

**DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR.**



NAAC- 'A' Grade

CIRCULAR NO.SU/ Science & Technology/ Diploma /03/2026.

It is hereby inform to all concerned that, Ad-hoc Board and recommended by the Dean, Faculty of Science & Technology **Academic Council** at it's meeting held on 16 March, 2026 has been accepted as per National Education Policy-2020" the following syllabi under the Faculty of Science & Technology run at the University Department, Dr. Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No	Subject Name	Semester
1.	<i>Diploma in Medical Imaging Technology (DMIT)</i>	III & IV
✓ 2.	<i>Diploma in Medical Laboratory Technology (DMLT)</i>	III & IV

This is effective from the Academic Year 2025-26 onwards under the Faculty of Science & Technology.

All concerned are requested to note the contents of the circular and bring notice to the students, teachers and staff for their information and necessary action.

University campus,
Chhatrapati Sambhajanagar-431004.
Ref. No. S.U/Sci & Tech/Diploma./2025-26/
Date: 03/ 06/ 2026

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**Deputy Registrar,
Syllabus Section**

Copy forwarded and Information to necessary action:-

- 1] **The Director, Department, Entrepreneurship and Skill Development Centre (ESDC), Deen Dayal Upadhyay Kaushal Kendra, Dr. Babasaheb Ambedkar Marathwada University.**
- 2] **The Director, Board of Examination & Evaluation,**
- 3] **The Director, University Network & Information Centre, UNIC, with a request to upload this circular on University Website.**
Dr. Babasaheb Ambedkar Marathwada University **Chhatrapati Sambhajanagar.**

**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR**



Two Year Diploma

**Medical Laboratory Technology
(DMLT)**

IIIrd and IVth Semester

As per National Education Policy-2020

From the Academic Year 2026-27 & Onwards.

Director

**Deen Dayal Upadhyay Kaushal Kendra,
Dr. Babasaheb Ambedkar
Marathwada University,
Chhatrapati Sambhajinagar(MS)-431004**

Syllabus of Semester III of

Two years Diploma in Medical Laboratory Technology (DMLT) as per NEP 2020

DMLT SEMESTER III							
Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Lab Course	Theory	Lab Course	
Major (Core) M7 Mandatory	MLT/DSC/T/200	Histopathology and Cytology	2		2		2+2=4
	MLT /DSC/P/226	Histopathology and Cytology Lab		4		2	
Major (Core) M8 Mandatory	MLT/DSC/T/201	Introduction to Microbiology	2		2		2+2=4
	MLT /DSC/P/277	Introduction to Microbiology Lab		4		2	
Minor	MLT/MN/T/200	Radiology Basics I	2		2		2+2=4
	MLT/MN/T/201	Radiology Basics II	2		2		
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) It should be chosen compulsorily from the faculty other than that of Major	MLT /GE/OE/T/200	Human Biochemistry in Medical Laboratory- 1	2		2		2
SEC (Skill Enhancement Courses) (Choose any one from pool of courses)	MLT /VSC/T/200	Introduction to Blood Banking, Serology and Immunology	2		2		2
	MLT /VSC/T/201	Pathology and Pharmacology	2		2		
AEC, VEC, IKS	MLT /AEC/T/200	English- 2 (Common for all the faculty)	2		2		2+2 =4
	MLT /AEC/T/201	Environmental Studies (Common for all the faculty)	2		2		
OJT/ FP/CEP/CC/RP	MLT/CC/P/226	Cultural Activity/ NSS, NCC (Common for all Faculty)				2	2
							22


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MAJOR-MANDATORY COURSES

Director
Open Dental Specialty Center
Dr. Barbara A. Koster
Marquette University
Chicago, IL 60604-1004

MLT/DSC/T/200 : Histopathology and Cytology

Course Type: TH; Major
Total Credits: 02

Total Contact Hours: 30 Hrs.
Maximum Marks : 50

Learning Objectives of the Course:

The Course aims to :

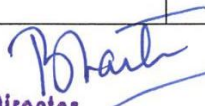
1. Impart knowledge of the normal microscopic structure and function of cells, tissues, and organs.
2. Train students to identify and differentiate normal, abnormal, benign, and malignant cellular and tissue features.
3. Equip students with practical skills in standard staining techniques, including Hematoxylin & Eosin (H&E) staining, special stains, and cytological stains such as the Papanicolaou (Pap) stain.

Course Outcomes (COs) :

Upon successful completion of the course, students will be able to:

1. Demonstrate understanding of the basic principles and workflow of histopathology and cytopathology laboratories
2. Handle, label, and process biological specimens safely and correctly according to standard protocols
3. Perform tissue processing procedures including fixation, dehydration, clearing, embedding, and section cutting, and staining.

Unit No.	Course Content	Content Hours
I	1. Introduction to Histopathology and Histotechnology 2. Methods of Examination of cell and tissue 3. Fixatives 4. Reception Processing and reporting	10 Hrs.
II	1. Embedding of tissue and Paraffin Block Preparation 2. Automation in Histotechnology 3. Section Cutting 4. Staining- Hematoxylin and Eosin 5. Mounting Medias	10 Hrs.
III	1. Introduction to Cytology 2. Cytology of Various body fluids 3. FNAC 4. PAP 5. Giemsa's Stain	10 Hrs.


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MLT/DSC/P/226 : Histopathology and Cytology - Lab	
Course Type: LAB; Major Total Credits: 02	Total Contact Hours: 60 Hrs. Maximum Marks : 50
Learning Objectives of the Course: The Course aims to : 1. Impart knowledge and train students to identify and correctly handle different types of tissue specimens. 2. Demonstrate proper specimen fixation techniques and understand the role of fixatives such as formalin. 3. Equip students with hands-on training in tissue processing procedures, including dehydration, clearing, and paraffin embedding techniques.	
Course Outcomes (COs) : Upon successful completion of the course, students will be able to: 1. Demonstrate proper collection, labeling, handling, fixation, and preservation of histopathology and cytology specimens according to standard laboratory procedures. 2. Perform tissue processing, embedding, and microtomy, smear preparation, and slide mounting techniques accurately and safely. 3. Carry out routine and special staining procedures including Hematoxylin and Eosin (H&E) and cytological staining methods such as Papanicolaou stain.	
At least Six experiments have to be performed 1. Collection, labelling, and preservation of tissue specimens 2. Fixation of tissues (commonly in formalin) 3. Tissue processing: dehydration, clearing, and embedding 4. Microtomy (cutting thin tissue sections using microtome) 5. Slide preparation and mounting 6. Routine staining techniques (e.g., Haematoxylin and Eosin stain) 7. Identification of normal and pathological tissue sections under microscope 8. Preparation of cytological smears (scraping, aspiration, exfoliative methods) 9. Fixation and staining of smears (e.g., Pap stain, Giemsa stain) 10. Fine Needle Aspiration Cytology (FNAC) technique demonstration 11. Examination of cervical cytology (Pap smear) 12. Identification of normal, inflammatory, and malignant cells.	
Text Books: 1. Basic and Advanced Laboratory Techniques in Histopathology and Cytology, BY Pranab Dey, 2018 2. Techniques in Histopathology & Cytopathology, by Sadhana Vishwakarma, Jaypee Brothers Medical Publishers.	
Reference Books: 3. Robbins and Cotran Pathologic Basis of Disease, by Vinay Kumar, Abul K. Abbas, Jon C. Aster, 10th Edition, 2021 4. Diagnostic Cytopathology, by Winifred Gray, Gabrijela Kocjan, 3rd Edition, 2020.	

Online Reference:		
1. https://www.intechopen.com/books/12319?utm_source=chatgpt.com 2. https://www.papsociety.org/image-atlas/		
MLT/DSC/T/201 : Introduction to Microbiology		
Course Type: TH; Major Total Credits: 02		Total Contact Hours: 30 Hrs. Maximum Marks : 50
Learning Objectives of the Course: The Course aims to : 1. Promote the knowledge of the basic concepts, scope, and importance of microbiology in healthcare and biological sciences. 2. Impart to students a comprehensive understanding of the structure, classification, and characteristics of microorganisms, including bacteria, viruses, fungi, and parasites. 3. Explain the role of microorganisms in health, disease causation, and infection processes.		
Course Outcomes (COs) : Upon successful completion of the course, students will be able to: 1. Describe the fundamental concepts, scope, and significance of microbiology in health and disease 2. Classify and explain the basic structure and characteristics of microorganisms including bacteria, viruses, fungi, and parasites 3. Interpret the role of microorganisms in infection, disease causation, and epidemiology.		
Unit No.	Course Content	Content Hours
I	General Bacteriology 1. Introduction to microbes, Source of infection, Models of spread, Bacterial Cell, Bacterial Spore, growth requirements of bacteria, Bacteria cycle 2. Study of Microscope, Features, type of microscope, Core of microscope, Phase contrast, Election Microscope and dark field microscope 3. Sterilization and disinfection, Definition, Methods of sterilization procedures, techniques and uses, Clinical importance 4. Identification of bacteria, Morphology principle and staining procedure, Gram's stain, Zieh/Nelson stain,	10 Hrs.

	Modified ZN staining, Albert stain, Fontana's method, Lividiti's Method 5. Common culture media in laboratories, types and classification, Nutrient broth, Peptone water, Sugar media, Hiss serum water, thyoglycolate transport media, Venkatra Raman's Media, Agar media, Nutrient Agar, Blood agar, Desoxycholate citrate agar, Chocolate agar, Loffler's media, Dorset egg Media, Macconkey Media, Lowenstein Jenson Media, Blood potassium tellurite media, TC B S Media, Bile salt Agar media, Mueller Hinton Agar, Sabourands Agar 6. Basic Principles of antibiotic susceptibility method of sensitivity testing	
II	Systemic Microbiology Study Bacteria: Gram Positive and Gram Negative Organisms 1. Staphylococci: Habitat, Morphology, Antigenic classification structure, Cultural characteristics, biochemical reactions, enzymes, Toxins, Pathogenicity, Serology, Sensitivity tests, Clinical importance 2. Streptococci: Morphology, Classification, Cultural characters, Toxins, Biochemical reactions, toxins, enzymes, pathogenicity, Serology, antibiotic, Sensitivity tests, Anaerobic streptococci, pathogenicity, clinical importance. 3. Pneumococci: Morphology, Cultural Characteristics, Biochemical properties, Antigenic structure, Pathogenicity, Bacterial Sensitivity, Laboratory diagnostics. 4. Neisseria: Human Pathogens, Grono coccus, Morphology Culture characteristics, Biochemical reactions, Pathogenesis, Laboratory diagnosis, Meningo coccus, Morphology culture characteristics, Biochemical reactions, Pathogenicity, Laboratory diagnosis 5. Corynebacterium Diphtheriae: Morphology and staining, Cultural Characters, Biochemical reactions, Toxins, Pathogenicity, Shick test, Eleck test, Laboratory diagnosis 6. Mycobacterium tuberculosis: Mycobacterium Leprae 6.1 Mycobacterium tuberculosis: Morphology, staining, Cultural Characters, BCG Vaccine, Tuberculin test, Pathogenicity, Lab Diagnosis, Atypical mycobacteria, Clinical importance	10 Hrs.

	6.2. Mycobacterium Leprae; Morphology, Pathogenicity, Lab Diagnosis, Bacteriological index, Morphological index, granularity index (SFG index), Lepromin test, Clinical importance.	
III	Mycology, Basic Virology and QC in Microbiology 1. Mycology Introduction, classification, Common pathogenic fungi Difference between Fungi and Bacteria; Yeast and Mucor, Clinical and Lab Diagnosis, Morphology of Fungal thallus, Vegetative structure of dermatophytes, asexual spores of chlamydo spores, arthrospores, sporangium of mucor, conidiospores of aspergillus, spore head of penicillium multi cellular conidia of alternaria species, candidiasis; Appearances of different fungi in tissues; Dermatophyte infections; Taenia, Deep mycosis Serological tests used in medical mycology 2. Basic Virology Introduction, Classification of Virus, RNA and DNA virus Bacteriophage, Host life cycle; General properties of virus Cultivation of virus, Virus structure, Lab diagnosis HIV and AIDS; Hepatitis virus, Hepatitis A, B, C, D and E of various types of hepatitis virus.	10 Hrs.
MLT/DSC/P/277 : Introduction to Microbiology – Lab Course Type: Lab; Major Total Contact Hours: 60 Hrs. Total Credits: 02 Maximum Marks : 50 Learning Objectives of the Course: The Course aims to : 1. Impart knowledge of the basic principles and scope of microbiology laboratory work. 2. Promote adherence to laboratory safety practices, aseptic techniques, and infection control procedures through appropriate training and supervision. 3. Equip students with the knowledge and practical skills to identify and correctly use common microbiology laboratory equipment and instruments. Course Outcomes (COs) : Upon successful completion of the course, students will be able to: 1. Demonstrate proper microbiology laboratory safety practices, aseptic techniques, and infection control measures during laboratory procedures. 2. Identify, operate, and maintain basic microbiology laboratory equipment, instruments, and materials effectively.		

3. Carry out microbial staining techniques, including Gram staining, and interpret microscopic findings based on morphology and staining characteristics.

At least Six experiments have to be performed

1. To study the rules, equipment, and safety measures used in a microbiology laboratory.
2. To understand the parts and proper handling of a microscope for microbial observation
3. To prepare nutrient media for the growth of microorganisms.(Preparation of culture media)
4. To study different methods of sterilization used in microbiology (Sterilization techniques)
5. To learn safe transfer of microbial cultures without contamination (Aseptic transfer technique)
6. To differentiate bacteria into Gram-positive and Gram-negative groups(Gram staining)
7. To determine whether bacteria are motile or non-motile(Motility test)
8. To observe live bacterial motility under the microscope.(Hanging drop method)
9. To isolate pure bacterial colonies from mixed cultures.(Streak plate method)
10. To cultivate microorganisms evenly on agar plates(Spread plate technique)
11. To study different phases of bacterial growth. (Bacterial growth curve)
12. To determine the effect of antibiotics on bacterial growth.(Antibiotic sensitivity test)
13. To examine size, shape, color, and texture of bacterial colonies (Colony morphology study)

Text Books:

1. Ananthanarayan and Paniker's Textbook of Microbiology, 12th Edition, 2022
2. Prescott's Microbiology,by Joanne Willey, Linda Sherwood, Christopher J. Woolverton, 10th Edition (commonly used), 2016.

Reference Books:

1. Jawetz, Melnick & Adelberg's Medical Microbiology, BY Geo. F. Brooks et al., 28th Edition, 2019, publisher - McGraw-Hill
2. Review of Medical Microbiology and Immunology,by Warren E. Levinson et al., 17th Edition, 2022.

Online Reference:

1. <https://biopedia.in/prescotts-microbiology-12th-ed-by-joanne-willey-kathleen-sandman-and-dorothy-wood/>
2. [https://bio.libretexts.org/Courses/City_College_of_San_Francisco/Introduction to Microbiology \(Liu et al.\)](https://bio.libretexts.org/Courses/City_College_of_San_Francisco/Introduction_to_Microbiology_(Liu_et_al.))

MINOR COURSES

MLT/MN/T/200 : Radiology Basics - I

Course Type: TH; Minor
Total Credits: 02

Total Contact Hours: 30 Hrs.
Maximum Marks : 50

Learning Objectives of the Course:

The Course aims to :

1. Impart knowledge to students regarding common medical imaging techniques and their applications in healthcare diagnostics.
2. Familiarize students with the concepts of normal and abnormal imaging findings and equip them with the ability to identify basic abnormalities in medical images.
3. Create awareness among students of radiation safety principles and equip them with the knowledge to adhere to safe imaging practices in clinical settings.

Course Outcomes (COs) :

Upon successful completion of the course, students will be able to:

1. Explain the basic principles of radiology and imaging techniques.
2. Identify common imaging techniques such as X-ray.
3. Recognize normal anatomical structures in common radiological images.

Unit No.	Course Content	Content Hours
I	Basics of Radiology 1. Introduction & role of radiology 2. Branches of radiology (diagnostic & therapeutic – basic idea) 3. Basic principles of X-ray imaging 4. Formation of X-rays (basic concept) 5. Radiopaque vs radiolucent 6. Basic X-ray equipment (tube, film/detector – overview)	10 Hrs.
II	Imaging Modalities 1. Overview of imaging modalities: a. X-ray b. Ultrasonography (USG) c. Computed Tomography (CT) d. Magnetic Resonance Imaging (MRI) 2. Basic working principle of each modality 3. Advantages and limitations (basic comparison)	10 Hrs.
III	Basic Image Interpretation 1. Common X-rays: Chest, Bone, Abdomen 2. Positioning basics (AP, PA – simple idea) 3. Basic normal anatomy (chest & bones)	10 Hrs.

	4. Common conditions: fracture, pneumonia, tuberculosis 5. Basic radiology terminology 6. Introduction to report reading (very basic) 3.6.Distance and time control	
Text Books		
1. Herring, W.Learning Radiology: Recognizing the Basics (4th Edition, 2020).Elsevier 2. Sutton, D.Textbook of Radiology and Imaging (7th Edition, 2003). Churchill Livingstone/Elsevier.		
Reference Books		
1. Weir, J., Abrahams, P.H.,Imaging Atlas of Human Anatomy (5th Edition, 2016). 2. Bushberg, J.T., Seibert, J.A., Leidholdt, E.M., Boone, J.M. The Essential Physics of Medical Imaging (4th Edition, 2020). Wolters Kluwer.		
Online References		
1. https://en.wikipedia.org/wiki/Radiopaedia?utm_ 2. World Health Organization (WHO) – Radiation safety information		

MLT/MN/T/201 : Radiology Basics – II

Course Type: TH; Minor
Total Credits: 02

Total Contact Hours: 30 Hrs.
Maximum Marks : 50

Learning Objectives of the Course:

The Course aims to :

1. Provide students with a comprehensive understanding of the normal radiological anatomy of major body systems.
2. Develop student's basic knowledge and skills in correlating radiological findings with symptoms.
3. Equip students with basic knowledge and diagnostic reasoning skills for the interpretation of imaging findings in clinical practice.

Course Outcomes (COs) :

Upon successful completion of the course, students will be able to:

1. Explain the role, indications, and basic interpretation of contrast-based radiological investigations.
2. Apply principles of radiation protection, including ALARA, and identify safety measures for patients and healthcare workers

Unit No.	Course Content	Content Hours
I	Laboratory Role 1. Role of lab personnel in radiology 2. Patient preparation (fasting, consent – basic) 3. Assistance during imaging procedures 4. Handling of patients (basic care & communication) 5. Coordination with radiology department 6. Record keeping (basic documentation)	10 Hrs.
II	Contrast Studies 1. Basics of contrast media (simple concept) 2. Types (iodine, barium – basic idea) 3. Purpose and common uses 4. Route of administration (oral, IV – basic) 5. Basic precautions and patient preparation 6. Introduction to adverse reactions (basic awareness)	10 Hrs.
III	Radiation Safety 1. Radiation hazards 2. ALARA principle 3. Units of radiation (very basic idea) 4. Basic protective measures: ○ Lead apron ○ Thyroid shield ○ Shielding devices 5. Time, distance, shielding principle 6. Safety precautions for patients and staff	10 Hrs.

Generic / Open Elective Course

MLT/GE/OE/T/200 : Human Biochemistry in Medical Laboratory -1 Course Type: TH; GE/OE Total Credits: 02 Total Contact Hours: 30 Hrs. Maximum Marks : 50		
Learning Objectives of the Course: The Course aims to : 1. Provide knowledge to students and develop an understanding of the basic principles and importance of clinical biochemistry in medical laboratory science. 2. Describe the structure, function, and metabolism of carbohydrates, proteins, lipids, enzymes, vitamins, and minerals. 3. Familiarize students with common laboratory equipment and instruments used in biochemistry laboratories.		
Course Outcomes (COs) : Upon successful completion of the course, students will be able to: 1. Explain the fundamental concepts of clinical biochemistry and the biochemical basis of normal human physiology and common diseases. 2. Demonstrate proper collection, handling, processing, preservation, and storage of specimens used in biochemical investigations. 3. Apply biochemical knowledge for patient safety in laboratory.		
Unit No.	Course Content	Content Hours
I	Basic Biochemistry and Biomolecules • Introduction to biochemistry and its relevance to medical laboratory • Structure and function of carbohydrates • Structure and function of lipids • Structure and function of proteins • Enzymes: classification, mechanism of action, factors affecting enzyme activity • Vitamins: fat-soluble and water-soluble vitamins (functions and deficiency)	10 Hrs.
II	Metabolism and Clinical Biochemistry • Carbohydrate metabolism: glycolysis, glycogenesis, glycogenolysis (overview) • Lipid metabolism: fatty acid oxidation and synthesis (overview) • Protein metabolism: amino acids, transamination, deamination • Clinical importance of blood glucose, lipid profile, and protein levels • Liver function tests (LFT)	10 Hrs.

	Renal function tests (RFT)	
III	Body Fluids, Electrolytes and Biochemical Applications in laboratory - Body fluids: composition and functions - Acid–base balance and pH regulation - Electrolytes: sodium, potassium, calcium, chloride – functions and imbalance - Plasma proteins and their clinical significance - Role of biochemistry in disease diagnosis and Laboratory correlation	10 Hrs.
Text Books - Satyanarayana U, Chakrapani U. Biochemistry. 6th ed. Elsevier; 2022. - Murray RK, Bender DA, Botham KM, Kennelly PJ, Rodwell VW, Weil PA. Harper’s Illustrated Biochemistry. 32nd ed. McGraw-Hill Education; 2021.		
Reference Books - Vasudevan DM. Textbook of Biochemistry for Medical Students. 10th ed. Jaypee Brothers Medical Publishers; 2023. - Devlin TM. Textbook of Biochemistry with Clinical Correlations. 7th ed. Wiley-Liss; 2010.		
Online References - MedlinePlus – Clinical Biochemistry: https://medlineplus.gov - Khan Academy – Biochemistry: https://www.khanacademy.org		

Skill Enhancement Courses

MLT/VSC/T/200 : Introduction to Blood Banking, Serology and Immunology

Course Type: TH; VSC

Total Contact Hours: 30 Hrs.

Total Credits: 02

Maximum Marks : 50

Learning Objectives of the Course:

The Course aims to :

1. Provide knowledge to students and develop an understanding of the basic concepts, scope, and importance of blood banking, serology, and immunology in medical laboratory science.
2. Familiarize students with an understanding of the structure and functions of the immune system, including innate and acquired immunity.
3. Equip with an understanding of the characteristics and functions of antigens, antibodies and immune responses.

Course Outcomes (COs) :

Upon successful completion of the course, students will be able to:

1. Identify ABO and Rh blood groups and perform blood grouping and compatibility testing procedures accurately.
2. Perform basic serological techniques such as agglutination, precipitation, and enzyme-linked immunological tests used in disease diagnosis.
3. Screen donor blood for transfusion-transmitted infections using standard laboratory methods.

Unit No.	Course Content	Content Hours
I	1. Basic Principles in Blood banking: Organization 1.1 Introduction 1.2 Blood Bank Organization and planning 1.3 Equipment required 1.4 Documentation 1.5 Selection of donors and collection of blood 1.5.1 Donor selection 1.5.2 Information provided to the Donors 1.5.3 Collection of blood from donors 1.5.4 Samples of Laboratory tests 1.6 Disposal of Blood and Laboratory Material 1.7 Safety of Blood	10 Hrs.
II	1. Blood Groups 1.1 Introduction 1.2 ABO blood group system	10 Hrs.

	1.3 Technique of blood grouping 1.4 Bombay blood group 1.5 The RH blood group system 1.6 Compatibility test or Cross matching 1.7 Rh Sensitivity and Rh Immunization Erythroblastosis foetalis	
III	<u>Serology and Immunology</u> 1. Immunology, Immune response and Immunity 2. Immune Paralysis and Immunoglobulins 3. Immunodiagnosics EIA/ELISA 4. Immuno diffusion 5. Flow Cell Cytometry 6. Applied Microbiology 7. Hospital Acquired Infection	10 Hrs.
Text Books 1. Harmening DM. Modern Blood Banking & Transfusion Practices. 7th ed. F.A. Davis Company; 2018. 2. Abbas AK, Lichtman AH, Pillai S. Cellular and Molecular Immunology. 10th ed. Elsevier; 2021.		
Reference Books 1. Owen JA, Punt J, Stranford SA. Kuby Immunology. 8th ed. W.H. Freeman; 2018. 2. Godkar PB, Godkar DP. Textbook of Medical Laboratory Technology. 3rd ed. Bhalani Publishing House; 2019.		
Online References 1. https://www.redcrossblood.org?utm_ 2. https://www.ncbi.nlm.nih.gov/books/?utm_		

MLT/VSC/T/201 : Pathology and Pharmacology		
Course Type: TH; VSC		Total Contact Hours: 30 Hrs.
Total Credits: 02		Maximum Marks : 50
Learning Objectives of the Course: The course aims to : 1. Familiarize students with an understanding of the basic concepts and principles of pathology. 2. Impart the knowledge of basic principles of pharmacology and the therapeutic use of drugs. 3. Provide students with fundamental knowledge of hematological and clinical pathology investigations used in disease diagnosis and laboratory practice.		
Course Outcomes (COs) : Upon successful completion of the course, students will be able to: 1. Explain the basic concepts of pathology, including the causes, mechanisms, and effects of diseases on the human body. 2. Understand Drug Actions and Uses 3. The absorption, distribution, metabolism, excretion, and effects of drugs on the human body.		
Unit No.	Course Content	Content Hours
I	1. Introduction to Pathology 2. Cell Injury 2.1 Cause and Mechanism - Ischemic, Toxic and Apoptosis 2.2 Reversible cell injury- Types, Morphology, hyaline, fatty change 2.3 Irreversible cell injury-- types of necrosis, gangrene 3. Inflammation and Repair 3.1 Acute inflammation: features, causes, vascular, cellular and Cellular events 3.2 Morphological Variant of acute inflammation 3.3 Wound Healing by primary and secondary union, factors promoting and delaying the process and complications 4. Circulatory Disturbances 4.1 Infarction types Common Sites, Gangrene 4.2 Shock Pathogenesis , types , Morphological changes	10 Hrs.

	5. Growth Disturbances 5.1 Atrophy, hypertrophy, hyperplasia, hypoplasia, Metaplasia, malformation, Agenesis, Dysplasia 5.2 Neoplasia: Causes, Classification, histogenesis, biological behaviour, benign and Malignant, Carcinoma and Sarcoma 5.3 Laboratory Diagnosis - Cytology, Biopsy, tumor Markers 6. Haematopathology 6.1 Anemia- Classification and Clinical Features 6.2 Nutritional Anemia- Iron Deficiency, Folic Acid, Vit B12 Deficiency Anemia 6.3 Coagulopathies- Coagulation factor deficiency, Hemophilia, DIC and Anticoagulant Control 6.4 Leucocyte Disorders- Leukocytosis, Leucopenia, Leukemic reaction 6.5 Acute and Chronic Leukemia Classification and diagnosis 6.6 Multiple myeloma and dysproteinemias	
II	Cardiovascular Pathology 6.7 Atherosclerosis and ischemic Heart Disease, Myocardial Infarction Respiratory Pathology 2. Renal and urinary tract Pathology 6.8 Clinical Presentation of renal disorders including nephritic, nephrotic syndrome, acute renal failure, recurrent Hematuria, CRF 6.9 Pyelonephritis, reflect Nephropathy, intestinal Nephritis 3. Pathology of Gastrointestinal Tract a. Oral Pathology ,Peptic ulcer, reflux esophagus b. Inflammatory Disease of Small Intestine- typhoid, tuberculosis, Appendicitis 4. Liver and biliary tract Pathology a. Jaundice types, etiopathogenesis and differentiation b. Cirrhosis-- Etiology, Classification, Pathology and Complications 5. Introduction of Reproductive System c. Primary and Secondary Organs d. Reproductive processes 6. Endocrine Pathology	10 Hrs.

	e. Diabetes Mellitus types, pathogenesis, pathology f. Non neoplastic lesion of thyroid Deficiency Goiter, autoimmune thyroiditis, thyrotoxicosis, Myxoedema 7. Neuropathology 7.1 Inflammatory disorders pyogenic and tuberculous meningitis, brain abscess, tuberculoma	
III	1. Introduction to pharmacology 2. Basic Concepts of Pharmacology 2.1 Pharma kinetics 2.2 Pharmacodynamics 3. Drugs affecting on nervous system 4. Drugs affecting the cardiovascular, Respiratory, Digestive and Excretory systems 5. Anti-allergic drugs 6. Chemotherapy, Antibiotics, Antifungal and Antiviral 7. Sedatives and Hypnotics 8. Non-Steroidal anti Inflammatory drugs	10 Hrs.
Text Books: - Robbins & Cotran Pathologic Basis of Disease, by Vinay Kumar, Abul K. Abbas, Jon C. Aster, 10th Edition, 2020 - Essentials of Medical Pharmacology, K.D. Tripathi, 9th Edition, 2025, Jaypee Brothers.		
Reference Books: - Textbook of Pathology, by Harsh Mohan, 9th Edition (Revised Reprint), 2026, Jaypee Brothers - Basic and Clinical Pharmacology, by Bertram Katzung et al., 15th Edition, 2021, published by McGraw-Hill.		
Online Reference: https://www.medscape.com/pathology?utm_source=chatgpt.com https://accessmedicine.mhmedical.com/?utm_source=chatgpt.com		

Diploma in Medical Laboratory Technology – Semester IV											
Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits	CA		UA	
			Theory	Practical	Theory	Practical		MIN	MAX	MIN	MAX
Internship	MLT/Internship/326	Hospital Internship	At least 660 Hours in Hospital				22	96	240	144	360


 Director
 Deon Dayal Upadhyay Kaushal Kendra,
 Dr. Babasaheb Ambedkar
 Marathwada University,
 Chhatrapati Sambhajinagar(MS)-431004

Syllabus for Semester – IV
Diploma in Medical Laboratory Technology

Director
Diploma in Medical Laboratory Technology
Kannur Medical College
Kannur
10/01/2020

DMLT/Internship/326: Hospital Internship

Total Credits : 22

Total Contact Hours : 660 Hrs

Maximum Marks : 600

Learning Objectives of the Course:

The course aims to:

1. Provide students with exposure to real clinical laboratory environments, laboratory workflow, and professional healthcare practices.
2. Enable students to develop practical skills in hematology, clinical pathology, biochemistry, microbiology, blood banking, and diagnostic laboratory procedures.
3. Provide opportunities to observe and perform routine laboratory investigations under supervision while following standard operating procedures.
4. Develop professional communication, teamwork, documentation, ethics, biosafety, and patient-handling skills in clinical laboratory settings.
5. Enable students to understand laboratory quality assurance practices, infection control measures, biomedical waste management, and laboratory safety protocols.

Course Outcomes (COs) :

On completion of the course, students should be able to:

1. Demonstrate professional behavior and laboratory work practices followed in diagnostic laboratories and hospital laboratory departments.
2. Perform routine hematological, biochemical, microbiological, and clinical pathology investigations under supervision.
3. Apply laboratory safety practices, infection control procedures, and biomedical waste management protocols during laboratory work.
4. Maintain laboratory records, test reports, quality control documentation, and internship reports effectively.
5. Communicate professionally with pathologists, laboratory professionals, patients, and healthcare staff in clinical settings.

Module No.	Course Content	Contact Hours
I	Clinical Internship Guidelines The Clinical Internship is a core experiential learning component designed to bridge the gap between academic learning and clinical laboratory practice. To successfully complete this course, students must adhere to the following procedural guidelines: 1. Planning and Commencement	660 Hrs

	• Detailed Training Plan Within one week of joining the host hospital or diagnostic laboratory, the student must submit a detailed training plan to the Department Advisor. This plan should outline the student's learning objectives, laboratory duties assigned by the institution, areas of laboratory training, and the proposed timeline for completion. • Daily / Weekly Diary Students are required to maintain a formal clinical laboratory diary documenting daily and weekly activities, laboratory procedures observed or performed, challenges encountered, and skills acquired during the internship. The diary must be signed by the Clinical Supervisor / Laboratory Mentor and submitted to the Department Advisor on a weekly basis.	
	2. Documentation Requirements • Progress Reports The student shall prepare two interim progress reports (at 30 days and 60 days) documenting laboratory exposure, departmental rotations, technical skills acquired, and completion of assigned activities. • Final Write-up At the conclusion of the internship, the student shall prepare a concise summary evaluating the achievement of the learning objectives and laboratory competencies outlined in the initial training plan. • Internship Report The student must submit a comprehensive final internship report (approximately 50 pages). The report should include: • Hospital / Diagnostic Laboratory profile • Description of departmental postings • Laboratory investigations observed or performed • Technical skills acquired • Laboratory safety and infection control practices followed • Quality control procedures observed • Case observations • Professional learning outcomes • Conclusion on the clinical and professional impact of the internship Students must maintain a minimum of 80% attendance during the clinical internship period.	

Students shall maintain patient confidentiality, professional ethics, and appropriate conduct during clinical postings.

Evaluation and Marking Scheme

The total assessment for the OJT/Internship is **600 Marks**, divided into **40% Continuous Internal Assessment (CIA)** and **60% University Assessment (UA)**.

I. Continuous Internal Assessment (CIA) – 240 Marks (40%)

The CIA is conducted by the department in two phases to track the student's progress.

Phase	Timeline	Particulars	Marks	Sub-Total
CIA (I)	30 Days	Clinical Internship Plan & Goal Setting	40	80 Marks
		First 30 Days Clinical Activity Report & Presentation	40	
CIA (II)	60 Days	Second 60 Days Clinical Activity Report	40	160 Marks
		Progress Report & Presentation	40	
		Comprehensive Viva-Voce	80	
Total CIA				240 Marks

II. University Assessment (UA) – 360 Marks (60%)

The University Assessment (UA) is a summative evaluation conducted jointly by one Internal Examiner and one External Examiner from a recognized hospital, or diagnostic center.

1. General Professional Assessment (75 Marks)

Assessment of the student's professional conduct and laboratory behavior during clinical training:

- Punctuality: Attendance, promptness, discipline, and commitment to assigned laboratory hours.
- Sincerity: Dedication towards laboratory work, sample handling, and assigned responsibilities.
- Initiative: Willingness to learn, proactive participation in laboratory activities, and problem-solving approach.
- Commitment: Understanding laboratory duties, workflow systems, and professional responsibilities.
- Professional Attitude: Ethical conduct, grooming, communication etiquette, biosafety awareness, and receptiveness to feedback.

2. Skills & Technical Competency (90 Marks) Assessment of practical knowledge and technical competencies acquired during clinical internship: • Communication: Professional verbal and written communication with pathologists, laboratory professionals, patients, and healthcare staff. • Documentation: Maintenance of laboratory records, logbooks, quality control records, and internship reports. • Reporting: Timely submission of progress reports and communication of assigned laboratory work. • Technical Competency: Demonstration of skills in specimen handling, laboratory investigations, staining techniques, microscopy, equipment handling, and quality assurance procedures. • Goal Achievement: Attainment of clinical laboratory learning objectives and program-specific competencies. 3. Formal Deliverables (195 Marks) • Written Internship Report (120 Marks) Evaluation of the comprehensive internship report (approximately 50 pages) including: • Hospital / Laboratory profile • Departmental postings • Laboratory investigations observed/performed • Technical skills acquired • Laboratory safety practices • Quality control procedures • Case studies and observations • Presentation & Viva-Voce (75 Marks) Final presentation and viva-voce examination conducted before the evaluation panel to assess: • Clinical laboratory understanding • Technical knowledge • Communication skills • Case presentation abilities • Overall internship experience and learning outcomes <i>Passing requires a minimum of 40% in both CIA and UA separately.</i>	
Clinical Areas for Training	

Students shall undergo rotational training in:

- Haematology Laboratory
- Clinical Pathology Laboratory
- Biochemistry Laboratory
- Microbiology Laboratory
- Histopathology and Cytology Laboratory
- Blood Bank
- Specimen Collection - OPD

Proposed Hospital / Laboratory Collaborations

1. Criticare Asia Multispecialty Hospital and Research Centre – Kurla, Mumbai.
2. Criticare Asia Multispecialty Hospital and Research Centre – Andheri West (Juhu), Mumbai.
3. Criticare Asia Multispecialty Hospital and Research Centre – Andheri East, Mumbai.
4. Criticare Asia Multispecialty Hospital and Research Centre – Malad west, Mumbai.
5. Tapadia Diagnostic Centre – Ch. Sambhajanagar.
6. Lambodar Hospital - Ch. Sambhajanagar.
7. Sharma Pathology - Ch. Sambhajanagar.
8. Samarth Pathology - Ch. Sambhajanagar.
9. Jindani Pathology - Ch. Sambhajanagar.
10. Dr. Patho Lab - Ch. Sambhajanagar.
11. Sahara Hospital - Ch. Sambhajanagar.
12. Care United Ciigma Hospitals - Ch. Sambhajanagar.
13. Diagnosein diagnostic center – Pune
14. Orchid Specialty Hospital – Pune
15. Oster & pearl Multispecialty Hospital – Pune