COURSE DESCRIPTIONS

Faculty	**Allied Medical Sciences**				
Department	**Medical Laboratory Sciences**			**NQF level**	**6**
Course Title	**Clinical biochemistry and nutrition**	**Code**	**901525**	**Prerequisite**	**901223**
Credit Hours	**2**	**Theory**	**2**	**Practical**	**0**
Course Leader		**Email**			
Lecturers	**Prof. Dr. Osama Althunibat**	**Emails**	**O.Althunibat@jadara.edu.jo**		
Lecture time	**10:00-11:00**	**Classroom**		**Attendance**	**Fulltime**
Semester	**1st 2024/2025**	**Production**	2021	**Updated**	Oct. 2024
Type of Teaching	☐ Face to Face	☒ Blended	☐ Online		

Short Description
This course discusses the fundamentals and principles of clinical and analytical biochemistry assays, methods and parameters, which are related to patient's care and disease/disorders diagnosis. It covers the skills of venipuncture and blood processes; familiarizes the students with different equipment (such as spectrophotometer and auto pipettes) and analytes measurements (such as electrolytes, proteins and enzymes) in plasma & serum.
Course Objectives
By the end of this course, the student will be able to: - Provide basic information regarding lab safety & phlebotomy. - Understand how to use centrifuges, water baths, & spectrophotometry. - Deal with different body fluids especially serum & plasma. - Read and interpret kit sheets of different analytes. - Explain qualitative & quantitative methods. - Prepare solutions & perform pipetting correctly. - Handle blood or blood-product samples safely.

Course Intended Learning Outcomes (CILOs)
A. Knowledge - Theoretical Understanding
a1. Explain various biochemical components (electrolytes, enzymes, trace elements, carbohydrates, tumor markers & drugs) in human body fluids and their clinical of significance. (K1)
B. Knowledge - Practical Application
C. Skills - Generic Problem Solving and Analytical Skills

- **b1. Analyze** knowledge and suitable scientific procedures from this course to solve problems in different topics related to clinical biochemistry**. (S1)**

D. Skills - Communication, ICT, and Numeracy

E. Competence: Autonomy, Responsibility, and Context

c1. Combine the correlation of laboratory results to clinical diagnosis and to human organs function, and the importance of performing special tests in clinical biochemistry field**. (C1).**

Teaching and Learning Methods

☐ Face to Face Lectures ☐ Brain Storming ☐ Synchronous remote ☐ Asynchronous remote
☐ Using Video ☐ Discussions ☐ Research Project ☐ Case Study
☐ Field visit ☐ Problem solving

Assessment Methods

☐ Formative Assessment ☐ Quiz ☐ Lab Exam ☐ Homework
☐ Project Assessment ☐ Oral Presentation ☐ Midterm ☐ Final Exam

Course Contents					
Week	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1.	**2**	**b1, c1,**	• **Introduction to clinical chemistry** • **Basic principles and practice of clinical chemistry**	**Power –point** **Brainstorming**	**Quiz, Midterm, Discussion & Interaction**
2.	**2**	**a1, b1, c1,**	• **Control of sodium and water in the body (renin-angiotensin-aldosterone system)** • **Serum osmolality, osmolar gap and anion gap**	**Power –point**	**Quiz, Midterm, Discussion & Interaction**
3.	**2**	**a1, b1, c1,**	• **Electrolyte disorders (hyponatremia, hypernatremia)** • **The Kidneys - GFR** • **Electrolyte disorders (hyperkalemia, hypokalemia)**	**Brainstorming**	**Quiz, Midterm, Discussion & Interaction**
4.	**2**	**a1, b1, c1**	• **Calcium (hypocalcemia, hypercalcemia)** • **Calcium disorders (Osteoporosis, Paget's disease of bone, osteomalacia)** • **Phosphorus & magnesium disorders**	**Power –point**	**Quiz, Midterm, Discussion & Interaction**
5.	**2**	**a1, b1, c1**	• **Blood gases, transport of CO2 in the human body and formation of blood buffer.**	**Brainstorming**	**Quiz, Midterm,**

					Discussion & Interaction
6.	**2**	**a1, b1, c1**	• **Acid-base balance** • **Acid – base disorders**	**Power –point**	**Quiz, Midterm, Discussion & Interaction**
7.	**1**	**a1, b1, c1**	**Midterm (1 hour)**	**Brainstormin g**	
	1	**a1, b1, c1**	**Regulation of blood sugar (hyperglycemia, hypoglycemia) – 1 hour**	**Power –point**	**Quiz, Final, Discussion & Interaction**
8.	**2**	**a1, b1, c1**	• **Regulation of blood sugar (hyperglycemia, hypoglycemia)** • • **Diabetes (FBS, RBS, OGTT, HbA1c)**	**Brainstormin g**	**Quiz, Final, Discussion & Interaction**
9.	**2**	**a1, b1, c1**	• **Kidney function test -1**	**Power –point**	**Quiz, Final, Discussion & Interaction**
10.	**2**	**a1, b1, c1**	• **Kidney function test -II**	**Brainstormin g**	**Quiz, Final, Discussion & Interaction**
11.	**2**	**a1, b1, c1**	• **Liver function tests – I** • **Enzymes and proteins**	**Power –point**	**Quiz, Final, Discussion & Interaction**
12.	**2**	**a1, b1, c1**	• **Liver function test-II** • **Bilirubin and Bile salts and acids.**	**Brainstormin g**	**Quiz, Final, Discussion & Interaction**
13.	**2**	**a1, b1, c1**	• **Lipid profile -I, II**	**Power –point**	**Quiz, Final, Discussion & Interaction**
14.	**2**	**a1, b1, c1**	• **TDM (therapeutic drugs monitoring)**	**Brainstormin g**	**Quiz, Final, Discussion & Interaction**
15.	**2**	**a1, b1, c1**	• **Nutrition (introduction , dietary nutrients ,energy requirements)**	**Power –point**	**Quiz, Final, Discussion & Interaction**
16.	**2**	**a1, b1, c1**	**Revision**	Brainstorming	

Infrastructure	
Textbook	Textbook: Clinical Chemistry, Principles, Techniques, and Correlations, Bishop et al, Enhanced 9th edition, 2023.
References	• Lecture handouts • NCBI Database (https//: www.ncbi.nlm.nih.gov/): includes many textbooks that are available online FREE. • Internet: there are many websites that provide valuable data related to Clinical Biochemistry including research paper, books, animation, etc. you can find more of these websites by searching in the internet using a suitable searching key. Many websites will be posted on E-learning during the semester.
Required reading	Textbook is obligatory and required by the students
Electronic materials	Provided to the students through JU e-learning website.
Other	

Course Assessment Plan					
Assessment Method		**Grade**	**CLOs**		
			a1	**b1**	**c1**
First (Midterm)		**30%**	**13**	**7**	**10**
Second (if applicable)					
Final Exam		**40%**	**15**	**10**	**15**
Coursework					
Coursework assessment methods	Assignments				
	Case study				
	Discussion and interaction	**15%**	**8**	**4**	**3**
	Group work activities				
	Lab tests and assignments				
	Presentations				
	Quizzes	**15%**	**8**	**4**	**3**
Total		**100%**	**44**	**25**	**31**

Plagiarism
Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code). Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the

coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.