

DIPLOMA IN MEDICAL
LABORATORY TECHNOLOGY
SYLLABUS (DMLT) Revised in 2019



*Government of Odisha
Health & Family Welfare Department
Revised vide DMET-LT/RT-Board-13063 Dt. 20.09.2019*

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 as one of the subject.
3. Total marks of the DMLT Course is 1000.
4. Minimum pass mark of the trainees is 40% in Theory, 50% in Oral & 50% in Practical.
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

Annual Examination

Part-1- within 4 months of the commencement of course-April to May.

Part-2- within 10 months of the completion Part-1 examination February to March annual examination.

Part-3- within 10 months of the Part-2 examination December.

Supplementary examination within 6 weeks of annual result publication.

Model question paper

Theory

Time-

3hrs

Question-1-Fill in the blank

Question-2-Tru & False

Question-3-Briefnots

Question-4-short notes

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

Time for Theory Paper

50 Marks-----2hrs

60 Marks-----2^{1/2}

60-100marks-----3hrs

PART-1
BASIC COURSE ON MEDICAL LABORATORY TECHNOLOGY

Duration - 4 Months

Subject

16 weeks (110hrs)

1. Anatomy (Theory+ Practical) – 20hrs+10hrs
2. Physiology (Theory + Practical) - 20hrs+10hrs
3. Comm. Medicine, Computer Science+Statistics(Theory+ Practical) – 20hrs+10hrs
4. Pharmacology (Theory) – 20hrs

EXAM - First

Theory Paper I	Section-A	Anatomy	35
	Section-B	Physiology	35
Practical	Section-A	Anatomy	15
	Section-B	Physiology	15
Theory Paper II	Section-A	Comm. Medicine + Statistics,	40
	Section-B	Computer Science	20
	Section-C	Pharmacology	40

Total=200

N.B- No practical in paper-II

SECTION-A

ANATOMY

Total period - 4 months

Theory – 20 hrs.

Marks - 35

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, Blood Vessels, Lymphatic & R.E.System -Spleen, Thymus & Tonsils
6. **Respiratory System**- Nose, Pharynx, Larynx, Trachea, Bronchi Lungs and Pleura
7. **Digestive System**- Alimentary canal (different parts)-Liver, Gall Bladder, Pancreases Peritoneum
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 & Olfactory sensations, General Sensibilities like touch, pain, temperature.
10. **Central & Peripheral nervous system**- Brain & Spinal Cord.- Cranial & Spinal Nervous.- Autonomic Nervous System.
11. **Regional Anatomy (Only Demonstration)**– Extremities, Head & Neck, Thorax, Abd. & Pelvis, **Surface Anatomy**, Important Blood Vessels, Important Nerve, Important Muscles for Injection.

Practical – 10hrs

Marks - 15

35 Marks

Short Note 5x4=20

Fill in the blanks 1x10=10

Single Sentence Question1x5=5

35

SECTION-B
PHYSIOLOGY

Total Period – 4 months

Theory – 20 hrs.

Mark – 35

- 1- **Blood**- Composition and general function of blood. Description of blood cells - normal counts & function. Steps of coagulation, Anticoagulants. Cerebrospinal Fluid, Formation, Composition & Function. Importance of blood groups composition & function of lymph.
- 2- **Respiratory System** -Name of structures involved in respirations and their function. External and internal respiration. How inspiration, expiration are brought about Transport of O₂ and CO₂ 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.

Practical – 10hrs

Marks - 15

Note: The teaching of Anatomy & Physiology should be coordinated so that structure and function of different parts of human body are correlated.

Only brief outline of the subjects to be given.

Theory Paper-II

COMMUNITY MEDICINE (SPM)

Total period - 4 months

Theory – 20 hrs.

SECTION-A

Mark-35

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.

Part B

Mark-5

STATISTICS-GENERAL

TABULATIONS	:	Simple Tables, Frequency Distribution Tables
DIAGRAMS	:	Bar Diagrams, Histogram, Line Diagram Pie Diagram
STATISTICAL AVERAGES	:	Mean, Median, Mode
MEASURES OF DISPESION	:	Normal Curve, Range, Standard Deviation Standard Error.
TESTS OF SIGNIFICANCE	:	't' Test.

SECTION-B

Mark-20

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

Theory Paper-2 SECTION-C

PHARMACOLOGY

Total period - 4 months

Theory – 20 hrs.

Mark-40

1. **General Pharmacology**
Drug, Drug nomenclature, Route of administration, concept of Pharmacokinetics, Pharmacodynamics 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.**

Short Note-----4x5=20

Fill in the blank-----1x10=10

True or False-----10

40

PART-2 (DMLT)

TOTAL MARK- 400, DURATION OF COURSE - 10 MONTHS

<u>PAPER</u>	<u>SUBJECT</u>	<u>MARKS</u>	<u>TOTAL MARKS</u>	<u>DURATION</u>
PAPER-I MONTHS	<u>PATHOLOGY</u>			
	THEORY	100	150	10
	IMMUNOHEMATOLOGY			
	BLOOD BANKING			
	HEMATOLOGY			
	PRACTICAL	30		
ORAL	20			
PAPER-II MONTHS	<u>MICROBIOLOGY</u>			
	THEORY	100	150	10
	GEN. BACTERIOLOGY			
	SYST. BACTERIOLOGY			
	CLIN. MICROBIOLOGY			
	MYCOLOGY			
PRACTICAL	30			
ORAL	20			
PAPER-III MONTHS	<u>BIOCHEMISTRY</u>	(Total teaching hrs 50 (30 Theory + 20 Practical hrs)		
	THEORY	60		10
	1. Chemistry of	a) Carbohydrates including proctiglycon b) Fat c) Protein & Amino acid		
	2. Water & Fat soluble Vitamin, Plasma protein.			
	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.			
	PRACTICAL	25		Total
Marks	ORAL	15		100

Short Note-----4x10=40

Fill in the Blank----1x10=10

True or False-----1x5=5

Single Sentence Question1x5=5

PART-3 (FINAL DMLT)

<u>PAPER</u>	<u>SUBJECT</u>	<u>MARKS</u>	<u>TOTAL MARKS</u>
	<u>DURATION</u> PAPER-I		
	<u>PATHOLOGY</u>		
	THEORY -	100	150
	10		10
	MONTHS		
	HISTOTECHNOLOGY		
	CYTOLOGY		
	MUSEUM STUDY		
	ORAL	30	
	PRACTICAL	20	
PAPER-II	<u>MICROBIOLOGY</u>		
	THEORY	100	150
	10		
	MONTHS		
	IMMUNOLOGY		
	SEROLOGY		
	PARASITOLOGY		
	VIROLOGY		
	ANIMAL CARE		
	PRACTICAL	30	
	ORAL	20	
PAPER-III	<u>BIOCHEMISTRY</u>		
	THEORY	60	100
	10		10
	MONTHS		
	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.		
	PRACTICAL	25	
	ORAL	15	

NB. SECOND SEMESTER EXAMINATION WILL BE CONDUCTED TEN MONTHS AFTER FIRST SEMESTER EXAMINATION. TOTAL MARKS- 400.

THE FINAL EXAMINATION WILL BE CONDUCTED TEN MONTHS AFTER SECOND SEMESTER. TOTAL MARKS FOR WHICH WILL BE 400.

PART-3 (FINAL DMLT)

FINAL PAPER –I-PATHOLOGY

Total Marks: 150 Theory -100, Practical-30, Oral-20

HISTOTECHNOLOGY, CYTOLOGY, MUSEUM STUDY

Introduction, Cell, Tissue and their function., 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 blockmaking , 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, Meason Trichrome , Men – Geison , Reticulin , PAS, Fe, Lipid, Mucicarmine , Vencos 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. , Papanicolaous staining technique/MCC staining/HE staining/. , Sex chromatin staining. , Nuscum 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.

ORAL AND PRACTICAL

MARKS-30+20

Histotechnology and Cytology, Fixation, processing, embedding and section and , reparation 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 ,Papanicolaoue’s staining techniques., MOG staining /HE staining. , Mounting .

FINAL PAPER-II-MICROBIOLOGY

Total Marks: 150 Theory -100, Practical-30, Oral-20

IMMUNOLOGY AND SEROLOGY

Emphasis on principal 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.)

ANIMAL CARE

- Care of sheep and procedure to draw blood from sheep., Handling, feeding and Breeding of laboratory animals.

Practical & Oral Marks-30+20

(Serology + Parasitology + Virology + Animal Care)

Parasitology

Collection, transportation, preservation of faecal materials for examination of parasites.

- a) Saline and Iodine preparation of faeces for identification of Ova Cysts, RBC, Puscells, Macrophage bacterial and fungal study
- b) Concentration techniques for examination of faeces.

Blood smear examination for malaria parasite L.D. bodies, micro filarial etc.

Virology - (all theory discussion), Embryonated egg inoculation, Tissue culture techniques

- Serological tests for diagnosis of common viral diseases, HIV surveillance lab and EUSA / Rapid tests.

Serology -Widal test and preparation of Salmonella antigens, VDRI Test, Latest agglutination tests for (RA, CRP, ASO, Pregnancy Test, Australia Antigen, Toxoplasmosis)

ELISA test RIA Test, Gel diffusion techniques and, Immuno electro phoresis, Detection of Antigen / Antibody for Malarial (ICT), Optimal Test, Assay of immunoglobulins

Diagnostic skin tests

- Tuberculin test (montoux test), Lepromin test, Casoni's test, Other tests.

FINAL PAPER-III-BIOCHEMISTRY

Total Marks: 100 Theory -60, Practical-25, Oral-15

Teaching hrs 50 (Theory 30 hrs + Practical 20 hrs)

CLINICAL BIOCHEMISTRY

SECTION-A

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. Principles of colorimetry & overview of semi analyzer.
2. Determination of Glucose in Blood/Serum, Glucose Tolerance Tests
3. Quantitation of Urea
4. Quantitation of Creatinine
5. Quantitation of Uric Acid
6. Cholesterol, Triglycerides, HDL Cholesterol, Lipid Profile (Demonstration Only)
7. Total serum protein and albumin
8. T₃, T₄, TSH (Data Interpretation Only)
9. Demonstrations of Electrophoresis & chromatogram
