absorption, and Metabolic Pathways of Carbohydrates	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Babaahmadi
Third	Aerobic Metabolism of Carbohydrates and Related Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Babaahmadi
Fourth	Glycogen Metabolism, Gluconeogenesis Pathway, Pentose Phosphate Pathway and Their Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Babaahmadi

Vice Chancellor for Education, Ahvaz University of Medical Sciences
Center for Studies and Development of Medical Sciences Education

Fifth	Digestion, Absorption, and Metabolic Pathways of Lipids and Related Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Salehipour
Sixth	Stages of Fatty Acid Biosynthesis, Ketone Body Metabolism and Related Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Salehipour
Seventh	Cholesterol Metabolism, Bile Salts, Complex Lipids and Related Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Salehipour
Eighth	Metabolism of Lipoproteins and Related Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Salehipour
Ninth	Digestion and Absorption, General Catabolic Reactions of Amino Acids, Urea Cycle and Related Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Igder

Vice Chancellor for Education, Ahvaz University of Medical Sciences
Center for Studies and Development of Medical Sciences Education

Tenth	Specific Catabolic Reactions of Amino Acids, Their Disorders, and Biosynthesis Pathways of Biomolecules Derived from Amino Acids	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Igder
Eleventh	Porphyryn and Bilirubin Metabolism and Related Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Mohammadi Zadeh
Twelfth	Digestion and Absorption, Nucleotide Metabolism and Related Disorders	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Mohammadi Zadeh
Thirteenth	Integration of Metabolic Pathways	Punctual and full-time attendance, active participation in class (attention, participation in discussion, Q&A, etc.)	Interactive lecture (Q&A during teaching), encouraging students for more participation	Dr. Faridi

**Vice Chancellor for Education, Ahvaz University of Medical Sciences
Center for Studies and Development of Medical Sciences Education**

Student Assignments: 1. Answering questions during each teaching session.

Course Assessment Method:

Assignment Score: 20%

Mid-term Exam Score: 40%

Final Exam Score: 40%

Main Course Resources and Ministry-Approved Texts:

Harper's Illustrated Biochemistry (2023)

Medical Biochemistry, Volume 2, Authored by the Authors' Committee of Tehran University of Medical Sciences.