# STANDARD OPERATING PROCEDURE (SOP)

## DEPARTMENT OF BIOCHEMISTRY

Brahmanbaria Medical College & Hospital
Ghatura, Brahmanbaria

Affiliated with Chittagong Medical University

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# 1. Introduction & Objectives

The Department of Biochemistry at Brahmanbaria Medical College (BMC) is committed to excellence in both medical education and clinical diagnostics. As a core discipline, it provides students with a profound understanding of the molecular and chemical mechanisms defining human health and disease. Concurrently, the Clinical Biochemistry section operates within the 600-bed modern hospital to deliver 24/7 accurate, timely, and advanced diagnostic services supporting the Critical Care Units (ICU, CCU, NICU) and general wards.

**Objectives:**

- To execute the BM&DC approved Phase I MBBS curriculum effectively.
- To maintain top-standard diagnostic precision using state-of-the-art analytical equipment.
- To ensure strict adherence to quality control, equipment calibration, and safety protocols.

# 2. Departmental Organogram & Staffing Pattern

To ensure robust academic and clinical operations, the department maintains a hierarchical staffing pattern compliant with BM&DC standards:

## A. Teaching Staff (Academic Division):

- Head of the Department (Professor)
- Associate Professor(s)
- Assistant Professor(s)
- Lecturers

## B. Laboratory Staff (Clinical & Practical Division):

- Medical Technologist (Senior)
- Medical Technologist (Junior)
- Laboratory Attendants

## C. Administrative & Support Staff:

- Computer Operator / Office Clerk
- MLSS (Peon) and Cleaners

# 3. Departmental Infrastructure & Facilities

- **Tutorial & Demonstration Rooms:** Multiple rooms accommodating 25-40 students, equipped with modern audio-visual aids.
- **Practical Class Rooms:** Spacious laboratories with benches, shelves, sinks, electric/gas points accommodating 50 students at a time.
- **Clinical Laboratory:** Dedicated space for automated analyzers, blood gas analysis, and routine biochemistry.
- **Departmental Library:** Housing reference texts, journals, and IT facilities for student/faculty research.
- **Office & Administrative Blocks:** Dedicated rooms for the Professor, Associate/Assistant Professors, Lecturers, and clerical staff.

# 4. Academic & Curricular Activities (Medical College)

The academic activities are structured around the Directorate General of Medical Education (DGME) MBBS Curriculum 2021.

## 4.1 Teaching Hours & Structure

> **Total Core Teaching Hours: 317 Hours**
>
> - Lectures: 117 hours
> - Tutorials: 100 hours
> - Practical Sessions: 100 hours
> - Integrated Teaching (Phase I common): 36 hours
> - Generic Topics (Medical ethics, behavioral science, etc.): 7.5 hours

## 4.2 Curriculum Modules (Cards)

The curriculum is divided into 6 distinct modules (Cards) spread across three terms:

- **Card 1:** Biophysics & Biomolecules (Introduction, pH, Buffers, Carbohydrates, Lipids, Proteins, Enzymes).
- **Card 2:** Food, Nutrition, Vitamins & Minerals (Balanced diet, BMR, Vitamins, Trace elements).
- **Card 3:** Digestion, Absorption, Bioenergetics & Metabolism.
- **Card 4:** Renal Biochemistry, Body Fluid, Electrolytes & Acid-Base Balance.
- **Card 5:** Clinical Biochemistry & Clinical Endocrinology (LFT, RFT, Thyroid profiles, Diabetes diagnosis).
- **Card 6:** Fundamentals of Molecular Biology & Genetics (DNA/RNA, Replication, PCR, Cloning).

## 4.3 Assessment & Evaluation

1st Professional Examination Marks Distribution (Total: 400 Marks):

- **Formative Assessment:** 20 Marks (Based on Term exams and attendance)
- **Written Examination:** 180 Marks (MCQ: 40, SAQ/SEQ: 140)
- **Practical Examination:** 100 Marks (OSPE: 40, Traditional Practical: 40, Practical Notebook: 10, Integrated Teaching Assignment: 10)
- **Structured Oral Examination (SOE):** 100 Marks

# 5. Hospital Laboratory Activities (Clinical Biochemistry)

The clinical laboratory side utilizes an array of modern diagnostic tools to perform critical assays. Equipment maintained includes:

- Auto Analyzers & Semi-auto Analyzers
- Blood Gas & Electrolyte Analyzers
- ELISA Machines & Hormone Analyzers
- Photoelectric Colorimeters & Spectrophotometers
- High-speed Centrifuges, Incubators, Water Baths, and Hot Air Ovens

# 6. Standard Operating Procedures (Laboratory Workflows)

## 6.1 Pre-Analytical Phase

- **Patient Preparation:** Ensure fasting protocols are met for relevant tests (e.g., Fasting Blood Sugar, Lipid Profile).
- **Phlebotomy & Sample Collection:** Follow strict aseptic techniques. Use designated vacutainers (Plain/Clot activator for serum, Fluoride for glucose). Ensure volume requirements are met.
- **Labeling & Transport:** Label all specimens immediately with Patient Name, ID, Ward/Bed number, and Timestamp. Transport to the laboratory within 30-45 minutes.

## 6.2 Analytical Phase

- **Sample Reception & Rejection:** Log all samples into the Laboratory Information System (LIS). Reject hemolyzed, clotted (if whole blood required), or improperly labeled samples.
- **Processing:** Centrifuge blood samples at 3000 RPM for 10 minutes to extract serum/plasma.
- **Daily Startup:** Technologists must run a daily startup protocol on all auto-analyzers, including checking reagent levels, distilled water, and running blank/calibrations.

## 6.3 Post-Analytical Phase

- **Result Validation:** Results are reviewed against reference intervals by the Clinical Biochemist and authorized by the Head of Department or designated duty doctor.
- **Critical Value Reporting:** Any critical values (e.g., Severe Hypo/Hyperkalemia, extreme Hypoglycemia) must be telephonically communicated to the respective ward/ICU immediately.
- **Turnaround Time (TAT):** Routine reports must be dispatched within 4-6 hours; Emergency/STAT reports within 1 hour.

# 7. Quality Assurance (QA) & Quality Control (QC)

- **Internal Quality Control (IQC):** Normal and pathological control sera must be run daily before processing patient samples. Application of Westgard rules dictates whether a run is accepted or rejected.
- **Calibration:** Equipment calibration is mandatory when changing reagent lots, after major maintenance, or when IQC fails.
- **External Quality Assurance Scheme (EQAS):** The laboratory participates in periodic inter-laboratory comparisons to ensure diagnostic accuracy and standardization.

# 8. Health, Safety & Waste Management

- **Personal Protective Equipment (PPE):** Mandatory use of aprons, gloves, and closed-toe shoes. Masks and goggles during aerosol-generating procedures or chemical handling.
- **Biohazard Waste Segregation:**
  - **Yellow Bins:** Infectious waste, blood-soaked cotton/gauze.
  - **Red Bins:** Infected plastics (syringes without needles, vacutainers).
  - **Puncture-Proof Containers:** Sharps (needles, glass slides).
  - **Black Bins:** General non-infectious waste.
- **Spill Management:** Chemical and biological spill kits must be readily available in the laboratory.