

BMS2003: CLINICAL CHEMISTRY

Effective Term

Semester A 2026/27

Part I Course Overview

Course Title

Clinical Chemistry

Subject Code

BMS - Biomedical Sciences

Course Number

2003

Academic Unit

Biomedical Sciences (BMS)

College/School

College of Biomedicine (BD)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course covers the basic principles and practice of clinical chemistry together with clinical laboratory instrumentation. It includes the topics of purine catabolism and excretion, specific protein markers, metabolic disorders, water and

electrolyte balance, acid-base balance, and trace and toxic elements, etc. The course also includes some analytical techniques and topics in clinical laboratory instrumentation, such as osmometry, turbidimetry, electrophoresis, atomic absorption spectrophotometry, and immunoassay. It allows students to learn the theoretical knowledge and practical skills to carry out clinical studies in clinical laboratory.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Implement the procedures and methodologies in clinical chemistry for diagnosis and monitoring of human diseases	25	x	x	
2	Carry out laboratory investigations by applying appropriate methodology and techniques, demonstrate ability in using equipment available in the laboratories	25	x	x	x
3	Evaluate and interpret the laboratory results in different clinical conditions, critically discuss the interpretation of the results and recommend changes based on recent practice	25	x	x	x
4	Develop an enduring set of clinical and research skills for use in their future laboratory work.	25	x	x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Basic knowledge will be taught mainly by lectures.	1, 2, 3, 4	
2	Tutorials	A forum for problem solving by applying the knowledge learned from the lectures.		
3	Laboratory practice	Experiments designed to teach the students basic laboratory techniques in clinical chemistry.	1, 4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("- for nil entry)	Allow Use of GenAI?
1	Quizzes	1, 2, 3	10	-	No
2	Laboratory reports	2, 3, 4	20	-	Yes

Continuous Assessment (%)

30

Examination (%)

70

Examination Duration (Hours)

3

Minimum Continuous Assessment Passing Requirement (%)

40

Minimum Examination Passing Requirement (%)

40

Additional Information for ATs

Practical exam (Duration: 3 hours): 30% Written exam (Duration: 3 hours): 40% Examination total: 70% Minimum Passing Requirement: - Continuous assessment: 40%; and - Written examination: 40%; and - Practical examination: 40%. Please note that attendance in all practical sessions is mandatory for the completion of the course. Practical sessions are an integral part of the curriculum, providing hands-on learning experiences and essential for medical laboratory science training. Failure to attend practical sessions (an unauthorized absence and/or lateness) may result in a deduction of marks or, in extreme cases, may lead to failure in the course.

Assessment Rubrics (AR)**Assessment Task**

1. Coursework (Mid-term quizzes, laboratory performance/reports)

Criterion

Mid-term Quizzes: Quiz score will be used to verify the state of students' learning progress

Lab reports: Practical reports are based on their knowledge and demonstrate subject-specific skills in carrying out experimental work and data analysis

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Less than Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2. End-of-term examination

Criterion

To test students' basic knowledge learnt in class and see whether they can apply the knowledge in case studies

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Less than Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

3. End-of-term lab test

Criterion

To test students' skills of using laboratory instrument and evaluate their technical and analytical skills based on their performance on the lab test

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Less than Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

- Basic Principles and Practice of Clinical Chemistry
- Practice and Setting in Clinical Chemistry Laboratory
- Automation in Chemical Pathology and Specimen Collection
- Disorders of Water and Electrolyte Balance
- Kidney Function and Diseases
- Acid-Base Balance

- Disorders of Lipids Metabolism
- Diabetes Mellitus & Hypoglycemia
- Hyperuricemia and Gout
- Instrumentation for Trace Element Analysis
- Trace and Toxic Elements
- Clinical Significance of Proteins
- Methodologies of Protein Analysis
- Non-protein Nitrogen Compounds
- Immunochemical Techniques and Nucleic Acid-based Techniques
- Introduction to Pharmacy

Reading List

Compulsory Readings

Title	
1	Michael L. Bishop; Edward P. Fody; Carleen Van Siclen; James March Mistler; Michelle Moy, Clinical Chemistry: Principles, Techniques, and Correlations. 9th Ed, 2023, Jones & Bartlett Learning

Additional Readings

Title	
1	Nessar Ahmed, Clinical Biochemistry. 3rd Ed, 2025, Oxford University Press
2	Peter Rae; Mike Crane; Rebecca Pattenden; Clinical Biochemistry Lecture Notes. 10th Ed, 2017, Wiley-Blackwell.
3	Nader Rifai; Rossa WK Chiu; Ian Young; Carl T Wittwer. Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics. 9th Ed, 2023, Elsevier
4	Richard A. McPherson, Matthew R. Pincus, Henry' s Clinical Diagnosis and Management by Laboratory Methods. 24th Ed, 2021, Elsevier