

DIPLOMA IN MEDICAL  
LABORATORY TECHNOLOGY  
SYLLABUS (DMLT), Revised in 2021



*Government of Odisha*

*Health & Family Welfare Department*

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# DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

## (DMLT) COURSE CURRICULUM

### GENERAL INFORMATION

1. The Duration of Diploma Course of Medical Laboratory Technology (DMLT) is two years.
2. The minimum educational qualification for selection of trainees for the Diploma Course of Medical Laboratory Technology is +2 Science with Biology or Mathematics as one of the subject.
3. A total mark of the DMLT Course is 1000.
4. Minimum pass mark of the trainees is 40% in Theory, 50% in Oral & Practical and 50% in Aggregate.
5. 1st Class mark is 60% in Theory, Practical & Oral in aggregate respectively.
6. Less than 40% either in Theory or in Practical or in Oral in any paper will be treated as unsuccessful (Fail).

**Examination schedule: There will be two Regular Examinations one in each year**

**Part-1: Annual: Is in First year**

**Part-2: Annual: Is in Second year (Final)**

**There will be a supplementary examination within six weeks of annual result publication.**

### 1st Year

	<b>Subjects</b>	<b>Mark distribution</b>	<b>Hours</b>
<b>Paper-I</b>	Section-A (Anatomy)	<b><u>Total Mark 75</u></b> Theory 50 Practical & Oral 25	<b>40</b> ( Including practicals)
	Section-B (Physiology)	<b><u>Total Mark 75</u></b> Theory 50 Practical & Oral 25	<b>40</b> ( Including practicals)
<b>Paper-II</b>	Section-A (Community Medicine & statistics)	<b><u>Total Mark 75</u></b> SPM 50, Statistcs 5 Comp 20	<b><u>30</u></b>
	Section-B (Computer)		<b><u>10</u></b>
	Section-C (Pharmacology)	<b>Total Mark-75</b>	40
<b>Paper-III</b>	<b><u>Bio-Chemistry</u></b> A) Chemistry of Carbohydrates	<b><u>Total Mark-150</u></b> Theory 100 Practical 30	<b><u>50</u></b>

	b) Fat c) Protein & Amino acid 2. Water & Fat soluble Vitamin, Plasma protein. 3. Enzymes (Classification, factors regulating, inhibitors 2 clinical application) 4. Buffers, Molarly, indicators, Radioisotopes, Radiation hazard, RA. 5. Overview of Iron, Calcium, Iodine, Flourine. 6. Overview of Nucleic Acids & Uric Acid.	Oral 20	
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## 2nd Year

<b>Papers</b>	<b>Subjects</b>	<b>Mark distribution</b>	<b>Hours</b>
<b>Paper-I</b>	<u><b>(Pathology)</b></u> General Pathology Hematology Blood Banking Histo-technology, Cytology, Museum Study	<u><b>Total Mark-200</b></u> Theory 100 Practical 50 Oral 50	<b>70</b> (Including practicals)
<b>Paper-II</b>	<u><b>(Microbiology)</b></u> GEN. Bacteriology SYST. Bacteriology CLIN. Microbiology Mycology Immunology Serology Parasitology, Virology	<b>Total Mark-200</b> Theory 100 Practical 50 Oral 50	<b>70</b> (Including practicals)
<b>Paper-III</b>	<u><b>Biochemistry</b></u> Glucose Homeostasis, overview DM, HGAIC. Lipoprotein & Hyper Lipoprotein. Liver function test. Renal function test. Thyroid function test. Alimentary function test. Water & Electrolytic Balance	<b>TotalMark-150</b> Theory 100 Practical 30 Oral 20	<b>60</b> (Including practicals)

# BASIC COURSE ON MEDICAL LABORATORY TECHNOLOGY

## PART-I (First year)

### Paper-I

#### Section-A (Anatomy)

1. **Introduction to the subject** - Anatomical position, common planes & Anatomical terms. -Different branches of Anatomy.
2. **Histology** -Typical animal cell (Structure & Function) -4 primary tissues (Classification & function)
3. **Skeletal System** - Axial and appendicular bones -Joints &movements
4. **Skin, Fascia and Muscles & Tendons**
5. **Circulatory System** –Heart & R.E.System -Spleen, Thymus & Tonsils
6. **Respiratory System**- Nose, Pharynx, Bronchi Lungs and Pleura
7. **Digestive System**- Alimentary canal (different parts)-Liver, Gall Bladder, Pancreases
8. **Urogenital System**- Different parts of urinary system -Different parts of Male & Female genital -System (Internal & External Genitalia)
9. **Special Senses& General Sensibilities**- Eye & Vision-Ears, Hearing & Equilibrium, -Taste.
10. **Central & Peripheral nervous system**- Brain & Spinal Cord. - Cranial & Spinal Nervous.- Autonomic Nervous System.
11. **Regional Anatomy (Only Demonstration)** – Extremities, Head & Neck, Thorax, Abdomen & Pelvis.

### Paper-I

#### Section-B (Physiology)

- 1- **Blood**- Composition and general function of blood. Description of blood cells - normal counts & function. Steps of concretion, Anticoagulants. Cerebrospinal Fluid, Formation, Composition & Function. Importance of blood groups composition & function of lymph.
- 2- **Reparatory System** -Name of structures involved in respirations and their function.  
External and internal respiration. How inspiration, expiration are brought about Transport of O<sub>2</sub> and CO<sub>2</sub> in the blood. Definition of respiratory rate, Tidal volume, vital capacity, Hypoxia.
- 3- **Excretory System**-Functions of Kidney, Nephron - Functions of Glomerulus and tubules, compositions of Urine, normal& abnormal. Skin-Function of Skin.

**4- Digestive System-**Composition and functions of saliva, mastication and deglutition.

Functions of stomach, composition of gastric juice. Pancreatic Juice, Bile and Digestion of food by different Enzymes, Absorption and Defecation.

**5- Endocrine-glands-**Definition of endocrine gland, Names of the endocrine gland and the hormone secreted by them. Major actions of such Hormones.

**6- Reproductive System-**Name of primary and accessory organs in male and female. Name of secondary sexual characters in male and female. Function of ovary-formation of ova, actions of ovarian hormone, menstrual cycle. Functions of Testes-Spermatogenesis and secretions of testosterone. Fertilization Vasectomy and tubectomy.

## **Paper-II**

### **Section-A (Community Medicine & Statistics)**

1. Identification and Public Health Importance of arthropods (Entomology):

Mosquitoes, Lice, Fleas, Flies, Rats & Rodents.

2. Water Sources:

Types, Purification

Bio-Medical Waste Management

Sanitation in Public Health

3. Food and Nutrition: Collection of different food samples :Cereals, Pulses, Vegetables, Roots and tubers, Fats and oils, Animal foods including milk

Food-borne diseases of Public Health importance, Assessment of Nutritional status.

### **STATISTICS-GENERAL**

**Mark-05**

TABLES : Simple Tables, Frequency Distribution

DIAGRAMS : Bar Diagrams, Histogram, Line Diagram  
Pie Diagram

STATISTICAL AVERAGES : Mean, Median, Mode

MEASURES OF DISPERSION : Normal Curve, Range,  
Standard Deviation

Standard Error.

TESTS OF SIGNIFICANCE : 't' Test.

## **Paper-II**

### **Section-B (COMPUTER)**

#### **1. Computer Basics:**

Importance, History, Computer Generation, Types of Computer, Anatomy of Computer, Input –output Devices, Processing Units and outline of Data Processing, Computer memory, external storage devices, Hardware, Software Basic functioning of Computers.

#### **2. Computer and Communication, Networking, Internet**

#### **3. Use of computer in Radio-diagnosis/Pathology Laboratory**

## **Paper-II**

### **Section-C (Pharmacology)**

#### **General Pharmacology**

1. Drug, Drug nomenclature, Route of administration, concept of Pharmacokinetics, Pharmaco-dynamics and Adverse during action.
2. **Drugs for the diseases of fundamental System**  
GI System. Respiratory System. Cardiovascular System. Blood, Blood Coagulation, Thrombosis, different types of anti-coagula (Special emphasis). Drugs affecting the Urine and renal functions, excretion of drugs in stool, bile and other body fluids (Special emphasis).
3. **Drugs for diseases of integrating systems of body**  
Central Nervous System. Autonomic System. Endocrine System and autacoids.
4. **Chemotherapeutic Agents**  
Anti-Viral including AIDs, Hepatitis. Anti-Bacterial Drugs. Anti-Fungal Drugs.  
  
Anti-Protozoan Drugs. Anthelmintics. Anti-Cancer Drugs.
5. **Antiseptic, disinfectants.**
6. **Drugs interfering in different Pathological tests.**
7. **Measurement of Drug levels in different body fluids and significance.**

## **Paper-III**

### **BIOCHEMISTRY**

1. Chemistry of
  - a) Carbohydrates including proctiglycon
  - b) Fat
  - c) Protein & Amino acid
2. Water & Fat soluble Vitamin.
3. Enzymes (Classification, factors regulating, inhibitors 2 clinical application)
4. Buffers, Molarily, indicators, Radioisotopes, Radiation hazard, RA.
5. Overview of Iron, Calcium, Iodine, Flourine.
6. Overview of Nucleic Acids & Uric Acid.

## **BASIC COURSE ON MEDICAL LABORATORY TECHNOLOGY**

### **PART-II (Final year)**

#### **PAPER-I**

#### **PATHOLOGY**

##### **General Pathology**

Cell injury, inflammation & repair adaptation, hemodynamics, infectious diseases, nutritional diseases, genetic diseases, neoplasia and occupational diseases.

##### **Hematology**

- 1.** Hemoglobin estimation, anemia classification.
- 2.** Blood group ABO/Rh typing, cross matching, complications of mismatch transfusion, selection of donor, mandatory tests, comb's test, component separation, preservation and uses.
- 3.** Transfusion transmitted diseases.

#### **HISTOTECHNOLOGY, CYTOLOGY, MUSEUM STUDY**

Methods of examination of tissues and cells, Fixation of tissue: Classification of fixatives, Simple Fixatives and their properties, Tissue processing, Collection of specimen, Labeling and fixation, Dehydration, Clearing, Impregnation, Embedding, Paraffin block making, Section Cutting, Microtomes and microtome knives – sharpening of knife, Microtome use – Honing, Stropping, Techniques of section cutting, Mounting of sections, Frozen section.

(a) Staining: Dyes and their properties, Theory of staining, staining technique with haematoxylin and eosin, Mounting of sections, Common special stains, Routine H & E, Masson Trichrome, Mordant – Geison, Reticulin, PAS, Fe, Lipid, Mucicarmine, Von Kossa for calcium, Special staining, Decalcification, Fixation, Decalcification, Detection of end point, Neutralization and processing.

(a) Exfoliative Cytology and Fine needle aspiration cytology Types of specimens and preservation, Preparation and fixation of smears, Papanicolaou staining technique/MCC staining/HE staining/, Sex chromatin staining, Nucleic Acid Techniques, Reception of specimen., Preparation of fixation, Preservation, Presentation

**AUTOPSY TECHNIQUE:** Assisting in autopsy, Preservation of organs and Processing of the tissue.

1. Waste disposal and safety in laboratory.

Histotechnology and Cytology, Fixation, processing, embedding and section and, repair of slides., Sharpening of the knife., Preparation of fixatives and, decalcifying fluid., Preparation of adhesives to fix the section to the slide., Preparation and fixation of cytology smears and Papanicolaou's staining techniques., MOG staining /HE staining., Mounting.

## **PAPER-II**

### **MICROBIOLOGY**

Gen. Bacteriology

Syst. Bacteriology

Clin. Microbiology

Mycology

### **IMMUNOLOGY AND SEROLOGY**

Emphasis on principles and uses/application, Immunity – Basic principles and classification, Antigen, Antibody (Immunoglobulin's), Complement system, Antigen – Antibody reactions, Hypersensitivity- classification & different skin tests used for diagnosis., Immunodeficiency diseases including AIDS – in brief, Autoimmunity – Basic concept, Immuno-prophylaxis & Immunization schedule, Vaccines-classification & uses.

### **PARASITOLOGY**



- Introduction & classification of medically important parasites, Intestinal & Tissue protozoa (E.histolytica, Giardia Primary Amoebic meningo-encephalitis)
- Malaria parasite, Leishmanial parasites, Tapeworms, Flukes of liver and , Intestine, Intestinal nematodes, Filarial worms and other tissue nematodes

## **VIROLOGY**

- General Characters of viruses, Classification in brief and name of the diseases they produce., Hepatitis viruses, HIV, (Polio, Rabies, Rata, Measles, Dengue)
- Oncogenic viruses in brief, Collection and transport of virological specimens
- Laboratory diagnosis of viral infections (various methods of virus culture, serology etc.)

## **PAPER-III**

### **BIOCHEMISTRY**

1. Glucose Homeostasis, overview DM, HGAIC.
2. Lipoprotein & Hyper Lipoprotein.
3. Liver function test.
4. Renal function test.
5. Thyroid function test.
6. Alimentary function test.
7. Water & Electrolytic Balance.

### **ORGAN FUNCTION TESTS**

1. Thyroid Function Tests
2. Renal Function Tests  
24 hr collection, preservation  
  
Physical characteristics, clearance tests.
3. Liver function tests
4. Gastric Function Tests
5. Pancreatic Function Tests  
Serum Amylase, Serum Trypsin, Serum Lipase,

6. Biochemical tests of CSF.
7. Instrumentation

## **ORAL AND PRACTICAL**

### **List of Practical's in Clinical Bio-chemistry**

1. Principals of colorimetry & overview of semi analyzer.
2. Determination of Glucose in Blood/Serum, Glucose Tolerance Tests
3. Quantition of Urea
4. Quantition of Creatinine
5. Quantition of Uric Acid
6. Cholesterol, Triglycerides, HDL Cholesterol, Lipid Profile  
(Demonstration Only)
7. Total serum protein and albumin
8. T<sub>3</sub>, T<sub>4</sub>, TSH (Data Interpretation Only)
9. Demonstrations of Electrophoresis & chromatogram

### **Model question papers in theory examination:**

- \* Short notes and Brief notes - 40%
- \* True or false/fill in the blanks-40%
- \*Long questions- 20%

**N.B-** The mark allotment per question will be according to full mark for each subject.

**Time for Theory Paper**

**50 Marks-----2hrs**

**60-100marks-----3hrs**

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