



Department of: Chemistry

College of: Education

University of: Salahaddin

Subject: Biochemistry

Course Book – (Year 3 Chemistry)

Lecturer's name: Dr. Zeyan Abdullah Ali

Academic Year: 2023/2024

Course Book

1. Course name	Practical biochemistry
2. Lecturer in charge	Dr. Zeyan Abdullah Ali
3. Department/ College	Chemistry/Education
4. Contact	e-mail: zeyan.ali@su.edu.krd Tel: (optional):07500464540
5. Time (in hours) per week	Practical: 4
6. Office hours	10
7. Course code	
8. Teacher's academic profile	<p>Since 1989, I worked as a chemical assistant in chemistry department/ Education college. I obtained MSc in 1994 in the field of natural products in Education College/ Saladaddin University at 1994, and published a number of scientific papers in the field of organic chemistry. I completed Ph.D in the field of clinical biochemistry in Ibn Al- Haitham college/ Baghdad University at 2006 and I published a number of scientific papers in the field of clinical biochemistry. I obtained Assistant Professor in 2010. The fields of my research interests are oxidative stress and prenatal biochemical screening.</p> <p>The objectives that I had taught: Analytical Chemistry, Organic Chemistry, Biochemistry, Natural Product, Phytochemistry/ undergraduate students.</p> <p>Natural Product, Clinical biochemistry, Metabolism and its regulation, Plant biochemistry, and Advanced biochemistry/ M.Sc. students.</p> <p>Currently I'm working in chemistry department and I'm supervisor for four M.Sc students.</p>
9. Keywords	Carbohydrate ,Lipid, Protein, Enzyme, and Vitamin
10. Course overview: <p>Biochemistry can be defined as the science concerned with the chemical basis of life. The cell is the structural unit of living systems. Thus, biochemistry can also be described as the science concerned with studying the various molecules that occur in living cells and organisms and with their chemical reactions.</p> <p>Biochemical reactions are involved in such areas as breaking down food molecules, generate and store energy, buildup new biomolecules, and eliminate waste. Some biomolecules are small and have only a few functional groups others are big and contain a large number of functional groups. The principal classes of biomolecules are carbohydrates, lipids, Proteins, enzymes, and vitamins. This course provides fundamental concepts in clinical biochemistry. Primary topics include identification, the structures, and properties of carbohydrates, lipids, amino acids, proteins and vitamins. The enzyme kinetics, inhibition, and the purification of enzymes are also addressed. Also provides fundamental concepts in clinical biochemistry which include analysis of blood and evaluation the activity of some enzymes which are present in our body and effect on heart, kidney, and liver.</p>	

4. Provide an introduction to the chemical and biochemical literature and the Library.
5. Provide an introduction to preparing scientific reports and documents.
6. Also Student's independent work
7. Student's preparation for a seminar

16. Course Reading List and References:

1. Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer, Biochemistry, 5 th edition, W.H. Freeman and Company, New York, 2004.
2. Devlin T.M., Textbook of Biochemistry with clinical correlations, 6 th edition, Wiley-Liss A John Wiley & Sons, Inc., Publication, 2006.
3. Champe P.C., Harvey R.A., and Ferrier D.R., Lippincotts illustrated reviews Biochemistry, 3 rd edition, Lippincott Williams & Wilkins, 2011.
4. Murray R.K., Granner D.K., Mayyes P.A., and Rodwell V.W., Harpers illustrated biochemistry, 26 th edition, The McGraw-Hill Companies, 2003.
5. Shivananda Nayak B., Manipal Manual of clinical biochemistry, 3 rd edition, Jaypee brothers Medical publishers, New Delhi, 2007
6. Shivaraja Shankara, Laboratory manual for practical biochemistry, Jaypee brothers Medical publishers, New Delhi, 2008.

17. The Topics:**Lecturer's name****18. Practical Topics (If there is any)****First semester**Dr. Zeyan
Le. Hemin

Week 1: An Introduction to the biochemistry.

Week 2: Identification Tests of carbohydrates: (Molisch test for Carbohydrates, Benedict's Test for Reducing Sugars, Barfoed's Test for Monosaccharides, Seliwanoffs Test for Ketoses, Bial's Test for Pentoses.

Week 3: Iodine Test for polysaccharides.

Week 4: Hydrolysis of polysaccharides.

Week 5: Identification Tests of lipids.

Week 6: Acrolein Test for free and esterified glycerol, Dunsten's test for free glycerol, Cupric acetate test for free fatty acids.

Week 7: Test for Cholesterol (Salkowski test, Liebermann- Burchard test.

Week 8: Kreis test for rancid fats or oils.

Week 9: Determination of saponification number

Week 10: Determination of Iodine number

Week 11: Identification Tests of amino acids and proteins. Ninhydrin test for amino acids and proteins, Biuret test for peptides and proteins, Xanthoproteic test for aromatic amino acids containing phenyl groups, Glyoxylic acid test for amino acids which have the indole groups, Pauly's test for the imidazole group, Sakaguchi test for guanidino group.

Week 12: Lead acetate Test test for S-S and SH, Nitroprusside test for SH group.

Week 13: Precipitation of proteins. Precipitation by heavy metals, Precipitation by acidic reagent, Precipitation by concentrated metal,

<p>Precipitation by ethanol, Precipitation by salts, Half saturation, Full saturation, Denaturation of protein.</p>	
<p>19. Examinations: Q1/ Explain how you can distinguish between 1- Monosaccharide and disaccharide 2- Pentose and hexose sugar 3- Starch and glucose 4- Galactose and mannose 5- Glucose and fructose Q2/ put true or false: 1- Reducing sugar is a sugar which has free carbonyl group. 2- Ribose gives positive with benedekit test. 3- Tyrosine give negative with sakagushe test Q3/ Choice the correct answer: 1- Hydrolysis of polysaccharides obtained by: a- Iodine test b- Benedict test c-Selewanof test d- Bial test Q4/ Define: 1- Non reducing sugar 2- Polysaccharides 3- Acid hydrolysis of starch</p>	
<p>20. Extra notes:</p>	
<p>21. Peer review</p>	