Department of Chemistry

College of Education

University of Salahaddin

Subject: Introduction to Biochemistry

Course Book – (Year 2) (Semester I)

Lecturer's name: Lutfia Muhamad Hassan

Academic Year: 2023/2024

Course Book

1. Course name	**Biochemistry**
2. Lecturer in charge	**Assistant Prof.Lutfia Mohammad Hassan**
3. Department/ College	**Chemistry/ Education**
4. Contact	**e-mail: lutfia.hassan@su.edu.krd** **Tel: 0750 4824623**
5. Time (in hours) per week	**Theory: 2** **Practical: 9**
6. Office hours	**Tuesday: 9am-1pm**
7. Course code	
8. Teacher's academic profile	**Educational background:** 1980- 1981: B.sc in chemistry, college of Education, university of Sulemanyia. 2000-2001: M.sc in Clinical Biochemistry, College of Education, University of Salahaddin. **Academic experience:** Since 2004, I have worked asa teaching staff at the University of Salahaddin, and started teaching Biochemistry for undergraduate students in the department ofChemistry, college of Education. It includes both theoretical and practical areas. In addition, during this time I havepublished certain publications. **Skills and professions:** Throughout my previous experience in the field, I have acquired the skills for working in accordance to the provided curriculum, and to obtain the important information to my students. Also, I have got researchexperiences in the field of Biochemistry.

9. Keywords	

10. Course overview:

This course will introduce student to the discipline of biochemistry and provide a foundation for understanding the chemistry of biological systems. We will discuss the structure and function of proteins, nucleic acids, lipids, carbohydrates and the chemical nature of genetic information storage and transmission. In this course, student will become familiar with the structure and function of biological molecules that are important to living things

11. Course objective:

To Provide an in depth understanding of modern biology in terms of biochemistry, and the state of the art technological developments and their applications in metabolomics, genomics, proteomics, bioinformatics, clinical research, developmental biology and allied research and development domains. To hone practical skills, encourage intuitive and analytical skills, and research aptitude in order to prepare students for careers in research and development, academia and Pharma, biotech-based industries, and food processing industries

12. Student's obligation

Sure, students play a significant role throughout the course. Based on that, there is a kind of deal between us, that all the students are obliged to attend the classes, both the theoretical and practical in the lab, during the academic year. However, they are frequently allowed not to attend the class, in in some urgent cases. Additionally, students are encouraged to see and ask me for clarifications during my office hours. Due to the previous experience, the student which has a regular attendance and look for more detailed clarification, are obtained a better result than those do not.

Additionally, all the exams, assignments and reports are obligatory required from the students during the academic year 2022/2023. Since they help to evaluate the students' achievements during the course and show the area of weakness of individual that need to be developed throughout the course.

13. Forms of teaching

During the classes, different equipments are used. For example, showing the information through power point slides by data show and sometimes the white board is used as well for giving more clarification and details to the students.

14. Assessment scheme

There will be a variety of assessments consisting of homework, presentations, and in-class assessments,

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Marking System

The grades for each piece of assessed work are as follows:

- 90-100 % is excellent
- 80-89% is very good
- 70-79% is good
- 60-69% is a moderate pass
- 50-59% is a pass

15. Student learning outcome:

Following successful completion of this course, each student should be capable of scholarly discussions of the following topics:

- the general principles of the biochemistry and
- of energy flow in biological systems,
- the chemical structures and function of the various classes of biomolecules
- the molecular basis of genetics and gene expression,
- chemical processes that occur in the human body, and
- examples of the relevance of biochemistry in today's society
- effectively communicate biochemical information in oral and written form.

- Describe the properties that make oxygen gas a strong oxidation and explain its role in metabolism.
- Recognizing the basic structures of macromolecules suchas lipids, nucleic acids, carbohydrates, also they will be able to identify their functional groups, and describe their utilization within cells.

- Identifying the 20 amino acids and describe the key chemical characteristics of each amino acid.
- Explaining the primary, secondary, tertiary, and quaternary structures for proteins.

16. Course Reading List and References:

The relevant sources to this course are:

1. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan Worth Publishers.

2. Harper's Biochemistry-Rober K. Murray, Daryl K. Grammer, McGraw Hill, Lange Medical Books. 25th edition.

3. Fundamentals of Biochemistry-J.L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.

4. Biochemistry-Dr. Amit Krishna De, S. Chand & Co., Ltd.

5. Biochemistry-Dr. Ambika Shanmugam,

Published by Author.

6. Biomolecules-C.Kannan , MJP Publishers,Chennai-5

Online at http://www.ncbi.nlm.nih.gov

- https://www.bio.cmu.edu/courses/BiochemMols/TCACycle/TCAMain.htm

17. The Topics:	Lecturer's name
This course include 14 units: **Unit 1: Carbohydrates** **UNIT-I:** Carbohydrates Classification of carbohydrates, stereo isomerism and optical isomerism of sugars, anomeric form and mutarotation. Occurrence, structure and biological importance of mono, di and polysaccharides (esp. starch, glycogen and cellulose). Reaction of	Assistant Prof .Lutfia

Carbohydrates due to the presence of hydroxyl, aldehyde andketone groups.

UNIT-II: Proteins

Classification and structure of amino acids based on structure. Introduction, classification of proteins based on solubility, size and shape. Structure of proteins - primary, secondary, tertiary and quaternary.

UNIT-III: Lipids

Lipids Introduction, definition, classification and functions of Lipids - simple lipids, compound lipids - phospholipids (esp. lecithin cephalin, phospotidyl inositol and phospotidyl serine) and derived lipids - steroid (cholesterol).

UNIT-IV: Nucleic acids

Nature of genetic material, structure of purine and pyrimidine nucleotides. Composition of DNA and RNA-Watson crick model of DNA. Types of nucleic acid (DNA and RNA). 12 B.Sc. Biochemistry: Syllabus (CBCS) ` Properties of nucleic acids-Tm, denaturation and renaturation, hypo and hyper chromicity

UNIT-V:

Vitamins Dietary Sources, deficiency manifestation and biological functions of fat soluble and water soluble vitamins.

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	(2 hrs)
	(2 hrs)
	(2 hrs)
	(2 hrs)

	(2 hrs)
18. Practical Topics (If there is any)	
	AssitantProf.Lutfia

19. Examinations:

1. Compositional:

Q/ What are the water soluble vitamins?

The answer: water soluble vitamins are: vitamin B complex and vitamin C.

2.True or false type of exams:

Q/ Enzymes are protein in nature.

The answer is (T)

3. Multiple choices: choose the best answer

Q/ the following is not a polyunsaturated fatty acid

a. linoleic acid.

b. palmitoleic acid.

c. linolenic acid.

d. arachidonic acid.

The answer is b.

20. Extra notes:

21. Peer review

Dr. parween Abdulsamad