



Paramedical Program

Specialization	Medical Laboratories
Course Number	020807151
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.

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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	Calibration Methods	-Calib. with standards -Method of Standard additions -Internal standard calibrations -External standard calibrations	
4	Flamephotometry	-Procedure -Types -Principles -Calculations -Applications	
5	Chromatography	- Principles, types , procedure, calculations , applications - Chromatography high-performance liquid chromatography (HPLC) - Ion chromatography - Liquid chromatography (LC) - Gas chromatography (GC)	
6	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"> - principles, types , procedure, calculations , applications - ELISA 	
7	Automated chemical analyzers	<ul style="list-style-type: none"> - Principles, types , procedure, calculations , applications - Automatic blood cell counters 	
8	spectroscopy	<p>Introduction :</p> <ul style="list-style-type: none"> -Atomic absorption spectroscopy (AA) -atomic emission spectroscopy (AES,OES) -Atomic fluorescence spectroscopy(AFS) - Infrared (IR) absorption spectroscopy - Nuclear magnetic resonance (NMR)spectroscopy 	

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**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- Undergraduate Instrumental Analysis .7th ed .2014. James w. Robinson, Eileen M. Skelly Fame .CRCpress.
- 2- Principles of In. An .7thed. 2018 .Douglas A.Skoog ,F. james Holler &Stanley . R.Crouch .
- 3- Analtical Instrumentation ; performance Characteiistics and quality .2000. Graham Currell.
- 4- Instru.ARobert Granger. 2016 .Oxford University Press ,USA.



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