Detailed Course Description - Course Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-3.0E

Faculty	Pharmacy	Department	Pharmacy
Course number	0201314	Course title	Pharmaceutical Biochemistry Laboratory
Number of credit hours	1	Pre-requisite/co-requisite	Pharmaceutical organic chemistry laboratory (0201212)

Brief course description

This practical course includes different chemical tests used to detect, differentiate and identify the properties of different types of carbohydrates, proteins and lipids. It also includes experiments that detect enzymes activity and factors affecting it.

The theoretical principles and the experimental procedures of each assay are demonstrated. Each experiment is assessed by a short report showing the obtained results and their interpretation based on the theoretical basis of the assay.

	Course goals and learning outcomes
Goal 1	To be able to detect proteins & know the factors affecting their solubility using simple colorimetric and solubility tests.
Learning outcomes	1.1) Being able to detect proteins, using general and specific tests, with understanding the underlying principle of each test. 1.2) Recognizing the factors affecting protein solubility using solubility tests, with understanding the underlying principle of each test.
Goal 2	To be able to detect enzymatic reactions and know the factors affecting them using simple enzymatic tests.
Learning outcomes	2.1) Being able to detect enzymatic reactions using "catalase" as an example, with its two types of catalase enzymatic reactions; the catalytic and the peroxidative type. 2.2) Recognizing the factors affecting the velocity of the enzymatic reaction including temperature, pH and substrate concentration.
Goal 3	To recognize the different types of carbohydrates and the effect of alkali and acids on each type of them.
Learning outcomes	3.1) Being able to distinguish between reducing and non-reducing sugars, ketoses and aldoses, pentoses and hexoses, mono- and polysaccharides using simple biochemical tests. 3.2) Recognizing the effect of strong and diluted acids on the different classes of carbohydrates. 3.3) Recognizing the effect of alkali on the different classes of carbohydrates.
Goal 4	To understand lipids in terms of their classification and chemistry, in addition to recognize the saponification process and soap properties.
Learning outcomes	4.1) Investigating lipids solubility using different types of solvents, and recognizing the role of the dielectric constant of the solvent in lipid solubilization 4.2) Understanding the saponification reaction and the properties of soluble and insoluble soaps.

	4.3) Detecting glycerol; as a major component of fat, and differentiating between saturated and unsaturated fatty acids, using Acrolein and Iodine tests respectively.
Textbook	Al-Qirim, T., Shahwan, M. and El-Huneidi, W. (2013). **Laboratory Manual For Pharmaceutical Biochemistry.** Al-Zaytoonah University of Jordan.
Supplementary references	**1.** Hegyi, G. *et al*. (2013). **Introduction to Practical Biochemistry**. Eötvös Loránd University. **2.** Aljebory, A. & Alsalman, A. (2015). **Practical Biochemistry**. Babylon University.

Course timeline				
Week	**Number of hours**	**Course topics**	**Pages (textbook)**	**Notes**
01	**3**	**Color reactions of proteins and amino acids:** 1-Biuret Test 2- Ninhydrin Test 3- Millons Test 4-Unoxidized Sulfur Test	**36**	
02	**3**	**Precipitation of proteins by the use of:** 1-Salts of Heavy Metals 2- pH 3-Ionic Strength 4- Alcoholic Solvent 5- Organic Acids(Alkaloid reagents)	**43**	
03	**3**	**Enzymes: Catalase:** a- Catalase Catalytic Reaction. b- Catalase Peroxidatic Reaction	**66**	
04	**3**	**Effect of temperature, pH , and substrate concentration on enzyme activity.**	**72**	
05	**3**	**General reactions of carbohydrates - Effect of strong acid with heating:** 1- Molish Test 2- Anthrone Test 3-Bial Test 4-Seliwanoff Test	**1**	
06	**3**	**Effect of alkali on carbohydrates:** 1-Benedict Test 2-Fehling Test 3- Barfoed Test 4-Iodine Test	**11**	
07	**3**	**Hydrolysis and fermentation of carbohydrate:** 1- Hydrolysis of Sucrose 2- Hydrolysis of Starch 3- Fermentation of Carbohydrates by Baker's yeast.	**22**	
08	**3**	**Lipids**: 1. Solubility of Fat and Oil (Dielectric Constant)	**54**	

		2. Saponification 3. Properties of Soaps: a. Salting out of Soap b. Formation of Fatty Acids c. Formation of Insoluble Soups 4. Acrolein Test. 5. Iodine Test		
09	**3**	Practical Final Exam		
10	**3**	Theoretical Final Exam		

Practical (clinical) course evaluation methods	Semester students' work (reports, quizzes, evaluation, assignments)= 50% Practical Final Exam = 15% Theoretical Final Exam= 35%

Approved by head of department	Dr. Abdelqader Albawab	**Date of approval**	

Extra information (to be updated every semester by corresponding faculty member)

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