هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Biochemistry**
Course Code:	**CHEM 204**
Program:	**Bachelor in Biology**
Department:	**Chemistry**
College:	**College of Science**
Institution:	**Jazan University (JU)**

Table of Contents

A. Course Identification

1. Credit hours: 3**h**
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: L 4, Year 2
4. Pre-requisites for this course (if any)**:** Organic Chemistry Chem 203 for biology students
5. Co-requisites for this course (if any)**:** **Non**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom and lab**	30 and 30	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	30
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

Course Title	Course Number	Contact Hours (CH)		Credit unit (CU)	Year	Level	Pre-requisite
		Lec.	Prac.				
Biochemistry	204 CHEM	2	2	3	Second	4th	CHEM 203

Course objectives: They are to identify the following.

1- Biological compounds, their functional groups and bioactivity

2- Biosynthesis methods of different biological compounds

3- Chemical reactions and its composition and their metabolism

Syllabus: A-Theoretical contents

1- Definition and classification of carbohydrates, lipids, amino acids, proteins, nitrogenous bases and nucleic acids.

2- The composition and functions of carbohydrates, lipids, amino acids, proteins, nitrogenous bases and nucleic acids in living cells

3- Translation and transcription of nucleic acids

4- Enzymes and their role in stimulating cellular reactions - enzymatic accompaniments - power generation and transmission in the cell and factors affecting enzymatic reactions

5- The biosynthesis of some biological molecules.

Syllabus: B-Practical contents

-Qualitative determination and quantitative estimation of some biological compounds belonging to carbohydrates (mono, di and polysaccharides), proteins and amino acids.

- some chemical properties of lipids and fatty acids

*See attachment

2. Course Main Objective

This course aims to provide students with the basic knowledge about the main classes of biomolecules, their composition, properties, functions and their transformations in cells

3. Course Learning Outcomes

CLOs		
1	**Knowledge and Understanding** Upon completion of the course, student will be able to:	
1.1	Demonstrate knowledge and understanding in biochemistry related to biology students including the identification, classification and properties of biological compounds. (I)	
1.2	Describe the essential facts, principles and theories related to biochemistry and evaluate the level of different biological metabolites in biological fluids. (I)	
2	**Skills :**	
2.1	Demonstrate critical thinking ability to differentiate and compare between biological compounds and different factors affecting biological and enzymatic reactions (I)	
2.2	Apply their experimental basics and skills to use laboratory equipment, modern instructions, and classical techniques to perform experiments of biochemistry (I)	
2.3	Examine and follow proper procedures and regulations for safe handling, use, and disposal of chemicals (P)	
3	**Values:**	
3.1	Working in team work collaborate with other colleagues (I)	

C. Course Content

No	List of Topics	Contact Hours
1	Carbohydrates	8
2	Proteins and amino acids	8
3	Lipids and fatty acids	6
4	Enzymes	4
5	Nucleic acids	4
...	Laboratory part	30
Total		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Demonstrate knowledge and understanding in biochemistry related to biology students including the identification, classification and properties of biological compounds.(I)	Lectures, directed reading, group discussion and assignments	MCQ and short answer questions
1.2	Describe the essential facts, principles and theories related to biochemistry and evaluate the level of different biological metabolites in biological fluids. (I)	Lectures, directed reading, group discussion and assignments	MCQ and short answer questions
2.0	**Skills**		
2.1	Demonstrate critical thinking ability to differentiate and compare between biological compounds and different factors affecting biological and enzymatic reactions (I)	Lectures, directed reading, group discussion and assignments	Written, questions, problems and class discussions
2.2	Apply their experimental basics and skills to use laboratory equipment, modern instructions, and classical techniques to perform experiments of biochemistry (I)	Lab work, group work	Practical sheet and final exam
2.3	Examine and follow proper procedures and regulations for safe handling, use, and disposal of chemicals (P)	Lab work	MCQ safety exam
3.0	**Values**		
3.1	Working in team work collaborate with other colleagues (I)	Group work and reports	Practical, Presentation and research

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz	5	2%
2	Home work	7	1%
3	Med Term Exam	10	15%
4	Home work	12	1%
5	Quiz	13	1%
6	Quiz in Safety	14	0%
7	Practical work	15	30%
8	Final Exam	16	50%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice: Student Academic Counseling: Members of staff will be available for academic counseling on daily basis for at 4h/day during office hours.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Lehninger, principales of biochemistry, fourth edition. David L. Nelson Michafi M. Cox
Essential References Materials	Biochemistry, Donald Voet, Wiley; 3rd edition (2004).
Electronic Materials	**https://chem.libretexts.org/Special:Search?qid=&fpid=230&fpth=&query=biochemistry&type=wiki**,
Other Learning Materials	www.wikipedia.org/ http://www.wpi.edu/Academics/Depts/Chemistry/Courses/General/

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1 Lecture room (s) for each group of 25 students. One Laboratory for each group of 15 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	AV, data show, Smart Board, software, etc.)
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Microscopes, Balances, and glassware

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and Assessment	Student	Likert-type Survey (CES) Indirect
Extent of achievement of course learning outcomes	Instructor & Course coordinator	Class room evaluation (direct & indirect)
Quality of learning resources	Program coordinator	Indirect
Exam Quality assessment	Assessment committee	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Chemistry Department Council**
Reference No.	42 / 35 /102 112
Date	17 /09 /1442 Corresponding to 28 / 04 /2021

LAB WORK

week	Exp. title	Chemicals	Tools and equipment	remarks
1	Introduction and Labe safety	glucose, fructose, starch, α-naphthol, sulfuric acid.	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, watch glasses,	
2	Estimation of carbohydrates, Mono and polysaccharudes	glucose, fructose, Barfoed's reagent	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, watch glasses,	
3	Estimation of carbohydrates, Mono, di and polysaccharides	Lactose, Maltose, Sucrose, α-naphthol, sulfuric acid	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, watch glasses,	
4	Osazone test	Maltose, lactose, phenyl hydrazine hydrochloride, sodium acetate.	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, watch glasses,	
5	Determination of Glucose by Titration with Fehling's Reagent	Fehling A, fehling B, Methylene blue, Glucose,	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, watch glasses, water bath.	
6	Determination of Maltose by Titration with Benedict's	Benedict's, Methylene blue, Maltose, sodium carbonate	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, watch glasses, water bath.	
7	Detection of proteins Solubility test	Albumin, casein. Gelatine. Cold water, hot water, solution of dilution HCl, solution of dilution NaOH, 2% solution of NaCl, Ethanol.	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, watch glasses, beakers.	
8	Precipitation of Proteins Test	Albumin, casein. Gelatine, solution of Picric acid, solution of trichloroacetic acid, ethanol, acetone, silver	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, hot plate	

		nitrate, leade acetate, copper sulphate.		
9	Denaturation of proteins : Coagulation by heating.	Albumin, casein. Acetic acid.	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, hot plate	
10	Color reactions of proteins: -Biuret test -Millon's test	Albumin, casein. Gelatine, sodium hydroxide, copper sulphate, Millon's reagent.	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, hot plate	
11	Test Detect the presence of sulfur	Albumin, casein. Gelatine, sodium hydroxide, lead acetate	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, hot plate	
12	Estimation of glycine by titration	Glycine, potassium hydroxide, phenolphthalein,	Erlenmeyer flask, Buret, graduated cylinders, pipettes, balance. Hot plate, Bechers, funnel, volumetric flask, ring stands, support rings,clamps,	
13	Revision	Protein and carbohydrate samples	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, hot plate	
14	Quiz and homwork			
15	Final exam	Protein and carbohydrate samples	Test tube, wash bottle, test tube holder, spatula, Dropper pipets, hot plate	