



University of Management & Technology
School of Science
Department of Life Sciences

Analytical Techniques in Biochemistry

Lecture Schedule	Monday and Thursday 12:30-13:45 PM	Semester	Spring 2021
Pre-requisite	F.Sc. /A-level	Credit Hours	4
Resource Person	Dr. Asma Irshad	Contact Moodle link	Asma.irshad@umt.edu.pk
Office	Additional offices North Block	Office Hours	Displayed on office door & on Moodle
Objectives	<ul style="list-style-type: none">• Demonstrating analytical laboratory techniques and explaining the theory and background behind these• To provide scientific understanding of analytical techniques and detail interpretation of results		
Expected Outcomes	<ul style="list-style-type: none">• To be able to use selected analytical techniques• Familiarity with working principles, tools and techniques• Understand the strengths, limitations and creative use of techniques for problem solving		
Lab Work	<ul style="list-style-type: none">• Separation of biomolecules by paper, column and thin layer chromatography; determination of molecular weight of proteins by gel filtration;• Identification of sugars, proteins, electrolytes etc. by UV/Visible spectrophotometer• Determination of sodium and potassium content in blood serum by flame photometer and mineral analysis of plant tissues using atomic absorption spectrophotometer		
Text book & Reference book(s)	<ol style="list-style-type: none">1. Boyer RF, 2011. Biochemistry Laboratory: Modern Theory and Techniques. Second Edition; Prentice Hall2. Wilson K, 2010. Principles and Techniques of Biochemistry and Molecular Biology. Seventh Edition; Cambridge University Press.3. Christian GD, 2003. Analytical Chemistry. Sixth Edition, John Wiley and Sons, New York.4. Chung et al., 2005. Analytical Methods validation and Instrument Performance verification. First Edition; John Wiley and Sons, New York.5. Sharma BK, 2005. Instrumental Method of Chemical analysis. First Edition; Meerut Goel Publishing House, India.6. Harris DC, 2010. Quantitative Chemical analysis. Eighth Edition; WH Freeman, New York.		

Grading Policy	Assignments:	5%
	Presentation.....	5%
	Quizzes:	10%
	Midterm:	25%
	Final:	35%
	Lab:	20%

Course Schedule

Week	Lecture #	TOPICS
1	1	<ul style="list-style-type: none"> • Introduction to analytical techniques in Microbiology • Microscopy- Bright Field, Dark-field and Phase contrast
	2	
2	1	<ul style="list-style-type: none"> • Fluorescence, Confocal Microscopy • Electron microscopy
	2	
3	1	<ul style="list-style-type: none"> • Chromatographic methods- General principles of Chromatography • Ion exchange, Gel filtration,
	2	
4	1	<ul style="list-style-type: none"> • Affinity chromatography techniques, • Gas-liquid (GC-LC) or GC-MS
	2	
5	1	<ul style="list-style-type: none"> • HPLC • immunochromatography
	2	
6	1	<ul style="list-style-type: none"> • Electrophoresis- General principles • Horizontal & Vertical Gel electrophoresis
	2	
7	1	<ul style="list-style-type: none"> • Isoelectric focusing, • SDS PAGE
	2	
8	1	<ul style="list-style-type: none"> • Immune-electrophoresis • Centrifugation techniques- Basic principles
	2	
9		<ul style="list-style-type: none"> • Mid Term
10	1	<ul style="list-style-type: none"> • Different types of Centrifuges • Ultracentrifugation methods
	2	
11	1	<ul style="list-style-type: none"> • Homogenization and its types • Cell culture technique
	2	
12	1	<ul style="list-style-type: none"> • NMR general principles • NMR detailed information about the structure and working
	2	
13	1	<ul style="list-style-type: none"> • Mass spectrometry Principle and Working • Instrumentation, Steps, Application
	2	
14	1	<ul style="list-style-type: none"> • PCR: introduction to the instrument • PCR types

	2	
15	1 2	<ul style="list-style-type: none">• Immunoassay introduction and principle• ELISA introduction and principle
16		<ul style="list-style-type: none">• Final term