Course Specification Clinical Chemistry

(2025 -2026)

1. Basic Information

Course Title (according to the bylaw)	(Basic) Clinical Chemistry			
Course Code (according to the bylaw)	CPAT 702			
Department/s participating in delivery of the course	Clinical and Chemical pathology department			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2h	**0.5 h**		
Course Type	اجباري			
Academic level at which the course is taught	الفرقة/المستوي الاول			
Academic Program	**MD of Clinical and Chemical pathology**			
Faculty/Institute	faculty of medicine			
University/Academy	Benha university			
Name of Course Coordinator	Prof. Dr. Jehan Sabry			
Course Specification Approval Date	**9/14/2025**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	**9/14/2025**			

2. Course Overview (Brief summary of scientific content)

1. 1. Knowledge of the chemo physiological background of all body organs.

1.2. Studying the chemical changes of blood and different body fluids and using it in diagnosis of different diseases.

1.3 Interpretation of tests results.

1.4 Case based learning.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs(NARS/ARS)

Program Outcomes(NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
			2.a.1. Define the chemistry of different circulatory lipid and CHO . .with their chemical tests for diagnosis and follow of disease.
			2.a.2. Identify clinical significance of different hormone and chemical test used for diagnosis of endocrine dysfunction.
			2.a.3. Identify serum protein and enzymes with their uses in diagnosis of different disease
			2.a.4. Describe lab measurement for evaluation of liver and kidney function
			2.a.5. Define basic principles and applications of molecular biology testing.
			2.a.6. Identify the principles of work of various instruments used to test various blood diseases
			2.b.1. Analyze the relation between the laboratory test results and

Program Outcomes(NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
		the clinical case of the patient.	

4. Teaching and Learning Methods

1- Lectures

2- Seminars

3 - Clinical sessions

4 - Groups discussion

5- Case presentation with interpretation of results

6- E lectures

Course Schedule

Chemistry Curriculum	**4- محتوى المقرر**		**Intended Learning Outcomes (ILOS):**
الموضوع	**النظرى**	**العملى**	
1-Total Quality Management: 1-Cost of quality			2.a.1

2.Definitions 3.How Do We Manage Quality? 4.Laboratory errors and mistakes 5.Control of Pre –analytical variables 6.Control of Analytical variables 7.Control of analytical quality using stable control materials 8.Control of analytical quality using data from patients 9.External quality control (EQC) 10.Control of Post –analytical variables 11.Relation of type and source of error 12.Biological variation	7	2	2.b.2 2.b.3 2.c.1 2.c.3 2.d.2 2.d.3 2.d.4

2-Laboratory Safety and Regulations • **LABORATORY SAFETY AND REGULATIONS** ✓ Occupational Safety and Health Act (OSHA) ✓ Other Regulations and Guidelines • **SAFETY AWARENESS FOR CLINICAL LABORATORY PERSONNEL:** • Safety Responsibility • Signage and Labeling • **SAFETY EQUIPMENT:** ✓ Hoods ✓ Chemical Storage Equipment ✓ Personal Protective Equipment • **BIOLOGIC SAFETY** ✓ General Considerations ✓ Spills ✓ Bloodborne Pathogen Exposure Control Plan ✓ Airborne Pathogens ✓ Shipping • **CHEMICAL SAFETY** ✓ Hazard Communication ✓ ✓ Laboratory Standard ✓ Toxic Effects From Hazardous Substances ✓ Storage and Handling of Chemicals • **DISPOSAL OF HAZARDOUS MATERIALS** ✓ Chemical Waste ✓ Radioactive Waste ✓ Biohazardous Waste • **ACCIDENT DOCUMENTATION AND INVESTIGATION**	**7**	**2**	2.a.1 2.b.3 2.d.1 2.d.2
3-Point-of-Care Testing • **ADMINISTRATION AND STRUCTURE** ✓ CLIA License and Regulation			

✓ Support Staff ✓ Standardization ✓ Oversight Structure • **COMMUNICATION** ✓ Handling a Request for New or Additional ✓ POCT ✓ Preliminary Selection of Devices/Methods ✓ Validation ✓ Contract Negotiation ✓ Implementation • **PROFICIENCY TESTING** • **POC APPLICATIONS** ✓ POC Glucose ✓ POC Chemistries and Blood Gases ✓ POC Connectivity	**5**	**3**	
4- • **interpretation of tests results** • **Case based learning**	**3** **3**	**4** **4**	
5-Molecular Biology: 1. DNA structure ,replication and transcription 2. Protein synthesis 3. Amplification techniques ❖ **Target Amplification Methods** ✓ Polymerase chain reaction (PCR`) • PCR using specific probes • RT PCR • Nested PCR • Multiplex PCR • Arbitrarily Primed PCR/Random Primer PCR ✓ NASBA-Nucleic Acid Sequence-Based Amplification ✓ TMA-Transcription Mediated Amplification ✓ SDA-Strand Displacement	**7**		

Amplification ❖ **Signal amplification techniques** ✓ Branched chain DNA (bDNA) ✓ Hybrid capture assay **4. Gel electrophoresis in molecular biology** ✓ RFLP ✓ Heteroduplex migration ✓ Single strand conformation polymorphism ✓ Denaturing gradient gel electrophoresis ✓ Temprature gradient electrophoresis ✓ MLPA ✓ DNA sequencing ✓ Blotting techniques **5-PCR-melting analysis** **6-Mutations** **7-Epigenetics**			

5. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (Semester work)	-		
2	Exam 2 ..... (Semester work)	-		
3	Final Written Exam	√	75	
	Final Practical/Clinical/... Exam	√	30	
	Final Oral Exam	√	20	
	Assignments / Project /Portfolio/ Logbook	√		
	Field training	√		
	Other (Mention)			

* The methods mentioned are examples, the organization may add and/or delete

6. Learning Resources and Supportive Facilities*

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	-Department book by Dr.OSAMAA EL SHAER(2014) -Log book by (staff members, 2009)
	Other References	Bishop clinical chemistry.by Michael L. Bishop ,Edward P.Fody ,Larry Schoef, 2019) Tietz textbook of clinical chemistry and molecular diagnostics.
	Electronic Sources (Links must be added)	-Lancet -British journal of clinical chemistry -American journal of clinical chemistry - http://www.medscape.com - http://www.pubmed.com - http://sciencedirect.com

	Learning Platforms (Links must be added)	
	Other (to be mentioned)	
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	√
	Supplies	√
	Electronic Programs	√
	Skill Labs/ Simulators	√
	Virtual Labs	
	Other (to be mentioned)	

*** The list mentioned is an example, the institution may add and/or delete depending on the nature of the course**

Name and Signature
Course Coordinator
أ.د/ جيهان صبرى

Name and Signature
Program Coordinator
أ.د/ ياسر اسماعيل