DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,

CHHATRAPATI SAMBHAJINAGAR.

NAAC- 'A+' Grade

CIRCULAR NO.SS/ Sci & Tech./ Diploma /12 /2025.

It is hereby inform to all concerned that, on recommendation of the Dean, Faculty of Science & Technology **Academic Council at its meeting held on 21 July, 2025 has been accepted as per National Education Policy-2020"_the following *New Two Year Program 1. Medical Laboratory Technology (DMLT), 2. Medical Imaging Technology (DMLT), of under* the Faculty of Science & Technology run at the Department, Entrepreneurship and Skill Development Centre (ESDC), Deen Dayal Upadhyay Kaushal Kendra, Dr. Babasaheb Ambedkar Marathwada University as appended herewith.**

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 Sambhajinagar-431004.
Ref. No. S S/Sci & Tech/Diploma./2025-26/
Date: 31/ 07/ 2025 / 1408-10

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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 Sambhajinagar.**

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar- 431001

Entrepreneurship and Skill Development Centre

'Diploma in Medical Laboratory Technology'

(Two Year Program)

Course Structure

(Based on NEP -2020)

Effective from 2025-26

22/8/2025

PREFACE

The National Education Policy (NEP) 2020 has introduced significant reforms aimed at transforming the education landscape in India. Here's how NEP 2020 intersects with skill education:

1. **Multidisciplinary Education**: NEP 2020 emphasizes multidisciplinary education, encouraging students to pursue a broad range of subjects and skills. This approach promotes flexibility and enables students to develop diverse skill sets tailored to their interests and career goals.
2. **Holistic Development**: The policy advocates for holistic development, which includes not only academic learning but also social, emotional, and vocational skills. This holistic approach ensures that students are well-rounded individuals equipped to navigate various aspects of life and work.
3. **Vocational Education and Internships**: NEP 2020 places a strong emphasis on vocational education, integrating it into mainstream curriculum from an early age. The policy encourages hands-on learning experiences, internships, and apprenticeships to provide practical skills and real-world exposure to students.
4. **Focus on Critical Thinking and Problem-Solving**: NEP 2020 prioritizes the development of critical thinking, creativity, and problem-solving skills. These skills are essential for innovation and adaptability in a rapidly changing world and are integrated across all levels of education.
5. **Flexible Learning Pathways**: The policy promotes flexible learning pathways, allowing students to choose their own educational trajectories based on their interests, aptitudes, and aspirations. This flexibility enables students to explore diverse skill areas and tailor their education to suit their individual needs.
6. **Teacher Training and Professional Development**: NEP 2020 recognizes the importance of teacher training and professional development in enhancing the quality of education. The policy emphasizes continuous learning for teachers, equipping them with the knowledge and skills necessary to effectively nurture students' talents and abilities.
7. **Digital Education and Technology Integration**: The policy advocates for the integration of digital technology in education to enhance access, equity, and quality. Digital platforms and tools are leveraged to facilitate interactive learning experiences, skill development, and personalized instruction.

By aligning with the principles and objectives of NEP 2020, skill education in India is poised to undergo a transformative shift, fostering innovation, equity, inclusivity, and excellence in education. These contexts have remained as mainframe while developing this curriculum.

The University has adapted Outcome-based education (OBE) since 2017. OBE is widely adopted in educational systems globally due to student centric advantages. OBE provides clear and measurable learning objectives that help students focus and stay motivated. It emphasizes real-world skills, bridging the gap between academia and the workforce. Customized learning paths are possible, accommodating different learning styles and promoting inclusivity. OBE focuses on mastery and competency rather than seat time, encouraging deeper learning and retention of knowledge. Continuous improvement is encouraged through ongoing assessment and feedback. OBE promotes accountability and transparency, allowing stakeholders to monitor progress and evaluate educational programs. It equips students with skills needed for the globalized economy, fostering critical thinking and collaboration. Lifelong learning skills like self-directed learning and adaptability are developed, creating a culture of continuous improvement. Overall, OBE offers a holistic approach to education, emphasizing relevant skills, competencies, and attitudes crucial for success in today's ever-changing world.
The authorities of Dr. Babasaheb Ambedkar Marathwada University, CHHATRAPATI SAMBHAJINAGAR (M.S.), remaining aligned to accreditation standards of National Assessment and Accreditation Council, decided to opt for National Education and Policy and Outcomes Based Education (OBE). As the part of the decision, different meetings, workshops and presentations were held at the campus of university.

This document is the outcome such meetings and workshops held at university level and department level. The detailed document is designed from the standpoint of the immediate and long-time requirements of heath care industries, and transformed in to the framework of NEP with OBE. This is the first step towards the implementation of NEP with OBE in the university departments and affiliated colleges. The document will serve all stakeholders in the effective implementation of the curriculum. The OBE is continuous process for quality enhancement and it will go a long way in order to enhance the competencies and employability of the graduates/Post-graduates of the university departments and affiliated colleges.

As we stand on the threshold of a new era in education, the dawn of the National Education Policy 2020 illuminates our path toward a holistic, inclusive, and progressive educational landscape. **The Two Year Diploma in Medical Laboratory Technology (DMLT)** curriculum outlined herein reflects the ethos and aspirations of this transformative policy, aiming to equip learners with the knowledge, skills, and values necessary to thrive in the dynamic world of the 21st century. At its core, the National Education Policy 2020 envisions an educational framework that is learner-centric, multidisciplinary, and geared towards fostering creativity, critical thinking, and innovation. It emphasizes the integration of knowledge across disciplines, breaking down traditional silos to encourage holistic understanding and application of concepts.

Medical Laboratory Technology is a vital and rapidly evolving field within healthcare, enabling accurate disease detection, treatment monitoring, and public health management. Medical Laboratory Technicians (MLTs), the trained professionals in this domain, serve as the backbone of diagnostic medicine. Their work provides the critical data physicians depend on to make informed clinical decisions, and their expertise ensures the accuracy, quality, and reliability of laboratory results—thereby playing an indispensable role in modern healthcare delivery.

In India, where healthcare services are expanding at an unprecedented pace, especially across semi-urban and rural regions, the demand for qualified MLTs is rising significantly. This makes the **Two-Year Diploma in Medical Laboratory Technology (DMLT)** not just an academic credential, but a practical and strategic response to the healthcare workforce needs of the country. The DMLT program equips students with a strong foundation in clinical biochemistry, microbiology, hematology, pathology, and medical ethics. It integrates classroom learning with hands-on laboratory training to ensure that graduates are job-ready and capable of performing essential diagnostic procedures with precision and professionalism.

Importance of the Two-Year DMLT in the Indian Context

The relevance of this diploma program in the Indian healthcare landscape is multifaceted:

- **Bridging the Healthcare Gap:** India faces a shortage of skilled healthcare workers, particularly in diagnostic services. DMLT-trained professionals help fill this gap, supporting early disease detection and reducing the burden on doctors and healthcare institutions.
- **Affordable Skill Development:** As a relatively short and cost-effective program, the diploma opens doors for students from diverse socio-economic backgrounds to pursue a meaningful and rewarding career in healthcare.

- **Support for Public Health:** MLTs trained through diploma programs are instrumental in disease surveillance, outbreak control, and health screening campaigns—especially important in a populous nation with diverse health challenges.
- **Employment Opportunities**: Graduates of the DMLT program find employment in hospitals, diagnostic labs, research centers, blood banks, and public health departments, contributing to both clinical services and healthcare administration.

Alignment with the National Education Policy (NEP) 2020

The **National Education Policy (NEP) 2020** emphasizes vocational education, skill-based training, and flexible academic pathways to meet the future needs of India's economy and society. The DMLT program aligns closely with this vision in several key ways:

- **Vocational Orientation**: The DMLT is a practical, employment-focused course that imparts industry-relevant skills—reflecting NEP's objective to integrate vocational education into mainstream learning.
- **Multiple Entry and Exit Options**: In line with NEP's modular approach, the diploma allows students the flexibility to opt for intermediate exit transition directly into the workforce.
- **Skill-Based Curriculum**: The program emphasizes real-world competence over rote learning, preparing students for the professional challenges of clinical laboratories and healthcare environments.
- **Inclusivity and Access**: NEP calls for broadening access to education, especially for marginalized groups. The DMLT program, being accessible and affordable, plays a significant role in democratizing healthcare education.

As detailed above, the **Two-Year Diploma in Medical Laboratory Technology** is more than just an educational qualification—it is a cornerstone for building a resilient, accessible, and high-quality diagnostic infrastructure in India. It provides students with valuable skills, ensures a steady supply of trained professionals to the healthcare system, and supports the broader goals of public health and disease management. Aligned with the forward-looking objectives of the **National Education Policy 2020**, the DMLT program embodies the spirit of skill-based, inclusive, and future-ready education.

As India strives toward universal healthcare and improved medical outcomes, the proposed **Two-Year Diploma in Medical Laboratory Technology** is a vital step in creating the human capital necessary to achieve these goals—empowering both individuals and the nation at large.

Programme Educational Objectives (PEOs) :

Programme Educational Objectives (PEOs) for the **Two-Year Diploma in Medical Laboratory Technology** Curriculum under the National Education Policy 2020:

1. **Mastery of Discipline-Specific Knowledge:** The Diploma holders in Medical Laboratory Technology will demonstrate a deep understanding of fundamental principles, theories, and methodologies in their chosen scientific discipline, enabling them to analyze complex problems, propose innovative solutions, and contribute to advancements in their field.

2. **Interdisciplinary Proficiency**: The Diploma holders in Medical Laboratory Technology will possess the ability to integrate knowledge and skills from multiple scientific disciplines, fostering a holistic approach to problem- solving and innovation. They will be equipped to address multifaceted challenges by drawing upon diverse perspectives and methodologies.

3. **Critical Thinking and Analytical Skills:** The Diploma holders in Medical Laboratory Technology will develop strong critical thinking abilities, enabling them to evaluate information rigorously, analyze data effectively, and make informed decisions based on evidence. They will demonstrate proficiency in applying logical reasoning and scientific methods to solve problems and generate new knowledge.

4. **Leadership and Innovation:** The Diploma holders in Medical Laboratory Technology will demonstrate leadership qualities and entrepreneurial mindset, capable of initiating and driving positive change in their organizations and communities. They will exhibit creativity, resilience, and adaptability, harnessing innovation to address complex challenges and seize opportunities for growth and advancement.

5. **Global Citizenship and Cultural Sensitivity**: The Diploma holders in Medical Laboratory Technology will possess a global perspective and cultural sensitivity, recognizing the interconnectedness of diverse communities and the importance of collaboration across borders. They will engage in cross-cultural dialogue, embrace diversity, and contribute to the advancement of knowledge and understanding on a global scale.

These Programme Educational Objectives serve as guiding principles for the Diploma in Medical Laboratory Technology Curriculum, reflecting our commitment to nurturing well-rounded pass outs who are prepared to excel in their careers, contribute to society, and lead meaningful lives in a rapidly changing world.

Program Outcomes (PO):

The Program Outcomes are the skills and knowledge which the students have at each exit level/at the time of graduation. These Outcomes are generic and are common to all exit levels mentioned in the programme structure. Diploma holders are expected to -

PO1. Apply fundamental knowledge of domain in the context of patient care and clinical support services.

PO2. Perform essential diagnostic and therapeutic procedures safely and accurately, using appropriate tools, instruments, and techniques within the paramedical scope of practice.

PO3. Assist in the management of patient care, including monitoring vital signs, handling medical emergencies, and supporting clinical decision-making under supervision.

PO4. Interpret basic clinical data and medical test results to support diagnosis and treatment planning in collaboration with healthcare professionals.

PO5. Ensure strict adherence to infection control, sterilization, and biomedical waste management protocols, prioritizing patient and healthcare worker safety.

PO6. Demonstrate ethical and professional behaviour, respecting patient confidentiality, cultural diversity, and legal frameworks in healthcare practice.

PO7. Communicate effectively with patients, caregivers, and healthcare teams in a compassionate, clear, and respectful manner to promote coordinated care.

PO8. Function efficiently in multidisciplinary healthcare environments, exhibiting teamwork, leadership, and adaptability in dynamic clinical settings.

PO9. Maintain accurate medical documentation and records, ensuring compliance with healthcare standards and regulatory requirements.

PO10. Engage in lifelong learning and continuous professional development, keeping pace with emerging healthcare technologies, procedures, and evidence-based practices.

Program Specific Outcomes (PSO):

Diploma holders in Medical Laboratory Technology are expected to -

PSO1. Apply domain-specific knowledge in **clinical biochemistry, hematology, microbiology, immunology, and pathology** to perform diagnostic investigations and support clinical decision-making.

PSO2. Utilize modern laboratory instruments, diagnostic kits, and information systems to **conduct, document, and validate** laboratory tests, while ensuring quality assurance and compliance with medical laboratory standards.

Eligibility:

XII Science/Commerce/Arts or equivalent from any recognized Board/Institution are eligible for registration/ admission to first year (Semester I) of DMLT program.

Exit Options:

The programme allows exit of a student in an intermediate stage, on successful employment. Scopes will be there for further continuation of study. The other wise exit options will be as follows-

Exit Point	*Duration*	*Diploma / Degree to be Offered*
First exit	After 1 yr.	Certificate in Medical Laboratory Technology
Second exit	After 2 yrs.	Diploma in Medical Laboratory Technology

Choice Based Credit System (CBCS):

The choice-based credit system is going to be adopted. This provides flexibility to make the system more responsive to the changing needs of our students, the professionals and society. It gives greater freedom to students to determine their own pace of study. The credit-based system also facilitates the transfer of credits.

- Students will have to earn 44 credits for the award of one year Certificate in Medical Laboratory Technology
- Students will have to earn 88 credits for the award of two year Diploma in Medical Laboratory Technology

Admission / Promotion Process:

XII Science/Commerce/Arts or equivalent from any recognized Board/Institution are eligible for registration/ admission to first year (Semester I) of DMLT program.

A candidate who has sought admission to Semester – I shall be admitted to Semester – II automatically. A candidate who has passed 75% of the papers at First Year (First and Second Semesters together) examinations shall be allowed to take admissions in third semester.

For obtaining Diploma in Medical Laboratory Technology, a student will have to complete all semesters successfully within maximum 04 years/08 semesters. The program also offers multiple exit/entry. Students can exit after completion of one year and can enter into the system (subsequent year) with 3 years from the date of first time registration.

Dropout students will be allowed to register for respective semester as and when the concerned courses are offered by the department, **HOWEVER HE / SHE SHOULD NOT EXCEED MORE THAN TWICE THE DURATION OF THE COURSE FROM THE DATE OF FIRST REGISTRATION AT PARENT DEPARTMENT / COLLEGE.** The admission of the concerned student will be automatically cancelled if he / she fails to complete the DMLT program within a period of maximum four years / eight semesters.

Credit-to-contact hour Mapping:

(a) One Credit would mean equivalent of 15 contact hours for theory lecture.

(b) For lab course/ workshops/internship/field work/project, the credit weightage for equivalent hours shall be 50% that for lectures /workshop.

(c) For self- learning, based on e-content or otherwise, the credit weightage for equivalent hours of study should be 50% or less of that for lectures/workshops.

Attendance:

Students must have 75 % of attendance in each course for appearing examination otherwise he / she will not be strictly allowed for appearing the examination of each course. Frequent absence from regular theory/Laboratory course may lead to disqualification from continuous assessment test (CAT) process in respective subject.

Departmental Committee:

The Departmental Committee (DC) of the Centre will monitor smooth functioning of the program.

Results Grievances / Redressal Committee

Grievances / Redressal committee should be constituted in the department to resolve all grievances relating to the evaluation. The committee shall consist of Head of the department, the concerned teacher of a particular course and senior faculty member of Department of Committee.

The decision of Grievances / Redressal committee will have to be approved by Department committee.

Evaluation Methods and Grading System:

Guidelines, as prescribed in Circular Bearing Reference No. SU/UG/ SCHEME EXAM/ NEP/ AC. AOB.I.04/2024/26092-105 dated 26-04-2024 by Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar (MS) will be strictly followed.

Course Structure of
Diploma in Medical Laboratory Technology (DMLT)
as per NEP – 2020

DMLT SEMESTER – I							
Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Lab Course	Theory	Lab Course	
Major (Core) M1 Mandatory	MLT/DSC/T/100	Fundamentals of Anatomy	4		4		4
Major (Core) M2 Mandatory	MLT/DSC/T/101	Fundamentals of Physiology	4		4		4
Major (Core) M3 Mandatory	MLT/DSC/T/102	Fundamentals of Biochemistry	4		4		4
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/ 100	Human Anatomy in Medical Laboratory	2		2		2
SEC (Skill Enhancement Courses) (Choose any one from pool of courses)	MLT/SEC/T/100	Patient Safety and Infection Control	2		2		2
	MLT/SEC/T/101	Laboratory Administration	2		2		
AEC, VEC, IKS	MLT /AEC/T/100	English (Common for all the faculty)	2		2		2+2 =4
	MLT /IKS/T/101	Choose any one from pool of courses	2		2		
OJT/ FP/CEP/CC/RP	MLT /CC/P/126	Health and Wellness (Common for all the faculty)		4		2	2
							22

Course Structure of
Diploma in Medical Laboratory Technology (DMLT)
as per NEP – 2020

DMLT SEMESTER II							
Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Lab Course	Theory	Lab Course	
Major (Core) M4 Mandatory	MLT/DSC/T/150	Fundamentals of Life Science and Hematology	2		2		2+2 =4
	MLT /DSC/P/176	Fundamentals of Life Science and Hematology- Lab		4		2	
Major (Core) M5 Mandatory	MLT/DSC/T/151	Fundamentals of Clinical Pathology	2		2		2+2 =4
	MLT /DSC/P/177	Fundamentals of Clinical Pathology - Lab		4		2	
Major (Core) M6 Mandatory	MLT /DSC/T/152	Fundamentals of Parasitology	2		2		2+2 =4
	MLT /DSC/P/178	Fundamentals of Parasitology - Lab		4		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/150	Human Physiology in Medical Laboratory	2		2		2
VSC (Vocational Skill Courses) (Choose any one from pool of courses)	MLT /VSC/T/150	OBS in Pathology Lab		4		2	2
	MLT /VSC/T/151	OBS in Blood Bank		4		2	
AEC, VEC, IKS	MLT /AEC/T/150	MIL 1 (Common for all the faculty)	2		2		2+2 =4
	MLT /AEC/T/151	Constitution of India (Common for all the faculty)	2		2		
OJT/ FP/CEP/CC/RP	MLT /CC/P/176	Yoga Education / Sports and Fitness (Common for all the faculty)		4		2	2
							22
Exit Option : Award of UG Certificate in Major with 44 credits and an additional 4 credits of core course / Internship OR continue with Major and Minor							

Course Structure of
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

Course Structure of
Diploma in Medical Laboratory Technology (DMLT)
as per NEP – 2020

DMLT SEMESTER - IV							
Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Lab Course	Theory	Lab Course	
Major (Core) M9 Mandatory	MLT /DSC/P/276	Hematology and Clinical Pathology Lab		8		4	4
Major (Core) M10 Mandatory	MLT /DSC/P/277	Biochemistry Lab		8		4	4
Minor	MLT/MN/T/ 250	Radiology Techniques I	2		2		2+2=4
	MLT/MN/T/ 251	Radiology Techniques 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/250	Human Biochemistry in Medical Laboratory- 2	2		2		2
VSC (Vocational Skill Courses) (Choose any one from pool of courses)	MLT /VSC/T/250	Microbiology Lab		4		2	2
	MLT /VSC/T/251	Blood Banking, Immunology and Serology Lab		4		2	
AEC, VEC, IKS	MLT/AEC/T /250	Modern Indian Lan. - MIL 2 (Common for all the faculty)	2		2		2
OJT/ FP/CEP/CC/RP	MLT/FP/P/ 276	Field Project		4		2	2+2=4
	MLT/CC/P/ 277	(Fine/ Applied/ Visual/ Performing Arts) (Common for all the faculty)		4		2	
							22
OR							
The student has to complete 660 Hours internship in a hospital throughout the semester : Credits							22

2025

DMLT SEMESTER - I

SYLLABUS

MLT/DSC/T/100 : Fundamentals of Anatomy

Total Credits : 04 **Total Contact Hours : 60 Hrs**

Maximum Marks : 50

Learning Objectives of the Course:

To provide fundamental concepts on -

1. Location and naming of bones, muscles, organs, blood vessels, and nerves on models, cadavers, or virtual dissections.
2. Describe the anatomical positioning of structures relative to each other using directional terms (e.g., anterior, posterior, medial). Conduct or observe dissections on specimens (human cadaver, animal models, or virtual), identifying structures and noting their functions.

Course Outcomes (COs) :

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

1. Accurately identify and label anatomical structures on models, diagrams, cadavers, or virtual platforms..
2. Explain the form, function, and spatial relationships of major organ systems using anatomical terms
3. Examine tissues and organs using microscopes and identify histological features related to organ function.
4. Use clear, correct anatomical language in lab reports, oral presentations, and collaborative discussions.

Module No.	Course Content	Contact Hours
I	**Basic Concepts, Cell and Tissue** 1.1 Human body as whole 1.2 Glands and cavities 1.3 Organs and Organ System 1.4 Cell Structure in detail 1.5 Identification of cell components 1.6 Tissue 1.7 Types of tissue+B349	**20 Hrs**
II	Cardiovascular Respiratory and Digestive System 2.1 Heart 2.2 Aorta and major blood vessels 2.3 Blood Circulation 2.4 Upper respiratory tract 2.5 Lower Respiratory tract 2.6 Digestive tract 2.7 Digestive accessory glands	**20 Hrs**
III	**Skeletal ,Muscular and Excretory system** 3.1 Axial Skeleton 3.2 Appendicular Skeleton 3.2 Types of Muscles	**20 Hrs**

	3.3 Kidney and Ureter 3.4 Urinary Bladder and urethra	

Text Books:

1. Phillip Snider, Terry Martin, Charles Welsh, and Cynthia Prentice-Craver," Laboratory Manual for Hole's Human Anatomy", 2024 (99th Edition)
2. Malgosia Wilk-Blaszczak," Human Anatomy Lab Manual", 2018
3. Michael G. Wood," Anatomy and Physiology Lab Manual featuring Martini Art', 2024 (7th Edition)

Reference Books:

1. Jodie Foster, Kendall Hunt, "Human Anatomy and Physiology Lab Manual Part I", 2022 (3rd Edition)

Online Reference:

1. https://uta.pressbooks.pub/anatomylab/?utm_source=chatgpt.com
2. https://www.pearson.com/en-us/subject-catalog/p/anatomy-and-physiology-lab-manual-featuring-martini-art/P200000011709/9780138252618

MLT/DSC/T/100 : Fundamentals of Physiology

Total Credits : 04 **Total Contact Hours : 60 Hrs**

Maximum Marks : 50

Learning Objectives of the Course:

To provide fundamental concepts on -

1. Physiological Principles
2. Basic functions of cells, tissues, organs, and systems in the human body.
3. Laboratory experiments to measure and observe functions such as muscle contraction, nerve impulse conduction, cardiovascular responses, and respiratory activity.

Course Outcomes (COs) :

On completion of this course, students should be able to -

1.Demonstrate Understanding of Physiological Mechanisms
2.Perform and Interpret Standard Physiological Experiments
3.Analyze and Evaluate Experimental Data

Module No	Course Content	Contact Hours
I	**General Physiology and Cell and tissues Physiology** 1.1 Homeostasis 1.2 Cell transport mechanism 1.3 Fluids 1.4 Transport process of cell	20 Hrs
II	**Cardiovascular System and Respiratory system** 2.1.Blood pressure 2.2. Heart Cardiac Impulse, Cardiac Cycle. 2.3. Cardiac output, Arterial Pulse 2.4 .Cardiac Action Potential	20 Hrs

	2.5 Cardiac Cycle. 2.6 Organization and Functions of respiratory System, Mechanism of Respiration 2.7 Transport of O2 and CO2 gases.	
III	**Digestive ,Endocrine and Nervous System** 3.1.Organization of digestive system, functions of various components, Salivary, Gastric, Pancreatic Secretion 3.2. Functions of liver, Small intestine and large intestine 3.3.Hormones 3.4.Hypothalamus 3.5.Anterior and posterior pituitary 3.6.Thyroid, Parathyroid 3.7.Pancreas, Adrenal Cortex 3.8.Organzaton of nervous system 3.9.Sensory System 3.10. Motor System 3.11.Brain 3.12.Autonomic Nervous system	**20 Hrs**

Text Books:

1. Dee Unglaub Silverthorn,,"Human Physiology: An Integrated Approach", 2020 (9th Edition)
2. D. L. Johnson, A. S. Polasky, J. L. H. Caputo,"Human Physiology: From Cells to Systems", 2021 (10th Edition)
3. David J. Whitmore,"Laboratory Manual for Physiology and Anatomy", 2019 (8th Edition)

Reference Books:

1. Walter F. Boron, Emile L. Boulpaep, "Medical Physiology: A Cellular and Molecular Approach", 2019 (4th Edition)
2. Connie Allen, Valerie Harper, "Laboratory Manual for Human Anatomy and Physiology", 2020 (12th Edition)

Online Reference:

1. https://www.wiley.com/en- us/ Laboratory+ Manual + for+ Physiology+ and+ Anatomy %2C+8th+ Edition-p-9781118974399
2. https://www.pearson.com/en-us/subject-catalog/p/anatomy-and-physiology-lab-manual-featuring-martini-art/P200000011709/9780138252618

MLT /M3/T/100 : Fundamentals of Biochemistry

Total Credits: 04 **Total Contact Hours : 60 Hrs.**

Maximum Marks : 50

Learning Objectives of the Course:

To provide fundamental concepts on -

1. Structure and Function of Biomolecules.
2. Chemical structure, properties, and biological functions of macromolecules such as proteins, carbohydrates, lipids, and nucleic acids.
3. Biochemical Techniques such as spectrophotometry, chromatography, electrophoresis, and enzyme assays.

Course Outcomes (COs) :

On completion of this course, students should be able to -

1. identify, isolate, and characterize major biomolecules (proteins, nucleic acids, carbohydrates, and lipids) using laboratory techniques like chromatography, electrophoresis, and spectrophotometry.
2. analyze enzyme-catalyzed reactions, determine enzyme activity, and calculate reaction rates using standard techniques, and apply this knowledge to understand enzyme mechanisms.
3. apply laboratory techniques to address clinical and diagnostic issues, such as analyzing blood samples for glucose or lipid levels and interpreting results.

Module No	Course Content	Contact Hours
I	**Basic Concept of Biochemistry, Introduction to Chemical Constituents of life, Biological Oxidation and Minerals** ATP-ADP cycle, electron transport chain, inhibitors and uncouplers. Importance of Some minerals Sodium, potassium, Calcium, Phosphorous, iron, copper, chloride and fluoride	20 Hrs.
II	**Units of measurements** SI units, Definitions, Conversions, Measurement of volumes, Strength, normality, molarity, molality Definitions, Mole, Molar and normal solutions (Preparations and standardization), pH (definition, Pka value, Example, importance of Henderson-hasslebalch equation), Buffer solutions (Definition, preparation of important solutions) pH Indicators (pH papers, universal and other indicators) pH Measurement Different methods (pH Paper, pH Meter, Principle of pH Meter, Structure, working and maintenance)	20 Hrs.
III	**Water Metabolism** Introduction to Water in the Human Body, Mechanisms of Water Balance and Regulation, Electrolyte Balance in Relation to Water, Disorders of Water Metabolism, Laboratory Investigations Related to Water Metabolism	20 Hrs.

Text Books:

1. U. Satyanarayana and U. Chakrapani, Essentials of Biochemistry, 2nd Ed., Elsevier, 2020.
2. Vasudevan D.M., Sreekumari S., Kannan Vaidyanathan, Textbook of Biochemistry for Medical Students, 8th Ed., Jaypee Brothers Medical Publishers, 2022.

3. Pankaja Naik, Biochemistry for Nurses, 2nd Ed., Jaypee Brothers Medical Publishers, 2011.

Reference Books:

1. Lehninger, Nelson & Cox, Lehninger Principles of Biochemistry, 8th Ed., W.H. Freeman and Co., 2021.
2. Harper's Illustrated Biochemistry, 32nd Ed., McGraw-Hill Education, 2017.
3. Debajyoti Das, Biochemistry, 18th Ed., Academic Publishers, 2019.

Online Reference:

1. https://www.elsevierhealth.com/satyanarayana-essentials-of-biochemistry-9788131262643.html
2. https://www.jaypeebrothers.com

MLT /SEC/T/100: Patient Safety and Infection Control

Total Credits: 02 **Total Contact Hours**: 30 Hrs.
Maximum Marks: 25

Learning Objectives of the Course:

This will help learners to

1. Understand the significance of patient safety.
2. Describe safety frameworks & human factors
3. Cultivate a safety culture
4. Master safe practice in high-risk areas.
5. Enhance communication with patients/families.

Course Outcomes (COs) :

After completion of this course, students should be able to:

1. Articulate why patient safety matters and describe major risks.
2. Identify safety hazards in their environments and conduct risk assessments.
3. Incorporate teamwork and structured communication to safeguard patients.
4. Embed patient and family perspectives in safety activities.

Module No	Course Content	Contact Hours
I	**1.1Communicating Effectively:** Involving patients as partners in healthcare, Communicating risks, Obtaining Consent, Being culturally respectful & Knowledgeable **1.2 Adverse events & near misses :** Introduction & explanation to the terms, Adverse event forms	10 Hrs.

II	**2.1 Working Safely :** Being a team player, Understanding human factors, Providing continuity of care **2.2 Medication safety :** Wrong site, Wrong patient, Wrong technique, Wrong dose, Wrong Medicine	10 Hrs.
III	**3.1 Why Infection control spread of infection control ways :** Care of skin, Hand hygiene, Protective apparel, Procedure for safe handling of sharps, Procedure for safe disposal of sharps, Management of blood and body fluid spills, Linen management (use & disposal). **3.2 PPE :** Hand washing, Gloves, Masks, goggles & face masks, Gowns, Patient care equipment, Environmental cleaning, Management of Sharps.	10 Hrs.

Text Books:

1. Text book of Patient Safety and Clinical Risk Management, Liam Doaldson, Walter Riccardo, year 2021.
2. Essentials of Hospital Infection Control, Apurba S. Sastry & Deepashree R. , Year 2024.

Reference Books:

1. Essentials of Hospital Infection Control, by Apurba S. Sastry & R. Deepashree, Year 2024.
2. Prevention of Healthcare – associated Infection: Infection Prevention and Control by Yatin Mehta & Usha K. Baveja Year 2021.
3. Applied Microbiology and Infection Control Practices for Nurses by Dr. Kannan, Year 2023

Online Reference:

1. https://qps.nhsrcindia.org/patient-safety
2. http://www.who.int/health-topics/infection-prevention-and Control

MLT /SEC/T/101: Laboratory Administration

Course Type: Core (DMLT Program)
Total Credits: 02 **Total Contact Hours**: 30 Hrs.
Maximum Marks: 25

Learning Objectives of the Course

This Course aims to:

1. Familiarize students with the structure and workflow of clinical laboratories.
2. Equip students with knowledge of quality control, equipment maintenance, and inventory management.
3. Introduce safety protocols and ethical practices in lab environments.
4. Prepare students to assist in laboratory audits and accreditation processes.

Course Outcomes (COs)

After completion of this Course, Students should be able to-

1. Describe the organization and functional layout of a medical diagnostic laboratory.
2. Demonstrate understanding of quality assurance, record keeping, and workflow management.
3. Apply laboratory safety protocols and waste disposal guidelines.
4. Assist in inventory control, equipment upkeep, and compliance with regulatory standards.

Course Modules

Module No.	Course Content	Contact Hours
I	**Introduction to Laboratory Organization and Management**: Types of medical laboratories, organizational structure, workflow design, job responsibilities, laboratory workflow and documentation, importance of standard operating procedures (SOPs).	10 Hrs.
II	**Quality Control, Inventory, and Equipment Management**: Internal and external quality control, calibration, validation, preventive maintenance, inventory handling, reagents, storage conditions, procurement and stock register maintenance.	10 Hrs.
III	**Laboratory Safety, Ethics, and Accreditation**: Biosafety levels, personal protective equipment (PPE), biomedical waste management,	10 Hrs.

Module No.	Course Content	Contact Hours
	fire safety, first aid, infection control, ethical responsibilities of lab personnel, introduction to NABL/ISO 15189 accreditation.	

Text Books

1. **Kanai L. Mukherjee**, *Medical Laboratory Management*, 2nd Ed., Elsevier India, 2016.
2. **Ramnik Sood**, *Concise Book on Medical Laboratory Technology*, 6th Ed., Jaypee Brothers, 2020.

Reference Books

1. **J.G. Webster**, *Management and Administration for Medical Laboratory Scientists*, CRC Press, 2014.
2. **NCCLS**, *Clinical Laboratory Management*, 3rd Ed., CLSI Publication, 2019.

Online References

1. https://nabl-india.org
2. https://clsi.org

MLT /GE/OE/T/100: Human Anatomy in Medical Laboratory

Course Type: General Elective
Total Credits: 02 **Total Contact Hours**: 30 Hrs.
Maximum Marks: 25

Learning Objectives of the Course

This will help learners to

1. Understand the basic anatomical structure of major organs and systems.
2. Recognize the laboratory tests commonly associated with different body systems.
3. Appreciate the importance of proper sample collection based on anatomical knowledge.
4. Bridge general anatomy concepts with diagnostic laboratory functions.

Course Outcomes (COs)

After completion of this course, students should be able to:

1. Identify major organs and systems of the human body and understand their basic functions.
2. Correlate anatomical structures with routine laboratory tests and procedures.
3. Demonstrate awareness of correct sample collection sites and techniques.
4. Explain how anatomical knowledge assists in interpreting common lab findings.

Module No.	Course Content	Contact Hours
I	**Basics of Human Anatomy and Orientation**: Introduction to human anatomy, anatomical terms, planes of the body, types of tissues, and general organ system overview. Importance of anatomical understanding in lab practice.	10 Hrs.
II	**Vital Organ Systems and Lab Correlation – I**: Cardiovascular, respiratory, and digestive systems—structure and basic function. Related laboratory tests: CBC, ECG (intro), sputum analysis, LFTs, stool test, blood pressure measurement.	10 Hrs.
III	**Vital Organ Systems and Lab Correlation – II**: Urinary, endocrine, reproductive, and nervous systems—basic structure and function. Lab relevance: urine analysis, kidney function tests, thyroid function tests, hormone tests, blood sugar, semen analysis, CSF (intro).	10 Hrs.

Text Books

1. **Ross and Wilson**, *Anatomy and Physiology in Health and Illness*, 14th Ed., Elsevier, 2021.
2. **Inderbir Singh**, *Textbook of Human Histology*, 8th Ed., Jaypee Brothers, 2020.

Reference Books

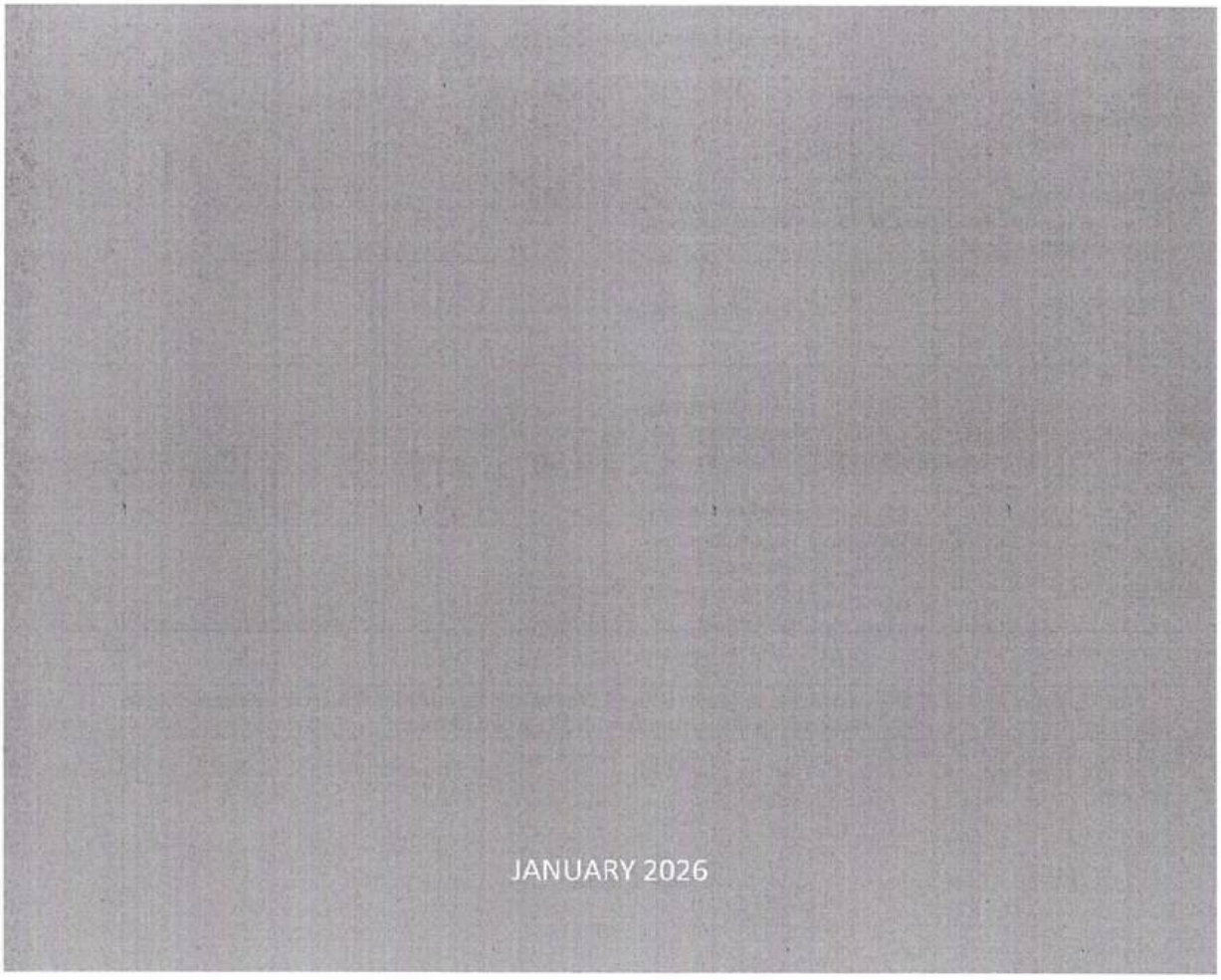
1. **Elaine N. Marieb**, *Essentials of Human Anatomy & Physiology*, 12th Ed., Pearson, 2018.
2. **Gosling et al.**, *Human Anatomy: Color Atlas and Textbook*, 6th Ed., Elsevier, 2016.

Online References

1. https://openstax.org/books/anatomy-and-physiology/pages/1-introduction
2. https://www.visiblebody.com

Dr. Babasaheb Ambedkar Marathwada University,
Chhatrapati Sambhajinagar
Entrepreneurship and Skill Development Centre
Deen Dayal Upadhyay KAUSHAL Kendra

DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY (SYLLABUS FOR SEMESTER II)



JANUARY 2026

Two years Diploma in Medical Laboratory Technology (DMLT) as per NEP 2020
Semester II Course Structure and Syllabus

Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Lab Course	Theory	Lab Course	
Major (Core) M4 Mandatory	MLT/DSC/T/150	Fundamentals of Life Science and Hematology	2		2		2+2= 4
	MLT /DSC/P/176	Fundamentals of Life Science and Hematology- Lab		4		2	
Major (Core) M5 Mandatory	MLT/DSC/T/151	Fundamentals of Clinical Pathology	2		2		2+2= 4
	MLT /DSC/P/177	Fundamentals of Clinical Pathology - Lab		4		2	
Major (Core) M6 Mandatory	MLT /DSC/T/152	Fundamentals of Parasitology	2		2		2+2= 4
	MLT /DSC/P/178	Fundamentals of Parasitology - Lab		4		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/150	Human Physiology in Medical Laboratory	2		2		2
VSC (Vocational Skill Courses) (Choose any one from pool of courses)	MLT /VSC/T/150	OBS in Pathology Lab		4		2	2
	MLT /VSC/T/151	OBS in Blood Bank		4		2	
AEC, VEC, IKS	MLT /AEC/T/150	MIL 1 (Common for all the faculty)	2		2		2+2= 4
	MLT /AEC/T/151	Constitution of India (Common for all the faculty)	2		2		
OJT/ FP/CEP/CC/RP	MLT /CC/P/176	Yoga Education / Sports and Fitness (Common for all the faculty)		4		2	2
							22
Exit Option : Award of UG Certificate in Major with 44 credits and an additional 4 credits of core course / Internship OR continue with Major and Minor							

MLT/DSC/T/150 : Fundamentals of Life Science and Hematology Theory

Course Type: TH; Core
Total Credits: 02 **Total Contact Hours: 30 Hrs.**
Maximum Marks : 50

Learning Objectives of the Course:

To provide fundamental concepts on:

1. Use of Laboratory Equipment and Techniques
2. Ensuring Laboratory Safety and Ethics
3. Composition and Function of Blood.

Course Outcomes (COs) :

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

1. Apply essential laboratory techniques including microscopy, sample handling, and biological assays.
2. Analyze experimental data using appropriate scientific reasoning and methodology.
3. Understand laboratory safety and ethical standards in handling biological materials and data.

Unit No.	Course Content	Content Hours
I	1. Introduction to Laboratories 2. Types of Laboratories 3. Standardized Clinical Lab Set up 4. Decontamination in Labs 5. Disinfection in Labs 6. Laboratory first Aid Kit and Measures 7. Responsibility of Laboratory worker 8. Laboratory Safety	10 Hrs.
II	**1. Laboratory Glassware's and Equipments** 1.1 Laboratory Glassware's, Calibration of Pipettes 1.2 Laboratory reagents 1.3 Lab Equipments and appliances **2. Collection of Blood** 2.1 Composition of Blood and functions 2.2 Anti-Coagulants 2.3 Preparation and examination of thick and thin film 2.4 Staining of Blood film	10 Hrs.
III	1. Haemopoisis and Bone Marrow examination 1.1 Haemopoisis	10 Hrs.

	1.2 Bone Marrow Examination 2. Haemoglobin Estimation 3. TLC 4. DLC 5. RBC Count 6. Absolute Indices concentration 7. Platelet count 8. Reticulocyte Counts 9. ESR 10. Introduction : Haemoglobinopathies 11. Introduction :Anemia	

Text Books:

1. Jyoti Saxena, Mamta Baunthiyal, Indu Ravi, "Comprehensive Laboratory Manual of Life Sciences Hematology", 2020

2. Bernadette F. Rodak, Jacqueline H. Carr, "Clinical Hematology Atlas, 5th Edition", 2015
3. Mrinalini Sant, "Textbook of Medical Laboratory Technology", 2nd Edition (2023)

Reference Books:

1. Robert T. Means Jr., Daniel A. Arber, Bertil E. Glader, et al., "Wintrobe's Clinical, 15th Edition", 2023
2. Praful B. Godkar & Darshan P. Godkar, "Textbook of Medical Laboratory Technology (Clinical Laboratory Science and Molecular Diagnosis)", 4th Edition (2024)

Online Reference:

1. **https://www.scientificpubonline.com/bookdetail/comprehensive-laboratory-manual-life-sciences/9789386652300/**
2. **https://www.lww.co.uk/9781975184698/wintrobes-clinical-hematology/**

MLT/DSC/P/176 : Fundamentals of Life Science and Hematology- Lab

Course Type: LAB; Core
Total Credits: 02 **Total Contact Hours: 60 Hrs.**
Maximum Marks : 50

Learning Objectives of the Course:

To provide fundamental concepts on:

1. Biochemical tests (e.g., Benedict's, Biuret, iodine test) to detect macromolecules like carbohydrates, proteins, and lipid
2. Haematological Tests

3. Haemostasis and Coagulation
4. Common laboratory equipment, including microscopes, pipettes, centrifuges, and incubators.

Course Outcomes (COs) :

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

1. Apply essential laboratory techniques including microscopy, sample handling, and biological assays.
2. Analyze experimental data using appropriate scientific reasoning and methodology.
3. Understand laboratory safety and ethical standards in handling biological materials and data.

At least Six experiments have to be performed

1. Study of Hemoglobin Estimation by Sahli's method and Cyanmethemoglobin method (Drabkin's method)
2. Study of Total RBC Count by Manual using hemocytometer and Automated hematology analyzer
3. Study of Packed Cell Volume (PCV) / Hematocrit by Wintrobe method
4. Study of Erythrocyte Sedimentation Rate (ESR) by Westergren method and Wintrobe method
5. Study of Reticulocyte Count by Supravital staining method
6. Study of Red Cell Indices MCV (Mean Corpuscular Volume), MCH (Mean Corpuscular Hemoglobin) and MCHC (Mean Corpuscular Hemoglobin Concentration)
7. Study of Total WBC Count by Manual using hemocytometer and Automated hematology analyzer
8. Study of Differential WBC Count (DLC)
9. Study of Absolute WBC Count
10. Study of Platelet Count
11. Study of Bleeding Time (BT) and Clotting Time (CT)
12. Study of Coagulation Tests, Prothrombin Time (PT), Activated Partial Thromboplastin Time (aPTT), Thrombin Time (TT), Fibrinogen Level Estimation
13. Study of Peripheral Blood Smear Examination Malarial Parasite.

MLT/DSC/T/151 : Fundamentals of Clinical Pathology

Course Type: TH; Core
Total Credits: 02 **Total Contact Hours: 30 Hrs.**
Maximum Marks : 50

Learning Objectives of the Course:

To provide fundamental concepts on:

1. Basic principles and scope of clinical pathology, including its role in disease diagnosis and patient care.
2. Correlating laboratory findings with clinical conditions, enhancing the ability to support differential diagnoses.

Course Outcomes (COs) :

On completion of this course, students should be able to –

1. Collect, handle, and process clinical specimens properly for laboratory testing (blood, urine, stool, sputum, and body fluids).
2. Explain the principles and scope of clinical pathology, including its diagnostic role in healthcare.

Unit No.	Course Content	Content Hours
I	**Examination of Urine and Stool Sample** 1.1 Indications, Collection, Container, Transport, Preservation of sample for different types of sample analysis. 1.2 Physical examination and its significance 1.3 Chemical examination and its significance 1.4 Microscopic examination and its significance	10 Hrs.
II	**Examination of Sputum and Semen Samples** 2.1. Indications, Collection, Container, Transport, Preservation of sample for different types of sample analysis. 2.2.Physical examination and its significance 2.3.Chemical examination and its significance 2.4.Microscopic examination and its significance	10 Hrs.
III	**Examination of CSF and Other Body Fluids; Peritoneal, Synovial and Ascitic Fluids** 3.1. Inductions, Collection, Container, Transport, Preservation of sample analysis. 3.2. Physical examination and its significance. 3.3. Chemical examination and its significance. 3.3. Microscopic examination and its significance.	10 Hrs.

Text Books:

1.Clinical Pathology – 3rd Edition, *2012* (Sabitri Sanyal) — foundational text on clinical pathology theory and lab diagnostics
2. Essentials of Clinical Pathology – 3rd Edition Reprint, *2025* (Shirish M. Kawthalkar) — focused on core clinical pathology principles and lab tests.

Reference Books:

1. Henry's *Clinical Diagnosis and Management by Laboratory Methods* — 24th Edition, *2021* (Richard A. McPherson & Matthew R. Pincus) — authoritative reference linking lab methods with clinical interpretation.
2. Oxford Handbook of Clinical Pathology — (Feb 2024 release) — concise clinical pathology reference.

Online Reference:

1. https://medtube.net/pathology
2. https://www.labtestsonline.org

MLT/DSC/P/177 : Fundamentals of Clinical Pathology – Lab

Course Type: LAB; Core
Total Credits: 02 **Total Contact Hours: 60 Hrs.**
Maximum Marks : 50

Learning Objectives of the Course:

To provide hands on training on:

1.Specimen Collection & Handling
2. Collecting methods, labeling, transporting, and storing clinical specimens (blood, urine, stool, CSF, etc.)
3. Performing and interpreting routine urinalysis including physical, chemical, and microscopic examination.

Course Outcomes (COs) :

On completion of this course, students should be able to –

1. Handle and prepare sample for testing.
2. Accurately use a microscope to identify normal and abnormal findings in pathology samples.
3. Perform necessary documentation and reporting

At least 4 experiments have to be performed

1. Study of Routine examination of Urine (Physical, Chemical and Microscopic)
2. Study of Routine examination of Stool (Physical, Chemical and Microscopic)
3. Study of Routine examination of Sputum (Physical, Chemical and Microscopic)

4. Study of Routine examination of Semen (Physical, Chemical and Microscopic)
5. Study of Routine examination of CSF (Physical, Chemical and Microscopic)
6. Study of Routine examination of Other body fluids (Physical, Chemical and Microscopic)

MLT/DSC/T/152 : Fundamentals of Parasitology Theory

Course Type: TH; Core
Total Credits: 02 **Total Contact Hours: 30 Hrs.**
Maximum Marks : 50

Learning Objectives of the Course:

To provide fundamental concepts on:

1. Parasitology and explain its scope and significance in human and animal health.
2. Parasites, hosts, vectors, and types of parasitic relationships.
3. Classification and Morphology

Course Outcomes (COs) :

On completion of this course, students should be able to –

1. Classify medically important parasites
2. Interpret life cycles of common parasites and correlate them with modes of transmission, intermediate hosts, and environmental factors.

Unit No.	Course Content	Content Hours
I	**Introduction to Parasitology:** 1.1.Examination of Intestinal Parasites Ova and Cyst 1.2.Classification of Human Parasites	**10 Hrs.**
II	**Protozoan Parasites** 2.1.Morphology,Life cycle, Pathogenicity and laboratory diagnosis of protozoa such as: • E.histolytica and E.coli. • Giardia • Trichomonas • Toxoplasma • Plasmodia and Lieshmania	**10 Hrs.**
III	**Helminths and Nematodes** 3.1. Morphology, Life cycle, Pathogenicity and laboratory diagnosis of protozoa such as: • Hook worm, Round worm, Whip worm, Thread worm, Pin Worm. • Tapeworm and Echinococcus	**10 Hrs.**

	• Wucheria Bancrofti	

Text Books:

1. Sougata Ghosh (based on C.K. Jayaram Paniker), " Paniker's Textbook of Medical Parasitology", 9th Edition 2021
2. Eric S. Loker and Bruce V. Hofkin," Parasitology: A Conceptual Approach", 2nd Edition 2022

Reference Books:

1.D. Dutta, " Textbook of Medical Parasitology", 2020
2. K.D. Chatterjee, " Parasitology: Protozoology and Helminthology", 13th Edition 2019

Online Reference:

1.https://digitalcommons.unl.edu/parasittext/?utm_source=chatgpt.com
2. https://www.ncbi.nlm.nih.gov/books/NBK8599/?utm_source=chatgpt.com

MLT/DSC/P/178 : Fundamentals of Parasitology – Lab

Course Type: LAB; Core
Total Credits: 02 **Total Contact Hours: 60 Hrs.**
Maximum Marks : 50

Learning Objectives of the Course:

To impart practical skills in:

1. Developing Laboratory Diagnostic Skills
2. Understanding the Principles of Parasitology
3. Learning Parasitological Techniques and Tools

Course Outcomes (COs) :

On completion of this course, students should be able to –

1. Interpret life cycles of common parasites and correlate them with modes of transmission, intermediate hosts, and environmental factors.
2. Understanding and Interpretation of Results
3. Demonstrate basic laboratory skills in parasitology, including specimen collection, microscopic examination, and diagnostic staining techniques.

At least 6 experiments have to be performed

1. Collection, Preservation and Transportation of Fecal material and its physical, chemical and parasitic examinations.

2. Preparation of stained and unstained slide for detection of larvae, ova or cysts
3. Concentration methods for ova and cysts
4. Demonstration of gross specimen of hook worm ,round worm, whip worm, thread worm, pin worm and tape worm
5. Demonstration of following parasites, ova, cysts under microscope.
6. E.histolytica and E.coli.
7. Giardia
8. Trichomonas
9. Toxoplasma
10. Plasmodia and Lieshmania
11. E.histolytica and E.coli.
12. Giardia
13. Trichomonas
14. Toxoplasma
15. Plasmodia and Lieshmania
16. T.vaganalis.

MLT /GE/OE/T/150: Human Physiology in Medical Laboratory

Course Type: TH; Generic/Open Elective
Total Credits: 02 **Total Contact Hours: 30 Hrs.**
Maximum Marks: 50

Learning Objectives of the Course:

This will help learners to:

1. Understand the basic principles of human physiology and how body systems maintain homeostasis.
2. Relate normal physiological processes to laboratory reference ranges and test results.
3. Understand how physiological alterations lead to disease and abnormal laboratory findings.
4. Apply physiological knowledge to sample collection, handling, and interpretation of results.

Course Outcomes (COs)

After completion of this course, students should be able to:

1. Explain the fundamental concepts of human physiology and mechanisms of homeostasis relevant to medical laboratory science.
2. Describe the normal physiological functions of major organ systems and correlate them with laboratory reference values.

3. Differentiate between normal and abnormal physiological states and relate them to pathological conditions reflected in laboratory findings.
4. Apply physiological principles to pre-analytical and analytical laboratory procedures, including specimen collection and handling.

Unit No.	Course Content	Contact Hours
I	**Introduction to Human Physiology:** Definition and scope of physiology, Levels of organization of the human body, Homeostasis and feedback mechanisms, Physiological basis of disease and Relevance of physiology in medical laboratory diagnosis.	**10 Hrs.**
II	**Cell Physiology:** Structure and functions of the cell, Cell membrane structure and transport mechanisms, Cellular metabolism and enzyme activity and Laboratory relevance of cellular physiology.	**10 Hrs.**
III	**Blood and Haematological Physiology** : Composition and functions of blood, Plasma proteins and their functions, Red blood cells: production, function, and lifespan, White blood cells and immunity, Platelets and haemostasis, Blood groups and transfusion physiology and Laboratory correlation: CBC, ESR, coagulation test.	**10 Hrs.**

Text Books

1 .C.C. Chatterjee – *Human Physiology*
Often recommended in allied health and MLT syllabi.

2. **Pal GK & Pal Pravati – Comprehensive Textbook of Medical Physiology**
Two-volume text good for both basic and applied aspects

Reference Books

1. **Guyton and Hall – *Textbook of Medical Physiology***
Gold standard for in-depth physiology.
Explains mechanisms clearly and clinically relevant.

2. **Ganong – *Review of Medical Physiology***
Detailed and concise reference with clinical emphasis.

Online References

1. https://teachmephysiology.com
2. https://cursa.app/en/free-course/human-physiology-lecture-djcj

MLT/VSC 1A/T/ Observership in Pathology Department

Course Type: OBSERVERSHIP; VSC
Total Credits: 02 **Total Contact Hours: 60 Hrs.**
Maximum Marks: 50

Learning Objectives of the Course

This Course will help learners to-

1. Identify the organizational structure of the pathology department.
2. Describe the roles and responsibilities of pathologists, residents, technologists, and support staff.
3. Observe procedures for specimen reception, labeling, accessioning, and storage.
4. Understand pre-analytical factors affecting specimen quality.

Course Outcomes (COs)

After completion of this course, students should be able to:

1. Describe the organization, workflow, and functions of the pathology department.
2. Identify different types of specimens received in pathology and explain their proper handling, labeling, and processing.
3. Demonstrate understanding of laboratory safety practices, infection control measures, and biomedical waste management.

At least 6 experiments have to be performed

1. Estimation of blood glucose
2. Estimation of serum total protein
3. Albumin estimation
4. A/G ratio calculation
5. Examination of Lipid Function Test
6. Examination of Renal Function Test
7. Examination of Liver Function Test
8. Examination of Electrolytes
9. Iron estimation

MLT/VSC 1A/T/ Observership in Blood Bank Department

Course Type: OBSERVERSHIP; VSC

Total Credits: 02 **Total Contact Hours: 60 Hrs.**
Maximum Marks: 50

Learning Objectives of the Course

This Course will help learners to-

1. Understand the principles of ABO and Rh blood group systems
2. Describe donor selection criteria and contraindications to blood donation
3. Explain the indications and contraindications of blood transfusion
4. Understand compatibility testing and cross-matching principles.

Course Outcomes (COs)

After completion of this course, students should be able to:

1. Explain the principles of blood group systems (ABO, Rh and other major systems), donor selection criteria.
2. Perform routine blood bank procedures including ABO and Rh typing, compatibility testing (cross-matching), and basic antiglobulin tests using standard operating procedures.
3. Describe and apply principles of blood collection, component preparation, storage, preservation, and cold-chain maintenance.

At least 6 experiments have to be performed

1. ABO blood grouping
   (Slide method / Tube method)
2. Rh (D) typing
3. Cross matching Method
4. Direct Coombs Test (DAT)
5. Indirect Coombs Test (ICT)
6. Pre-donation screening tests
7. Blood collection procedure
8. Component preparation
9. ELISA testing for HIV, HBsAg and HCV

❖ Note: No reference books and Text books are required. This is hospital Observership.

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