MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Clinical Chemistry instrumentation			**Module Delivery**	
Module Type	Core			☒Theory ☐Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	UOMU024044				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	UGII	**Semester of Delivery**	4		
Administering Department	MIET	**College**	EETC		
Module Leader		**e-mail**			
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.		
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	19/11/2023	**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.Desribe the measurement instruments of ions and salts in human body. 4. Identify all the clinical chemistry analysis and their measurement techniques. 5. Discus 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. Discus 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	Indicative content includes the following:

	Clinical chemistry definition, analysis lists, work security rules, best laboratory uses guidelines. [3hr]. Spectrophotometer instruments criteria, theory, types, components, advantage and disadvantage, physical and medical application and Beer-Lambert law derivative .[10hr] Electrolyte analyzer definition, features, theory, components, configuration advantages, disadvantages and application. [6hr] Autoanalyzer concept, Blood Gas Analyzer (BGA) criteria, types, theory, components, figuration, advantages and disadvantages. [6hr] ELISA Technique concept, theory ,methods:(direct and indirect), components ,figuration, advantages ,disadvantages and applications [6hr]. Minerals definition, classifications, sources, function, nutrition(mg/day) and diagnostic procedure[6hr]. Electrical conduction concept , examples ,performing tests. Osmotic conduction concept, examples ,performing tests [10hr]. Enzyme definition, classification, function, performing test and clinical significant. [6hr] Proteins definition, classification ,function, clinical significant, Electrophoresis Technique :diagnostic procedure, theory and principle work [6hr]. Fats concept, classification, sources, importance, clinical signification and measurements: Hydro densitometry Weighing (Underwater Weighing, Near – infrared interaction (NIR), Skin Fold Caliper, Dual energy X-ray absorptiometry (DEXA), BMI (Body mass impedance) [10hr] . Hemoglobin definition, structure, analysis, hemoglobin diseases, clinical significant and diagnostic procedure: complete blood count (CBC) [6hr]. Concept of immunology, structure, material and disease diagnostic [3hr].

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**	2 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
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج 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.
Week 8	Lab7: Electrophoresis, theory, principle of work, operation, component's function, normal results, maintenance and the faults.
Week 9	Lab 8: Body fat analyzer, theory, principle of work, operation, component's function, normal results, maintenance and the faults.
Week 10	Lab 9: review for the clinical chemistry instrumentation.

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.pdf3.	

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.