Course Specification
(Bachelor)

Course Title:	Biochemistry
Course Code:	BIO 1237
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	1
Last Revision Date:	20/8/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 4 (3 lectures + 2 laboratories)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (9/4)					
4. Course general Description:					
This course offers an overview of the chemical processes that drive biological systems. It also explores the basic principles of biochemistry and develops the student's appreciation and understanding of biological networks. In addition, it focuses on the understanding of biochemical processes in the context of chemical principles; and the importance of research design and application in the investigation of questions in biochemistry.					
5. Pre-requirements for this course (if any)**:**					
BIO 101 and CHM 101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
The objective of the course is to provide the students with the basic knowledge about the structure, properties, function, and metabolism of the major cellular macromolecules, including carbohydrates, proteins, lipids, enzymes, vitamins, and nucleic acids. It also aims to provide the students with an overview of the key biochemical steps for the major metabolic pathways of these macromolecules. In addition, it provides the students with a detailed understanding of the fundamental principles of how the anabolism and catabolism of these macromolecules are regulated					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	100%
2	E-learning	-	-
3	Hybrid	-	-

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	36
2.	**Laboratory/Studio**	24
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the structure, biochemical properties, biological role, anabolism and catabolism of the cellular macromolecules, including carbohydrates, proteins, lipids, enzymes, vitamins, and nucleic acids	1.1	Lecture and take-home research assignment	Quizzes, midterm exam and final exam
1.2	Outline the biochemical reactions and	1.1-1.2	Lecture and take-home research assignment	Quizzes, midterm exam and final exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	bioenergetics of the major macromolecules' metabolic pathways, their interrelationships, and how they are controlled			
2.0	**Skills**			
2.1	Analyze the different macromolecules in natural/synthetic samples using macromolecule-specific qualitative tests	2.1	Laboratory and take-home research assignment	Lab reports and Lab exam
2.2	Estimate the concentration of a macromolecule candidate in biological samples using quantitative assays	2.1-2.3	Laboratory and take-home research assignment	Lab reports and Lab exam
3.0	**Values, autonomy, and responsibility**			
3.1	Assemble and summarize information from a variety of sources (textbooks, research papers and review articles), and use information technology to prepare, process and present information	3.2	Lecture, laboratory and take-home research assignment	Quizzes, midterm exam, Lab reports, project presentations, Lab exam and final exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.2	Compose and show ideas effectively both orally and in writing	3.1-3.3	Lecture, laboratory and take-home research assignment	Quizzes, midterm exam, Lab reports, project presentations, Lab exam and final exam
3.3	Perform independently and as a member of a team	3.3	Lecture, laboratory and take-home research assignment	Quizzes, midterm exam, Lab reports, project presentations, Lab exam and final exam

C. Course Content

No	List of Topics (lectures)	Contact Hours
1.	Carbohydrates	3
2.	Proteins	3
3.	Lipids	3
4.	Enzymes	3
5.	Vitamins	3
6.	Nucleic acids	3
7.	Introduction to anabolism and catabolism	3
8.	Glycolysis (glycolytic pathway)	3
9.	Tricarboxylic acid cycle (citric acid cycle/Krebs cycle)	3
10.	Electron transport chain and oxidative phosphorylation	3
11.	Gluconeogenesis	3
12.	Pentose phosphate pathway (hexose monophosphate shunt)	3
Total		36

No	List of Topics (labs)	Contact Hours
1.	Carbohydrates identification tests	2
2.	Proteins identification tests	2
3.	Lipids identification tests	2
4.	Quantitative estimation of glucose	2
5.	Quantitative estimation of total protein	2
6.	Quantitative estimation of albumin	2
7.	Quantitative estimation of cholesterol	2
8.	Quantitative estimation of triglycerides	2
9.	Quantitative estimation of bilirubin	2

10.	Quantitative estimation of urea	2
11.	Quantitative estimation of creatinine	2
12.	Quantitative estimation of alpha-Amylase	2
Total		24

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm 1	Around 4th - 5th week	15%
2.	Midterm 2	Around 7th - 8th week	15%
3.	Quizzes, Participation, and Attendance	During the semester	10%
4.	Lab reports	During the semester	5%
5.	Lab Exam	Around 9th week	15%
6.	Final Exam	Around 13th week	40%
Total			100%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Kyle Kirkland, Anne Wanjie (2014). The Basics of Biochemistry (Core Concepts), Rosen Pub Group.
Supportive References	Michael A. Lieberman, Rick Ricer (2009). Lippincott's Illustrated Q&A Review of Biochemistry, 1st Edition, Lippincott Williams & Wilkins.
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Biochemistry-related instruments, including safety cabinet, centrifuges, incubators, light microscopes, spectrophotometers, microplate reader

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct
Effectiveness of Students assessment	Program Leaders	Direct
Quality of learning resources	Peer Reviewer	Indirect
The extent to which CLOs have been achieved	Program Leaders	Direct
Other	-	-

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Head of Biology Department**
REFERENCE NO.	
DATE	