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**Department of Chemistry**

**College of Science**

**University of Salahaddin**

**Subject: Biochemistry**

**Course Book – 3rd stage**

**Lecturer's name: Dr Najat Zaid Mohammed, Jian Lateif Hussen, Dr Dotsha Jaleel Raheem**

**Academic Year: 2024/2025**

**Course Book**

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| **1. Course name** | **Biochemistry**  |
| **2. Lecturer in charge** | **Dr Najat Zaid**  |
| **3. Department/ College** |  |
| **4. Contact** | **e-mail: najat.mohammad@su.edu.krd****Tel: 00964-750-4553147** |
| **5. Time (in hours) per week**  | **Theory: 3**  |
| **6. Office hours** | **Sunday 11:30 – 02:30** |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | **Background**BSc in Chemistry from College of Science - Salahaddin UniversityMSc in Organic Chemistry –College of Science – Baghdad UniversityPhD in Chemistry-School of Chemistry – Bangor University-UK**Research interests*** Synthesis of heterocyclic organic compounds with possible biological activities
* Plant chemistry (natural product isolation and structural elucidation) and their quantitative analysis.
* Ecological aspects of plant chemicals. Interactions resulting from these chemicals with other organisms (plants, insects and microorganisms) in a specific ecological niche.

**Website**[**https://sites.google.com/a/su.edu.krd/dotsha-j-raheem-2017/**](https://sites.google.com/a/su.edu.krd/dotsha-j-raheem-2017/)**Researchgate:** [**https://www.researchgate.net/profile/Dotsha\_Raheem**](https://www.researchgate.net/profile/Dotsha_Raheem) |
| **9. Keywords** | **Practical Biochemistry, Enzyme, Immobilization, Clinical** |
| The general aim of this course is to equip students with knowledge and skills to develop and understand principle of biochemistry and the methods which use in practical biochemistry.- It is important to learn what is the practical biochemistry and its relation to their live.-they will understanding the principle of carbohydrate, lipids , proteins, enzymes, Vitamins and many other techniques in practical biochemistry like electrophoresis, separation methods of protein, denaturation of protein and they will take Sufficient knowledge and understanding working in bio lab or clinical biochemistry lab in future in hospital or private |
| **11. Course objective:**After this course and Upon completing this course, students should understand the basic concepts* and practices of contemporary experimental biochemistry. A successful student will learn how to keep a laboratory notebook and prepare laboratory reports in the style of a biochemical journal, and have practical experience in the fundamental biochemical techniques that would be expected of a student applying to quantities and qualitative experiments in carbohydrates, lipid, protein and enzymes. And some techniques form the foundation for many of the experiments of a contemporary
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| **12. Student's obligation*** Lack of attendance and tardiness to class are unacceptable practices for laboratory courses. Obviously unforeseen events can lead to absenteeism and/or tardiness, but those instances are expected to be rare. So, please report to class on time! Due to limitations in support personnel and materials/supplies, opportunities to make up missed laboratory experiments will not be feasible. If a student is absent for any reason, he/she should email Dr. Peek and the teaching assistant as soon as possible. Late assignments will only be accepted at the discretion of the instructor.

Weekly report:- The purpose of the laboratory report is to communicate experimental work in writing. The educational goal is to help students learn and practice expressing their ideas and describing their work in a professional manner.- Homework assignments will be given to students.-PROJECT PRESENTATION some time will done- LABORATORY NOTEBOOK MAINTENANCE* All experimental data, except instrument output, should be recorded in indelible ink in a bound laboratory notebook with pre-printed sequential page numbers. Students should sign the notebook on the last page of that day’s experiment. Do not leave blank pages in a laboratory notebook. A lab notebook should include protocols, identification of samples, observations, and data. Record data and observations as you obtain or make them. Do not write on scraps of paper with the intention of transferring information to the lab notebook later. Do not worry if your notebook is a little messy. The recording and organization of a permanent record of laboratory observations is as important a technique to master as any of the experimental methods
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| **13. Forms of teaching**Forms of teaching utilized in this course include:* Power point presentations
* Practice texts including research articles and review papers
* Class discussions and student presentations
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| **14. Assessment scheme**The overall grading is 15% and distribute as in this scheme for this course is as follows:1% Laboratory Reports3% Laboratory Performance and Notebook Maintenance1% Homework and quiz5% tow Mid exam and15% Final Examinations ‌ |
| **15. Student learning outcome:**Upon completing this course, students should understand the basic concepts and practices of* contemporary experimental biochemistry. A successful student will learn how to keep a laboratory notebook and prepare laboratory reports in the style of a biochemical journal, and have practical experience in the fundamental biochemical techniques. Also they will learn how to do clinical test because it is important to their future work in hospital and bio lab.
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| **16. Course Reading List and References‌:**▪ Key references: * Practical biochemistry, analytical biochemistry, enzymes. Clinical biochemistry

▪ Useful references: Analysis of Lipids practic detail: analyticaltechniquesinbiochemistbyrajankatoch▪ Magazines and review (internet): highwire press web siteThe journal of biological chemistryEnzyme journals |
| **17. The Topics:** | **Lecturer's name** |
| They are divided to the blocks{ B 1 } : Carbohydrates1- Libratory roles and safety………………………………..…..…………..1st week2- Molisch,s test………………………………….………………………….…. 2nd week3- Reactions of reducing sugars including………………………….....3rd week.4- Test for individual carbohydrates including................................................................................... 4th week5-The hydrolysis of polysaccharides…………………………………….. 5th week6- identification of an unknown carbohydrate…………………..… 6th weekIt is examination about the carbohydrates by using the scheme{ B2 } Chemical And physical properties of amino acids and proteinsQualitative tests1- The solubility of amino acids………………………………………….….7th week2- Ninhydrin reaction3- Xanthoproteic reaction………………………………………..………….. 8th week4-The Biuret test for peptide bonds5- Denaturation and Precipitation of portions including5:1- by heat and Heavy metal ……………………………………………...9th week5:2- by Precipitation of protein by ammonium sulfate ……….10th week5:3- Denaturation of protein by organic solvents……………….. 11th week-----------------------------------------------------------------------------------------{B 3 } : LIPIDS AND MEMBRANESQualitative tests for Lipids……………………………………..….……...12th week1-The solubility of lipids2-Grease test3-Tests for unsaturated fatty acids4-Tests for triacyl glycerol……………………………….…………………..13th week5- Tests for cholesterol1.Lieberman test2. Salkowaski testQuantitative Analysis of Lipids1- The determination of the peroxide value of a fat …..……….14th week1. Determine the rancidity in the fat2. Determine the peroxide value in fat2- The determination of the acid value of a fat……………………..15th weekExam in the B1,B2,B3………..………………………………….…………...16th week-----------------------------------------------------------------------------------------------{ B4 } : ENZYMES1- Enzymes classification ……………………………..………………….….17th week1. Catalase by using H2O2 which is act as substrate …..18th week2. Peroxidase by using 4 amino antipyrine reagent ……..19th week3. Polyphenol oxidase by using catechole ………………….20th week2- factors affecting the rate of the enzyme activity1:Temperature ……………………………...………………………………. 21th week2: pH ………………………………………………………………………………..22th week2: Substrate concentration…………………………….…………………23th week3- Determination of ascorbic acid …...............................……..24th week4- Dialysis and separation of large molecule ……………………. 25th week5- electrophoresis ……………………………………………………………..26th week----------------------------------------------------------------------------------------- Clinical Chemistry Assay-{ B5 }1. Blood sugar test …………………………………... 27th week2. Blood Cholesterol……………...................……………28th week.-{B6 }: Total protein …….....................................29th weekBilirubin test .................................................................... 30th week Practical examination in general tests…………………………….…..31th week | Dr Najat Shwani ex: (3hrs) |
| **18. Practical Topics (If there is any)** |  |
| 1- Carbohydrates w1-62- Lipids w6-103- Proteins w10-13 | Dr Najat Shwany, Jian Lateif, Dr Dotsha Jaleel |
| **19. Examinations:****Exam questions can include a combination of the following:*** **Definitions of terms**
* **Explanation and reasons for given statements**
* **Gap filling**
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| **20. Extra notes:** |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ** ‌‌  |