IN THE NAME OF GOD

Isfahan University of Medical Sciences
School of Pharmacy and Pharmaceutical Sciences
Department of Clinical Biochemistry

Course Syllabus: Theoretical Biochemistry 1 for Dentistry Students
Course Designer: Professor Abbasali Palizban

Course name: Theoretical Biochemistry 1 **Semester: First (1405-1406)**
Course number: 311409 **Course Credits: 2**
Field and Level of Study: Doctor of Dental Surgery (DDS)
Number of Students: 10
Student Representative: Aya Srour (Tel:)
Schedule: Mondays, 08:00–10:00
Venue: Shahid Solimani Building
Prerequisite/Corequisite: ***The course is not defined as a prerequisite, but the student must know an introduction to organic chemistry and biology***
Supervisor: Professor Palizban
Office Phone Number: 7044 | Email: palizban@pharm.mui.ac.ir
The course presented by:
Dr Adel Mohammadalipour
Prof Abbas Ali Palizban

Overall Objective of the Course: This course is part of the specialized curriculum for the Doctorate in Dentistry currently implemented at the Isfahan Dental School. It falls under the category of basic sciences (Course Code 8) and is titled "Theoretical Biochemistry 1." The main goals of this course are to enhance students' knowledge and strengthen their scientific foundation and insight for a better understanding of specialized subjects.
Course Design: The course is structured so that students, upon completion, will grasp concepts related to "the structure of biomolecules" that are crucial in biochemical pathways and metabolism. The syllabus is derived from the guidelines issued by the Dental Education Council.
Content Overview:

1. **Introduction to Biochemistry:**
    - Understanding biochemistry and the molecular structure of the human body.
2. **Properties of Water:**
    - Discussion on water properties, pH, and buffers.
3. **Biochemistry of Water:**
    - Metabolism related to water, conditions of acidosis, and alkalosis.
4. **Electrolytes and Blood Chemistry:**
    - Examination of water, electrolytes, and chemical compounds in blood.

5. **Carbohydrates:**
    - Structure and chemical properties of carbohydrates relevant to sugar metabolism and their clinical significance.
6. **Lipids:**
    - Discussion on the structure and chemical properties of lipids, including their classification.
7. **Vitamins and Enzymes:**
    - Overview of the properties and roles of chemical compounds such as vitamins and enzymes in living organisms.

Learning Outcomes: By the end of this course, students are expected to acquire comprehensive knowledge as outlined in the specific objectives. Completion of this course is mandatory for obtaining credits for Biochemistry 2 in Dentistry.

Specific Objectives of the Course: The specific objectives of this course are designed to first familiarize students with the science of biochemistry and its connection to medical sciences, along with relevant definitions. In one or two sessions, new topics in biochemistry related to water and its metabolism, electrolytes, physiological pH, conditions of acidosis and alkalosis, and regulatory pathways will be taught. The role of buffers and their significance in the body will also be covered. Following this introduction, students will delve into carbohydrate metabolism, including the structure and chemical properties of carbohydrates, their classification, and glycosaminoglycans, which are particularly important for dental students. Subsequently, the course will cover the structure, chemical properties, classification of amino acids, and their clinical significance. Further along in the curriculum, discussions will focus on amino acids' role in protein structure, classification, and their clinical importance. A key topic will be introducing students to enzymes—their mechanisms of action and regulatory mechanisms—over several sessions. The Michaelis-Menten equation and the role of competitive inhibitors will also be discussed. For most metabolic pathways, vitamins play a crucial role. This course will briefly outline vitamin classifications, their coenzyme roles in the body, factors affecting their activity, and their importance in health and disease. If additional class time is available and students are present, the course will also address the role of lipoproteins (VLDL, LDL, HDL, Chylomicrons). Finally, students will gain a brief overview of cell membrane structure and cellular exchanges, as well as the structure and chemical properties of nucleotides and nucleic acids, including protein biosynthesis.

Main Sources for the Biochemistry Course: The primary sources for this biochemistry course will include the following textbooks:

1. **Devlin's Biochemistry**
2. **Lehninger's Biochemistry**
3. **Biochemistry for Dental Students**
4. **Strayer's Biochemistry**
5. **Harper's Biochemistry**
6. **Garett and Grisham's Biochemistry**
7. **Lippincott’s Biochemistry**

These texts provide comprehensive coverage of biochemical principles and are designed to meet the educational needs of dental students, ensuring a solid foundation in both theoretical and practical aspects of biochemistry.

Present By:	Subject	Hours	Section	no
Prof. Palizban	Introduction to biochemistry and its importance in medical sciences	2	1	**1**
Prof. Palizban	Biochemistry of water, PH, buffers and the buffering system of the human body	2	2	2
Prof. Palizban	The structure of amino acids and their classification	2	3	3
Prof. Palizban	The Function of Amino Acids	2	4	4
Prof. Palizban	The Structure of Proteins			
Prof. Palizban	Blood Proteins	2	5	5
Prof. Palizban	Enzymes and their classification	2	6	6
Prof. Palizban	The mechanism of Enzyme Action	2	7	7
Prof. Palizban	Enzyme inhibitors and isozymes	2	8	6
	MIDTERM EXAM	2	9	9
Dr. Mohammadalipour	The structure of lipids	2	10	10
Dr. Mohammadalipour	The Lipid classification	2	11	11
Dr. Mohammadalipour	The biochemical properties of Lipids	2	12	12
Dr. Mohammadalipour	Structure of sphingolipids and eicosanoids	2	13	13
Dr. Mohammadalipour	Classification of hormones	2	14	14
Dr. Mohammadalipour	Vitamins B kind and C	2	15	15
Dr. Mohammadalipour	Vitamins, K,E,D and A	2	16	16
Dr. Mohammadalipour	Blood enzymes	2	17	17
Dr. Mohammadalipour	Membrane transfers	2	18	18

Assessment Structure:A) During the Course:

- Quizzes + Midterm Exam: **40%** (8 out of 20 points)

B) End of Course:

- Quizzes + Final Exam: **60%** (12 out of 20 points)

Policy on Attendance and Punctuality:

1. **Late Arrivals:** Any delay will be considered as an absence.
2. **Absences:** Student absences will be managed according to current educational regulations.

This structure emphasizes the importance of consistent attendance and participation in class, as well as the need for timely arrival to maximize learning opportunities.