



# Paramedical Program

Specialization	Medical Laboratories
Course Number	21107141
Course Title	Clinical Laboratory Instruments
Credit Hours	(2)
Theoretical Hours	(1)
Practical Hours	(3)



**Brief Course Description:**

This course deals with the principles of clinical laboratory instruments. It introduces the students to the principles of instrumental methods of analysis including visible and ultraviolet spectrophotometry, flame photometry, chromatography, electrophoresis, radiation counters and automated chemical analyzers.

**Course Objectives:**

- 1- A study of physical chemical forces and interactions that determine structures, functions and behavior of proteins and other macromolecules.
- 2- Discussion of spectroscopic and other physical techniques employed in studying macromolecular structures and properties.
3. Describe mechanism of action, advantages & disadvantage of each method.





## Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1	Microscopy	-Types, principles, applications. -Transmission-electron microscopy (TEM) -Scanning-electron microscopy (SEM) -Light microscopy	
2	Photometric chemical analysis & Spectrophotometry	- Ultra-violet , absorption, transmetance. - Beer- Lambert low - Principles of spectrophotometer - Applications of spectrophotometer - Procedure of spectrophotometer	
3	Flamephotometry	- Principles - Types - Procedure - Calculations - Applications	
4	Chromatography	- Principles, types , procedure, calculations , applications - Chromatography high-performance liquid chromatography (HPLC) - Ion chromatography - Liquid chromatography (LC) - Gas chromatography (GC)	
5	Electrophoresis	- principles, types , procedure, calculations , applications - Capillary electrophoresis & Gel electrophoresis (SDS-PAGE)	

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6	Radio immuno assay & enzyme immuno assay	<ul style="list-style-type: none"><li>- principles, types , procedure, calculations , applications</li><li>- ELISA</li></ul>	
7	Automated chemical analyzers	<ul style="list-style-type: none"><li>- Principles, types , procedure, calculations , applications</li><li>- Automatic blood cell counters</li></ul>	
8	spectroscopy	Introduction : <ul style="list-style-type: none"><li>-Atomic absorption spectroscopy (AA)</li><li>-atomic emission spectroscopy (AES,OES)</li><li>-Atomic fluorescence spectroscopy(AFS)</li><li>- Infrared (IR) absorption spectroscopy</li><li>- Nuclear magnetic resonance (NMR)spectroscopy</li></ul>	





**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Practical Exam	10%	--/--/----
	Final Exam	35%Theory 15%Practical	--/--/----

**Teaching Methodology:**

- ❖ Lectures
- ❖ Slides and posters
- ❖ Practice inside labs

**Text Books & References:**

**Reference**

1-Clinical diagnosis and management by laboratory methods , 7<sup>th</sup> edition,1984.

2- practical clinical biochemistry. ISBN 0433338059

3- clinical hematology ISBN 0-8121-0718-7

4- Instruments manuals

5- internet



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