

MODULE DESCRIPTION FORM

Module Information معلومات المادة الدراسية				
Module Title	Clinical Chemistry instrumentation		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MIET2204			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGII	Semester of Delivery	4	
Administering Department	MIET	College	UOH	
Module Leader	Zahra Aamer Ismail	e-mail	zahraa_amer@hilla-unc.edu.iq	
Module Leader's Acad. Title	Assistant lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor	Zahra Aamer Ismail	e-mail		
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date	10/3/2026	Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	None
Co-requisites module	None	Semester	None

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1.To introduce the clinical chemistry and biochemical mechanism in the human body 2.To describe the types of laboratory medical instruments. 3. To describe the types of clinical chemistry analysis or (tests). 4. To explain the principal work of the laboratory medical devices techniques. 5. To describe the most important compositions in human body. 6. To understanding the maintenance of laboratory medical devices and its electrical and mechanical faults.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students should be able to: 1.Define the clinical chemistry and recognize what is the laboratory security system and determine the quality control results in medical laboratory. 2. List the principal work of spectrophotometer instruments and derive Beer's-Lambert Law. 3.Describe the measurement instruments of ions and salts in human body. 4. Identify all the clinical chemistry analysis and their measurement techniques. 5. Discuss the importance of minerals in human body and their measurement. 6. Describe the principal work of Elisa technique and list their methods. 7. Explain the electrical conduction concept and their examples in human body. 8. Explain the osmotic conduction concept and their examples in human body. 9. List the types and function of enzyme in human body and their measurements techniques. 10. Discuss the importance of proteins in human body and describe their measurements. 11. Explain the importance of fats in human body and explain their measurement techniques. 12. Define the hemoglobin and explain the hemoglobin diseases with its clinical significant. 13. List all types of minerals in human body and describe their daily requirements. 14. Define the immune system and recognize the foreign material and explain the disorders of immune system.

Indicative Contents المحتويات الإرشادية	1. Spectrophotometer: Criteria, theory, types, components, pros & cons, applications, Beer-Lambert law. (10h) 2. Electrolyte Analyzer: Definition, features, theory, components, advantages, applications. (6h) 3. Autoanalyzer & Blood Gas Analyzer (BGA): Concept, criteria, types, theory, components, pros & cons. (6h) 4. ELISA Technique: Concept, theory, methods (direct/indirect), components, applications. (6h) 5. Minerals: Definition, classification, sources, functions, nutrition, diagnostics. (6h) 6. Electrical & Osmotic Conduction: Concepts, examples, tests. (10h) 7. Enzymes: Definition, classification, function, tests, clinical significance. (6h) 8. Proteins: Definition, classification, function, electrophoresis, diagnostics. (6h) 9. Fats: Concept, classification, sources, importance, clinical significance, measurement methods. (10h) 10. Hemoglobin: Definition, structure, analysis, diseases, clinical significance, CBC. (6h)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures - scientific laboratory- data show - summer training- workshops- seminars, written exam, Quizzes and online testing .

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10%	3, 11	LO:1,2,3.....14
	Assignments	2	10%	7,10	LO: 6, 13
	Projects / Lab.	2	10%	4,8	LO: 3, 10
	Report	1	10%	11	LO: 10,12
Summative assessment	Midterm Exam	1.5 hr	10%	7	LO: 1-7
	Final Exam	3 hr	50%	14	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction ,Best laboratory uses and quality control.
Week 2	Spectrum instruments and uses.
Week 3	Ion and salt measurement instruments
Week 4	Auto-analysis instruments
Week 5	Mineral measurement instrument
Week 6	Elisa instrument and its uses
Week 7	Mid-term Exam
Week 8	Electrical conduction
Week 9	Osmotic conduction
Week 10	Enzyme and their measurement
Week 11	Protein and its importance
Week 12	Fats and its importance
Week 13	Hemoglobin
Week 14	Minerals and nutrition
Week 15	Immunological chemistry

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Clinical Chemistry instrumentation
Week 2	Lab1: spectrophotometer and colorimeter, theory, principle of work, operation, component's function, maintenance and the faults.
Week 3	Lab2: Flame photometer, types, theory, principle of work, operation, component's function, maintenance and the faults.
Week 4	Lab3: Blood gas analyzer and PH meter, theory, principle of work, operation, components function, normal results, maintenance and the faults.
Week 5	Lab4: Auto-analysis, types, theory, principle of work, operation, component's function, maintenance and the faults.
Week 6	Lab5: Elisa, types, theory, principle of work, operation, components function, maintenance and the faults.
Week 7	Lab6: Hemodialysis and peritoneal technique, theory, principle of work, operation, maintenance and faults.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Clinical Chemistry Hand book :workbook of principles ,techniques and correlation by N.T.Coleman	yes
Recommended Texts	LABORATORY INSTRUMENTATION AND TECHNIQUES, Book by Dr.Mathew Folaranmi OLANIYAN,Associate Professor,Department of Medical Laboratory Science,Achievers University, Owo-Nigeria,2017.	No
Websites	1. https://byjus.com/chemistry/spectrophotometer-principle/ 2.3. https://www.bosterbio.com/media/pdf/ELISA_Handbook.pdf 3.	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

د. د. هارون عبد الكاظم شهيد
الحسيد

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