ONE Year DIPLOMA

In

Medical laboratory Technology

(2021-2022)

DEPARTMENT OF BIOTECHNOLOGY

ANWARUL ULOOM COLLEGE

(AUTONOMOUS)

HYDERABAD

DEPARTMENT OF BIOTECHNOLOGY

ANWARUL ULOOM COLLEGE

(NEW MALLEPALLY HYDERABAD)

Enrollment Form

For Diploma in "Medical laboratory technology" (DMLT)
(One year)

Affix passport size photograph

(Applicant)

1. Personal details

a. Name :

b. Gender :

c. Date of birth :

d. Email :

e. Phone number :

f. Qualification :

g. Specialization :

2. Institution/College details

a. Name :

b. Address :

Signature of Applicant

Anwarul Uloom College (Autonomous)

Department of Biotechnology

One Year Diploma in Medical Lab Technology

2020-2021

PAPER	Paper / Title	Teaching Hours /Week	Units	Credits	Marks		
					Internal Assessment	Semester	Total
I	BIOCHEMISTRY	4	4	4	20	80	100
	BIOCHEMISTRY - Practical	2	_	1	-_	25	25
ll	MICROBIOLOGY	4	4	4	20	80	100
	MICROBIOLOGY - Practical	2	_	1	-_	25	25
III	PHYSIOLOGY	4	4	4	20	80	100
	PHYSIOLOGY – Practical	2	_	1	_-	25	25
IV	PATHOLOGY PATHOLOGY - Practical	4 2	4 -	4 1	20 -	80 25	100 25
		24	16	20	80	420	500

Head of the Department

Diploma in Medical Laboratory Technician

Diploma in Medical Laboratory Technician (DMLT) is one of the leading courses in the medical industry. It is the peak course which ensures that students become successful lab technicians after the completion of their training Doing a diploma in medical lab technician is going to help secure all the dreams in the medical professional.

Being an extensively popular course, the importance of this course is also very much.
Medical laboratory technologists (MLTs) play a **critical role in the health system** by performing lab tests on blood, body fluids, cells and tissues – nearly half a million in Ontario each day.

A blood sugar test to diagnose and monitor diabetes...a biopsy to check for cancer…prenatal testing to detect genetic diseases…enzyme analysis to identify heart disease…assessment of cells and tissues to aid surgical decisions - these and thousands of other **tests performed by MLTs provide the results other health professionals need to deliver the best care**.
MLTs in various specialties collect and process specimens, analyze results, and interpret findings. The **knowledge and expertise of the MLT contributes to innovation in the prevention, diagnosis and treatment of diseases** and medical conditions.

DIPLOMA IN MEDICAL LAB TECHNOLOGY

Course Overview

Duration: 1 Year

Diploma in Medical Laboratory Technology is a 1-year diploma course designed to impart experiential learning to the students in order to develop a desired workforce to combat ever increasing demand of medical lab technicians in the healthcare sector. The course is designed with specific inputs from industry experts, based on the latest technologies available and in practice, for individuals interested in entering the field of clinical laboratory science. This course will cover all aspect of clinical lab analysis including analysis of body matter, Hematology, Biochemistry, Pathology, Microbiology, Serology and Blood Banking etc. Students will also learn operations of advanced lab equipments used for providing various laboratory tests reports.

Course Educational Objectives

- Students will have knowledge and research practices required for clinical testing laboratories.
- Students will be able to function efficiently, confidently and safely in clinical laboratory settings including hospital environments.
- Students will be able to follow ethical practice associated with medical lab technology.
- Students will have updated knowledge of research trends in health care.
- Students will be able to work and communicate effectively in inter-disciplinary environment, either independently or in a team, and demonstrate significant leadership qualities.
- Students will engage in life-long learning and professional development through continuing education by graduate programs.

Course Outcomes

Upon the completion of the course student will be able to:

- Apply knowledge and technical skills associated with medical lab technology.
- Perform routine clinical laboratory procedures within acceptable quality control parameters in hematology, chemistry, immune-hematology, and microbiology.
- Demonstrate technical skills, social behavior, and professional awareness imperative upon a laboratory technician.
- Apply problem solving techniques in identification and correction of procedural errors, instrument malfunctions and verifying the accuracy of laboratory results.
- Demonstrate ability to plan and implement professional activities.
- Understand professional and ethical responsibility in medical lab technology practices.
- Efficiently execute well-designed research experiments, and contribute to organization, analysis and interpretation of clinical data.
- Understand the impact of laboratory tests in a global and environmental context.
- Work as a leader in the diverse professional and industrial research areas.
- Communicate effectively by oral, written, and graphical means.
- Recognize the need to engage in lifelong learning through continuing education and research.

Core Modules

Human anatomy & physiology, pathology, microbiology, biochemistry, blood banking, biomedical techniques and ethics, and advanced diagnostic techniques.

Career Avenues

Diploma holders in medical lab technology would typically be recruited as:

- Medical lab technicians
- Technologists.
- Lab information system analyst
- Healthcare administrator
- Hospital outreach assistant coordinator

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DMLT (2021 – 2022)

Paper I: Biochemistry

Unit-I: Carbohydrates and Lipids

- Carbohydrates:-Importance, classification and properties
- Structure, configuration and biochemical importance of monosaccharide (glucose and fructose).
- Disaccharide: Maltose, iso-Maltose and lactose
- Structure and function of polysaccharides-Starch, glycogen.
- Lipids:-Classification of lipids (Saturated and Un-saturated Fatty acids).
- Properties and Nomenclature of lipids
- Triacylglycerols,

Unite II: Proteins and Enzymes

- Proteins: Definition, classification structure and properties of amino acids.
- Primary, Secondary, Tertiary and Quaternary Structure of proteins
- Enzymes:-Classification and nomenclature of enzymes, Kinetics of enzyme catalyzed reactions
- Factors influencing enzymatic reactions:-pH, Temperature, Substrate concentration, Enzyme concentration.
- Catabolism of amino acids--Phenylalanine and tyrosine, Phenylketonuria and albinism.
- Acid base balance concepts & disorders - pH, Buffers, Acidosis, Alkalosis

Unit-III - Clinical Biochemistry (15 Hours)

- Endocrine glands & hormones
- Types of hormones
- Control of Hormones secretion
- Endocrine glands
- Hormones of Heart & Kidney
- Hyperglycemia & hypoglycemia
- Diabetes mellitus - definition, types, features, gestation diabetes mellitus,
- Glucose tolerance test, glycosuria

Unit IV: Metabolism

- Glycolysis, TCA cycle
- Gluconeogenesis, Glycogenolysis
- Beta-Oxidation of Fatty acids
- Cholesterol metabolism
- Urea cycle
- Nitrogen metabolism: Nitrate and ammonium assimilation

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DMLT (2021 – 2022)

Paper II: Microbiology and Immunology

UNIT I: Fundamentals of Microbiology.

- Historical Development of Microbiology and contributors of Microbiology
- Microscopy: Bright Field, Dark Field, Phase Contrast and Fluorescent Microscopy.
- Scanning and Transmission Electron Microscopy.
- Structure and General characters of Virus,
- Structure and General characters of Bacteria,
- Structure and General characters of Fungi.

UNIT II: Sterilization

- Sterilization: Physical and Chemical.
- Pure Culture: Isolation, Identification and maintenance.
- Concept of containment facility
- Sterilization of industrial food
- Types of anti-microbial agent
- Development of resistance by microorganisms to various chemicals

UNIT: III BASICS OF IMMUNOLOGY

- Types of Immunity- innate and Acquired
- Antigens-Immunogenicity Versus Antigenicity. Factors affecting antigenicity, epitopes.
- Structure of different Immunoglobulins; types and functions of immunoglobulins
- Classes of Immunoglobulins. (IgG,IgA,IgM,IgE, IgD .
- Antigen-Antibody reactions.
- Monoclonal Antibody Production (Mabs) production and its applications.
- Hypersensitivity – Types of Hypersensitivity.
- Autoimmune disease – mechanism of Autoimmunity.

UNIT IV: PRINCIPLES OF IMMUNOLOGY

- Cells of Immune system
- Granulocytes – neutrophils, basophils and eosinophils
- Organs of Immune system – Primary lymphoid organs (Bone marrow and Thymus)
- Secondary lymphoid organs (Lymph nodes, spleen, peyer’s patches, tonsils)
- Gammaglobulinemia
- Selective Ig deficiency

Paper – I Biochemistry

Practical

1. Instrumentation
2. Estimation of sugar by anthrone method
3. Estimation of proteins by biuret method
4. Qualitative test of sugars and proteins
5. Estimation of sugar in blood
6. Glucose tolerance test
7. Estimation of cholesterol
8. Estimation of serum creatinine
9. Estimation of serum urea
10. Estimation of serum uric acid

Paper II: Microbiology and Immunology

1. Preparation of media
2. Isolation of microorganism from blood and urine
3. Microscopy
4. Gram staining and acid-fast staining
5. Widal test
6. Vrdl test
7. ELISA test
8. Antibiotic sensitivity

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MLT (2021 – 2022)

Paper III: Human Physiology

Unit: I: Hematology

- Blood-composition, function, cellular component & their functions
- Hemoglobin & anemia
- Blood groups and coagulation
- Lymphatic system-Composition & function of lymph
- Lymphatic tissue
- Immunity with the role of thymus

Unit: II Cardiovascular system

- Structure and Functions of heart
- Cardiac cycle
- Heart rate
- Blood pressure, mechanism of circulation
- Definition of hypertension & shock
- Cell composition of normal adult bone marrow

Unit: III Respiratory system

- Parts of respiratory system
- Mechanism of respiration
- Pulmonary function
- Pulmonary circulation, lungs volume
- Gas transport between lungs and tissues
- Definition of hypoxia, dyspnea, cyanosis, asphyxia and obstructive airways diseases.

Unit: IV Gastrointestinal physiology

- Organs of GIT and their structure & function
- Secretion, digestion, absorption and assimilation
- Gastrointestinal hormones
- Physiology of digestion of carbohydrates, proteins & lipids
- Structure & function of liver, spleen, gall bladder & pancreas, Jaundice
- Cirrhosis & Pancreatitis

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DMLT (2021 – 2022)

Paper IV: Pathology

Unit I: Cell Injury and Cellular Adaptations

- Normal Cell
- Cell Injury- types of cell injury, etiology of cell injury, morphology of cell injury, cellular swelling.
- Cell death: types- autolysis, necrosis, apoptosis & gangrene.
- Cellular adaptations-atrophy, hypertrophy, hyperplasia & dysplasia.
- Inflammation: Acute inflammation - vascular event, cellular event, inflammatory cells
- Chronic Inflammation - general features, granulomatous inflammation, tuberculoma.

Unit II: Hemodynamic Disorders

- Oedema, hyperemia, congestion, hemorrhage
- Circulatory disturbances, thrombosis, ischemia& infarction.
- Neoplasia: Definition, how does it differ from hyperplasia
- Difference between benign tumor and malignant tumor
- Healing Definition, different phases of healing,
- Factors influencing wound healing

Unit III: Pathology of Urine

- Collection of urine and its preservation
- 24-hour urine collection for protein
- Urine sediment preparation
- Urine composition
- Physical characteristics of Urine
- Substances found in normal urine
- Pathological urine constituents –Proteinuria, Glucosuria, Ketonuria

Unit IV: Pathology of Blood

- Blood disorders: Anemia, Sickle cell anemia, Lymphocytopenia, Eosinophilia
- Leukemia- Types, symptoms, treatment
- Blood clotting disorders: Hemophilia, Blood clotting, Blood poisoning, Blood donation
- Principle and practice of blood transfusion
- Health check before blood donation

Practical

Paper III: Physiology

1. Collection of samples
2. Administration of drugs (infection types)
3. Estimation of hemoglobin
4. RBC count in blood
5. WBC count in blood
6. Platelet count in blood

Paper IV: Pathology

1. Separation of serum in blood
2. Identification of Blood grouping
3. E. S. R
4. Checking of Blood pressure
5. Estimation of proteins in urine and sugars