



**Faculty of Science  
Department of Chemistry**

**Biochemistry  
(30206322)**

**Lecturer: Dr. Da'san M. M. Jaradat**

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### **Course Objectives**

Biochemistry is a multidisciplinary science. This course aims at introducing the students to the basic concepts of Biochemistry. This course begins with providing necessary background to connect biochemistry to other sciences. Next, it focuses on proteins; indeed on their building blocks (amino acids), their structural organizations and their functions as biocatalysts (enzymes). This is followed by an introduction to techniques used to purify, isolate, and characterize macromolecules (proteins). An overview on carbohydrates and lipids is discussed as well. Next, introduction to metabolism and the central dogma of molecular biology is covered.

### **Textbooks**

- 1- Bettelheim, Brown, Campbell and Farrell, Introduction to Organic and Biochemistry, 7<sup>th</sup> Edition (Brooks/Cole, Cengage Learning, CA 94002-3098 USA, 2010).
- 2- Campbell and Farrell, Biochemistry, 6<sup>th</sup> Edition (Brooks/Cole, Thomson Higher Education Davis Drive Belmont, CA 94002-3098 USA, 2009).
- 3- John McMurry, Organic Chemistry, 8<sup>th</sup> Edition, (Brooks/Cole, Cengage Learning, CA 94002-3098 USA, 2012).

### **Assessment System**

Laboratory:	25%
Midterm exams:	40%
Final Exam:	35%

Academic Honesty: In accordance with University policy anyone caught cheating will fail the course.

### **Course Outline**

Topic	Chapter Number
1: Biochemistry and the Organization of Cells	Ref. 2 (Chapter 1)
2: Water: The Solvent for Biochemical Reactions	Ref. 2 (Chapter 2)
3: Proteins & Enzymes	Ref. 1 (Chapters 14 & 15)
4: Protein Purification and Characterization Techniques	Ref. 2 (Chapter 5)
5: Carbohydrates	Ref. 1 (Chapter 12)
6: Lipids	Ref. 1 (Chapter 13)
7: Biomolecules: Nucleic Acids	Ref. 3 (Chapter 28)
8: The Organic Chemistry of Metabolic Pathways	Ref. 3 (Chapter 29)



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**Lab. of Biochemistry  
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### Course Objectives

The purpose of this laboratory is to get hands-on experience with modern methods of separation, identification, and study of biomolecules and macromolecular structures. It will strengthen your understanding of material taught in Biochemistry (30206322). You will do experiments with biomolecules such as proteins, sugars, lipids, and nucleic acids.

### References

- 1- **Modern Experimental Biochemistry** by Rodney Boyer, 3<sup>rd</sup> Edition Copyright © 2000 (Addison Wesley Longman Inc, San Francisco, CA 94111).
- 2- **Introduction to Practical Biochemistry** by G. Hegyi, J. Kardos, M. Kovács, A. Málnási-Csizmadia, L. Nyitray, G. Pál, L. Radnai, A. Reményi, I. Venekei Copyright © 2013 ELTE Faculty of Natural Sciences, Institute of Biology.
- 3- **Physical Biochemistry Laboratory Manual**, by Zaenab Alzahrani, 2010, KSU – College of Science – Department of Biochemistry

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### Experiment Outline

Experiments	Week
Safety consideration & Introduction to the Laboratory	1
Preparation of Buffer Solutions	2
Acid – base properties of amino acids	3
Protein project: (Protein isolation, protein purification by chromatography, SDS-PAGE Electrophoresis, protein determination (Bradford method))	4,5,6,
Enzymatic Assays	7
Carbohydrate Chemistry	8
Lipid Chemistry	9
Nucleic Acids Project (DNA extraction, Polymerase Chain Reaction (PCR), and Agarose Gel Electrophoresis)	10,11,12
Final Exam	13