

# **DEBRA THANA SAHID KSHUDIRAM SMRITI MAHAVIDYALAYA**

Gangaram Chak, Chak Shyampur, Debra, West Bengal



*PROPOSED SYLLABUS (DRAFT) OF*

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## **BACHELOR OF MEDICAL LABORATORY TECHNOLOGY -BMLT (HONOURS)**

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**4-YEAR UNDERGRADUATE PROGRAMME**  
*(w.e.f. Academic Year 2024-2025)*

*Based on*

**Curriculum & Credit Framework for Undergraduate  
Programmes (CCFUP), 2023 & NEP, 2020**

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks		
								CA	ESE	TOTAL
BMLT (Hons.)	1 <sup>st</sup>	I			<b>SEMESTER-I</b>					
			<b>Major-1</b>	<b>BMLTHMJ101</b>	T: Basic Haematology; P: Practical	<b>4</b>	<b>3-0-1</b>	<b>15</b>	<b>60</b>	<b>75</b>
			<b>SEC</b>	<b>BMLTSEC01</b>	P: Phlebotomy and Sample Processing; P: Practical	<b>3</b>	<b>0-0-3</b>	<b>10</b>	<b>40</b>	<b>50</b>
			<b>AEC</b>	<b>BMLTAEC01</b>	Basic diagnostic Instrumentation ( <i>only for BMLT programmes</i> )	<b>2</b>	<b>2-0-0</b>	<b>10</b>	<b>40</b>	<b>50</b>
			<b>MDC</b>	<b>BMLTMDC01</b>	Laboratory Ethics and Biosafety ( <i>only for BMLT programmes</i> )	<b>3</b>	<b>3-0-0</b>	<b>10</b>	<b>40</b>	<b>50</b>
			<b>VAC</b>	<b>BMLTVAC01</b>	Environment and Health ( <i>only for BMLT programmes</i> )	<b>4</b>	<b>2-0-2</b>	<b>50</b>	<b>50</b>	<b>100</b>
			<b>Minor-1</b>	<b>BMLTMI01</b>	T: Basic Anatomy and Physiology; P: Practical	<b>4</b>	<b>3-0-1</b>	<b>15</b>	<b>60</b>	<b>75</b>
				<b>Semester-I Total</b>	<b>20</b>					<b>400</b>

MJ = Major, MI = Minor Course, SEC = Skill Enhancement Course, AEC = Ability Enhancement Course, MDC = Multidisciplinary Course, VAC = Value Added Course; CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-TutorialPractical, MIL = Modern Indian Language, ENV5 = Environmental Studies

**PROPOSED CURRICULUM & SYLLABUS (DRAFT) OF BACHELOR OF  
MEDICAL LABORATORY TECHNOLOGY -BMLT (HONOURS) 4-YEAR  
UNDERGRADUATE PROGRAMME**

**SEMESTER- I  
MAJOR (MJ)**

**Major-1**

**Basic Haematology**

**Credits 04 (FM: 75)**

**Basic Haematology (Theo)**

**Credit- 03**

**Course content:**

1. Basic concept of blood, plasma and serum, Differences between plasma and serum and their separation.
2. Cellular components of blood- RBC structure, Erythropoiesis in brief and its importance, WBC types- Description of each type. Arneht Index, Leucopoiesis in brief, Function.  
Platelets- Structure, Formation and Function of platelets.
3. Blood film preparation and staining.
4. Clotting Time and Bleeding Time- Definition, Determination, and Importance.
5. Blood group: ABO-System & Rh typing, Basic method of blood group detection.  
Importance of blood grouping in brief.
6. Plasma protein-Types, Importance of each type. Plasmapheresis.
7. PCV, ESR, Hb concentration-types-MCH, MCHC, Hb- quantification-Sahli's method.
8. Anticoagulants- Types, Uses in blood for processing, Merits and Demerits.
9. Anaemia-General concept, Types-Causes, Detection of Anaemia.
10. Concept of Thalassemia in brief. Types, Causes, Complications
11. Leukaemia- Causes, Complications

**Basic Haematology**

**Credit- 01**

**Practical**

1. Blood film preparation and staining.
2. Separation of plasma and serum from blood.
3. Blood cell count-Total count, Differential count.
4. Identification of different types of WBC.
5. Haemoglobin estimation by Sahli's method.
6. Blood group by Ag-Ab reaction (Agglutination)-ABO Blood grouping & Rh-typing.
7. ESR, PCV determination.
8. Clotting Time & Bleeding Time determination.
9. MCV, MCH, MCHC determination.
10. Arneht Index assessment, Shift to the Left and Right. Schelling Index.

## SKILL ENHANCEMENT COURSE (SEC)

**SEC 1: Phlebotomy and Sample Processing**  
**SEC 1P: Phlebotomy and Sample Processing**

**Credits 03(FM: 50)**  
**Credits 03**

### **Course Outline:**

1. Phlebotomy Equipment and Supplies:
  - i. Gloves, Tourniquet ii. Alcohol pads, Gauze iii. Needle and needle holder
  - iv. Evacuated blood collection tube and tube inversion technique v. Blood specimen in Phlebotomy vi. Lancet vii. Centrifuge
2. Capillary blood collection procedure, specimen collection, Throat swab specimen collection:
  - i. Venipuncture using a syringe ii. Venipuncture using a butterfly needle iii. Venipuncture using a multisampling needle iv. Dermal puncture
3. Specimen collection other than Blood
  - i. Urine specimen collection
  - ii. Stool specimen collection
  - iii. Sputum collection
4. Specimen processing:
  - i. Specimen labelling, Specimen handling (Light, Time, Temperature).
  - ii. Specimen transportation- Precaution. iii. Process for rejection of specimen.
5. Waste disposal system of collected specimen
6. Separation of serum and plasma.
7. SOP and GLP in Laboratory Medicine.

## ABILITY ENHANCEMENT COURSE (AEC)

**AEC 1T: Basic diagnostic Instrumentation**

**Credits 02 (FM: 50)**

### **Course content:**

1. Microscope: Light microscope, Compound microscope, Phase Contrast microscope, Fluorescent, Polarized, Electron Microscope.
2. Colorimeter: Working Principle, components, and its application.
3. Spectrophotometer: Working Principle, components, and its application.
4. Centrifuges: Working Principle, types and its application g and rpm.
5. Laminar flow: Working Principle, components, and its application.
6. Autoclave: Types, Working Principle, and its application.
7. Incubator: Working Principle, types, and its application.
8. Blood cell counter: Working Principle, and its application.
9. Semi and full auto-analyser: Working Principle, and its application.
10. Demonstration:
  - a) Demonstration and operation of different microscope (Light microscope, Compound microscope).
  - b) Demonstration and operation of Colorimeter and spectrophotometer.
  - c) Demonstration and operation of centrifuges.
  - d) Demonstration and operation of incubator, hot air oven, laminar flow, and autoclave.

## MULTIDISCIPLINARY COURSE (MDC)

### **MDC 1T: Biosafety and Laboratory Ethics** **content:**

**Credits 03 (FM: 50) Course**

1. Safety of Laboratory - Code of good and safe laboratory practice for support staff and responsibilities of the workers regarding Biosafety. ISO rules for laboratory medicine. Laboratory Biosafety Level Criteria (BSL-1-4).
2. Chemical, electrical, fire and radiation safety. Safety organization. General Safety checklist. Safety equipment. Safety signs.
3. Handling, transfer, and shipment of specimen. Decontamination and disposal. Treatment and disposal technologies for health-care waste. Responsibility from acquisition of the specimen to the production of data. Cross contamination-Factor influencing
4. Medical ethics - Definition - Goal – Scope, Basic principles of medical ethics Confidentiality.
5. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records, it's importance for last 10 years - other various aspects.
6. Obtaining an informed consent (English, Hindi and Regional Language).
7. Ethics in the profession of Medical Laboratory Science, Good behaviour with patients.

## VALUE ADDED COURSE (VAC)

### **VAC 1T: Environment and Health**

**Credits 04(FM: 100)**

#### **Course content:**

1. Basic idea about environment, Relation between environment and health. Types of pollutants.
2. Water Pollution-Water related diseases (biological and chemical), water pollution law, water quality criteria and standards, controlling measures of water pollution. Heavy metal pollution of water –Pb, Cd, Hg, As pollution- Sources and Health Hazards.
3. Air pollution- Sources of air pollutants, types, Health hazards by air pollutants, ventilation and its standards, controlling measures of air pollution, air stress indices- heat stress, cold stress, global warming.
4. Noise pollution- Sources, Types of health hazards by noise pollutant. Protection against noise pollution.
5. Pesticides, fertilizers and food preservative link pollution and its impact on human health in general.
6. Food Pollutants-Food additives, adulteration, contaminants.
7. Radioactive pollution- Types, effects.

## 8. Hygiene, Sanitation and Health

### MINOR (MI)

#### MI – 1: Basic Anatomy and Physiology

Credits 04(FM: 75)

#### MI – 1T: Basic Anatomy and Physiology

Credits 03

Course contents:

1. Basic concept of Homeostasis in Physiological system- Specially- Blood Pressure, Heart Rate, Blood Coagulation, Endocrine System, feedback system, PH in blood by Buffers.
2. Digestive System- Anatomy of different parts of digestive tract and digestive organs in brief (Stomach, Liver, Gall bladder, Small and Large Intestine).  
Digestion of Carbohydrate, Protein and Fat.
3. Excretory System: Anatomy of Excretory duct and Excretory organ- Kidney, Urinary bladder. GFR. Renal failure in brief, Renal function Test-Brief description.
4. Endocrine and Reproductive System- Anatomy of Endocrine and Reproductive organs- Functions of Thyroid, Ant. And Post. Pituitary. Pancreatic, Adrenal glands and gonads. Spermatogenesis and oogenesis. Ovulation. Menstrual Cycle in brief.
5. Cardiovascular System: Anatomy of Heart, Heart Rate, Cardiac Cycle, Heart Sound, Blood pressure, Superficial vein and their anatomical location in details.
6. Respiratory System: Anatomy of Lungs and Trachea, Breathing Process, Mechanism of O<sub>2</sub> and CO<sub>2</sub> transport, Hypoxia, Lung Volume, and its significance. Blood O<sub>2</sub> saturation level and clinical importance.
7. Neurone- system: Anatomy of Cerebral Cortex, Cerebellum, Brain and Spinal Cord. Reflex Process, Autonomic Nervous System.
8. Muscular system-Voluntary and non-voluntary muscle, structure of muscle fibre & muscle contraction.

#### MI – 1P: Basic Anatomy and physiology (Practical)

Credits 01

**Practical contents:**

1. Identification of stained tissue section of Stomach, Small Intestine, Large Intestine, Thyroid, Pancreas, Testis, Ovary, Adrenal, Artery, Vein, Oesophagus, Trachea
2. Staining of Squamous epithelial cells.
3. Blood Pressure Recording.
4. Analysis of Spirometry Record.
5. Oxygen saturation study by pulse oximeter.
6. pH determination of different body fluids- Blood, plasma, serum, urine, sweat.
7. Buffer preparation of different strength.