



Department of: Chemistry

College of: Education

University of: Salahaddin

Subject: Biochemistry

Course Book: (Year 3)

Lecturer's name: Dr. Zeyan Abdullah Ali

Academic Year: 20203/2024

Course Book

1. Course name	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)
5. Time (in hours) per week	Theoretical:2, Practical: 3
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. I was a supervisor for two Masters students.</p> <p>Currently I'm working in chemistry department</p>
9. Keywords	
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.</p> <p>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.</p>

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.

11. Course objective:

Upon successful completion of this course, the students will be able to:

Know the principles of some biomolecules like carbohydrates, lipids, amino acids, proteins, enzymes, vitamins, and nucleic acids

12. Student's obligation

1. Student is expected to attend all lecture, laboratory classes, reports, seminars and intermediate assessments on time, be prepared for and participate in discussion during seminars and laboratory classes.
2. Students are expected to perform all the practical's mentioned in the syllabus.
3. It is beneficial to read and understand the lecture before the seminars and laboratory classes.
4. Students must be turn off cell phones, talking and speaking, and drinking or eating are not permitted during laboratory class.

13. Forms of teaching

Different forms of teaching will be used to reach the objectives of the course: power point presentations and by using white board for explanation of concepts the principle and the reaction of some biomolecules.

Every week before the lecture day, I will be given Digital copy of each lecture to students to obtain hard copy and to read the lecture before the classes.

14. Assessment scheme

The students are required to do two examinations at the mid of the semester (75 degree) in addition to the final examination. Also the student must be do the following activity:

Quiz every week (5 degree)

Seminars (10 degree)

Report (10 degree)

15. Student learning outcome:

Upon successful completion of this course, the students will be able to:

Know structures, and chemical properties of macromolecules such as carbohydrates, lipids, amino acids, proteins, enzymes, vitamins and nucleic acids

16. Course Reading List and References:

Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer, Biochemistry, 5th edition, W.H. Freeman and Company, New York, 2004.

Lehninger's Principles of Biochemistry, Nelson D.L., and Cox M.M., CBS Publishers and distributors, 4th edition, 2005.

Mathews, Van Holde, and Ahern, Biochemistry, 3rd edition, 2003.

Murray R.K., Granner D.K., Mayyes P.A., and Rodwell V.W., Harpers illustrated biochemistry, 26th edition, The McGraw-Hill Companies, 2003.

Danniston, Topping, and Caret, General, Organic, and Biochemistry, 4th edition, The McGraw-Hill Companies, 2003.

Jain J.L., Fundamentals of Biochemistry, S.Chand & Company LTD., 2002.

Champe P.C., Harvey R.A., and Ferrier D.R., Lippincott's illustrated reviews Biochemistry, 3rd edition, Lippincott Williams & Wilkins, 2005.

Chatterjea M.M., and Shinde R., Textbook of Medical Biochemistry, 7th edition, Jaypee brothers Medical Publishers(P) Ltd, New Delhi, 2007

Garrett R.H., and Grisham C.M., Biochemistry, 3rd edition, Thomson Brooks/Cole, 2005.

Devlin T.M., Textbook of Biochemistry with clinical correlations, 6th edition, Wiley-Liss A John Wiley & Sons, Inc., Publication, 2006.

Vasudeven D.M., and Sreekumari S., Textbook of Biochemistry, 5th edition, Jaypee brothers, New Delhi, 2007.

Voet J.G., and Voet D., Biochemistry, 3rd edition, John Wiley & Sons, Inc., 2004.

McKee and McKee, Biochemistry, an Introduction Wm. C. Brown Publishers, 1996.

Naik P., Biochemistry, Jaypee brothers Medical Publishers (P) Ltd, New Delhi, 2007.

Sheety B.V., Nandini M., and Pai V.R., Biochemistry for physiotherapy and allied Health Sciences Students, Jaypee brothers Medical Publishers (P) Ltd, New Delhi, 2008.

17. The Topics:	Lecturer's name
<p>Week 1: Enzymes, Proteins nature of enzymes, Properties of enzymes, Localization of enzymes, Mechanism of enzyme action, Models of enzyme-substrate complex formation, Lock and key models (Rigid template model or Emil Fisher), Induced fit model (Koshland model). Enzyme Nomenclature, Specificity of enzyme action (Absolute specificity, Group specificity (non-absolute specificity), and Stereo specificity).</p> <p>Week 2: Cofactors and Coenzymes, Isoenzymes or isozymes, Zymogene (proenzymes), Enzyme unit.</p> <p>Week 3: Factors affecting the velocity of enzyme reaction, Substrate concentration, Enzyme concentration, Temperature, Effect of PH. Inhibitors, Competitive inhibitions, Non-competitive inhibition, Un competitive inhibition</p> <p>Week 4: Vitamins: Fat-soluble vitamins: Vitamin A, Deficiency of vitamin A, Toxicity of vitamin A, Vitamin D, Deficiency of vitamin D, Toxicity of vitamin D.</p> <p>Week 5: Vitamin E, Deficiency of Vitamin E, Toxicity of vitamin E, Vitamin K, Deficiency of Vitamin K.</p> <p>Week 6: Water-soluble vitamins: Vitamin C, Deficiency of Vitamin C, B- Complex vitamins, Thiamine (vitamin B1), Deficiency of thiamine, Riboflavin (vitamin B2), Deficiency of riboflavin, Niacin, Deficiency of niacin, Vitamin B6 (pyridoxine), Deficiency of vitamin B6.</p>	<p>Dr. Zeyan A. Ali</p>

<p>Week 7: Pantothenic acid, Pantothenic acid, Deficiency of pantothenic acid, Biotin, Deficiency of biotin, Lipoic acid, Deficiency of lipoic acid. Folic acid, Deficiency of folic acid, Vitamin B12 (cobalamine), Deficiency of vitamin B12.</p> <p>Week 8: Nitrogenous bases of DNA&RNA (Purine bases and Pyrimidine bases), Pentose sugar, Nucleosides, Nucleotides, Functions of nucleotides.</p> <p>Week 9: Nucleic acids, the structure of DNA, Functions of DNA, Ribonucleic acids, Types of RNA, Messenger RNA, Transfer RNA (tRNA), Ribosomal RNA (rRNA).</p> <p>Week 10: Synthesis of protein (part1).</p> <p>Week 11: Synthesis of protein (part2).</p>	
18. Practical Topics (If there is any)	Lecturer's name
19. Examinations:	
20. Extra notes:	
21. Peer review	