Jerash University
Faculty of pharmacy

Course Syllabus

Course Title: Pharmaceutical Biochemistry I	**Course code: 1101214**
Course Level: 2nd year	**Course prerequisite:** **Pharmaceutical Organic Chemistry I**
Lecture Time: S + T 09:30-11:00	**Credit hours: 3 hrs**

Name	Rank	Office Number	Office Hours	E-mail Address
Dr. Jalal Aljamal	**Full Professor**	**411**	**12:30 – 13:30**	

Course module description:

Pharmaceutical biochemistry I, an introduction to the structure and function of biological molecules, is designed to study the molecules and macromolecules in living systems through an application of the principles of organic and physical chemistry as well as biology and genetics. This will include an examination of the structure of these molecules in detail in order to understand how their unique chemical and physical properties contribute to their biological function.

After an introduction to the basic concepts of biochemistry, the structure and function of proteins will be discussed. Special attention will be given to the methods and techniques of biochemistry and their application to proteins and nucleic acids. In order to illustrate these principles, a number of specific proteins will be discussed in detail.

The structures, specificities and mechanisms of action of selected enzymes will illustrate the enormous diversity of this group of catalytic molecules. The mechanism of action of a few enzymes will be studied in detail and general theories for the kinetic analysis of both single substrate and multi-substrate enzymes will be developed.

The structure and function of the nucleic acids will be discussed in some detail and the association of nucleic acids with proteins will introduce these important macromolecular interactions. Higher levels of organization of the genetic material will be introduced and the mechanism of DNA replication, repair, and recombination will be studied. A very brief introduction to transcription and RNA processing, translation and gene regulation will be presented.

Course module objectives:

The course is taught as an integrated view of the fundamentals of biochemical processes and cellular structure and function. At the end of the course the student will have a basic understanding of the structure of biological macromolecules and molecular composition and function of the major subcellular organelles. Emphasis will be on structure/function relationships and an appreciation of the dynamic aspects of cell organization will be fostered. The implications for drug chemistry and biochemistry will be underlined throughout the course.

Course components

- **Books**

Lehninger Principles of Biochemistry, Fourth Edition by David L. Nelson, Michael M. Cox Publisher: W. H. Freeman; latest edition

In addition to the above, the students will be provided with handouts by the lecturer.

Students will be expected to give the same attention to these references as given to the Module textbook.

Principles of biochemistry with a human focus, Garrett, Reginald H. Grisham, Charles M., latest edition

BOHENSKI Modern Concepts in Biochemistry latest edition , Robert C. Bohenski, Prentice Hall, Englewood Cliffs, New Jersey. latest edition

Biochemistry Stryer, by Freeman latest edition

Teaching methods:

Lectures and discussions

Learning outcomes:

At the end of this module, student will be able to:

- Understand the organization of human cells and the structure and function of different cellular components.
- Appreciate the relationship between bio-molecule structure and biological function.
- Know the major principles of protein synthesis.
- Know the structure and organization of DNA and RNA in cells and their role in cell growth and replication.
- Understand the application of recombinant DNA technology in medicine.
- This course should expand your problem solving skills. Scientists ask questions and solve problems. Many of you will do work that requires you to solve problems that do not have already known solutions. This will require you to apply concepts learned in one context to a new situation. Problem solving requires logic, organization, and synthesis, and it is a skill, like any other, that improves with practice. I will mentor you in this skill by giving you problems as homework, by asking you to pose questions and experiments in class.

- By the end of the course successful students who have attended regularly and completed required work will recognize the applicability of biochemistry to the careers to which they will be progressing.

Assessment instruments

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**20%**
Second examination	**20%**
Final examination: 50 marks	**40%**
Quiz	**20%**
Total	**100%**

Attendance policy:
Absence from lectures shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Expected workload:
I estimate it will require a minimum of 2 hours/credit hour/week outside class time to pass this course.

Documentation and academic honesty

All University policies regarding academic integrity apply to this course. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor.

Course academic calendar

Week	Basic and support material to be covered	Homework/reports /quizzes and their due dates
(1)	Course Introduction Protein Structure and Properties.	
(2)	Protein Structure and Properties.	**2nd Week**
(3)	Protein Folding.	
(4)	Mechanisms of Enzyme Catalysis.	**4th Week**
(5)	Enzyme Inhibition and Inactivation Reversible Enzyme Inhibitors Selected Examples of Competitive Reversible Inhibitor Drugs.	
(6) **First examination**	Irreversible Enzyme Inhibitors. Selected Examples of Drug Inactivators. Natural Regulation of Enzymes. Enzyme Therapy.	
(7)	Biological Membranes. Carbohydrates and Lipids as Components of Biological Membranes.	
(8)	Receptor Structure. Drug-Receptor Theories. Principles of Receptor Classification.	**8th Week**
(9)	Intracellular Signal Transduction Ion Channels	
(10)	Voltage Dependent Channels. Ligand Gated Channels	
(11) **Second examination**	Ligand Gated Channels Receptor Mediated Endocytosis.	
(12)	DNA Structure and Properties. DNA Biosynthesis. DNA Repairing.	
(13)	RNA Biosynthesis. RNA Processing. Genetic Code. Single Point Mutation.	**13th Week**
(14)	Protein Biosynthesis. Activation, Initiation, Elongation and Termination.	
(15)	Principles of Recombinant DNA. Polypeptide Production by Recombinant DNA Technology.	
(16)	Final Exam Week	