



EXAM SCHEME AND SYLLABUS

(Applicable for the batches admitted from the Academic Session
2023-24 onwards)

Diploma in Medical Lab Technician (DMLT, 2 Year Diploma Programme)

FACULTY OF PARAMEDICAL SCIENCE & ALLIED HEALTH SCIENCE

Chirayu University

Bhopal, MP 462030, India

AIMS: The aims of Diploma in Laboratory Technician program is designed to equip students with the necessary knowledge and skills to work effectively in a laboratory setting.

OBJECTIVES:

1. **Technical Proficiency:** Develop practical skills in using laboratory equipment, conducting experiments, and performing various tests in areas such as clinical, medical, or scientific laboratories.
 2. **Laboratory Safety:** Emphasize the importance of adhering to safety protocols, handling hazardous materials, and maintaining a safe laboratory environment for both students and those working in the future.
 3. **Scientific Methodology:** Teach students the principles of scientific inquiry, research methodology, and the ability to design, conduct, and analyze experiments in a systematic manner.
 4. **Sample Collection and Processing:** Train students in proper techniques for collecting, handling, and processing different types of specimens or samples, depending on the focus of the laboratory (e.g., blood, tissues, chemicals).
 5. **Quality Control:** Instill the importance of maintaining high standards of accuracy and precision in laboratory work, including the implementation of quality control measures to ensure reliable results.
 6. **Instrumentation:** Familiarize students with the operation and maintenance of laboratory instruments and equipment, such as microscopes, centrifuges, spectrophotometers, and automated analyzers.
 7. **Data Analysis:** Develop skills in data analysis, interpretation, and reporting of laboratory findings. This includes the use of computer software for data management and generating reports.
 8. **Ethics and Professionalism:** Instill ethical principles and professional conduct in handling confidential information, respecting privacy, and maintaining the integrity of scientific research.
 9. **Communication Skills:** Foster effective communication skills, both written and verbal, to enable clear reporting of findings, collaboration with colleagues, and communication with healthcare professionals or researchers.
 10. **Continuing Education:** Encourage a commitment to continuous learning and staying updated on advancements in laboratory techniques, technologies, and research methods.
 11. **Certification and Accreditation:** Prepare students for relevant certification and ensure that the program meets accreditation standards set by the council.
 12. **Team Collaboration:** Develop the ability to work collaboratively with other healthcare professionals, researchers, and colleagues in a multidisciplinary environment.
- These aims and objectives collectively aim to produce competent and skilled laboratory technicians who can contribute effectively to various fields such as healthcare, research, and industry. The emphasis is on a combination of technical proficiency, adherence to safety and ethical standards, and effective communication skills.

COURSE STRUCTURE:

Diploma in Medical Lab Technician (DMLT) is 2 Year Diploma Programme.

DURATION OF THE PROGRAM:

1. DMLT I YEAR
2. DMLT II YEAR

TEACHING DAYS: Each academic year shall consist of 160 teaching days.

SYLLABUS AND SCHEME OF EXAMINATION:

Syllabus and Scheme of examination will be the same for both first and second year.

**SCHEME OF EXAMINATION:
Diploma in Medical Lab Technician (DMLT)
FIRST YEAR D.M.L.T. EXAMINATION**

S. No.	Paper	Subject	Max. Marks	Min. Passing Marks
1	Paper- I	Human Anatomy & Physiology	100	50
2	Paper- II	Biochemistry	100	50
3	Paper- III	Pathology –I : Haematology & Blood Banking, Clinical Pathology & Parasitology	100	50
4	Paper- IV	Pathology-II: Microbiology & Serology Histology & Cytology	100	50

(There shall be Institutional/College level theory examination as per university notification, marks to be send to University for internal assessment purposes of university examination)

**SCHEME OF EXAMINATION FOR 2ND YEAR (UNIVERSITY EXAMINATION):
DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)**

There shall be university examination at the end of 2nd year curriculum of Diploma in Medical Lab Technician (DMLT)

S. No.	Paper	Subject	Theory	Internal Assessment	Practical	Total
1	Paper- I	Human Anatomy & Physiology	100	100	100	300
2	Paper- II	Biochemistry	100	100	100	300
3	Paper- III	Pathology –I : Haematology & Blood Banking, Clinical Pathology & Parasitology	100	100	100	300
4	Paper- IV	Pathology-II : Microbiology & Serology Histology & Cytology	100	100	100	300
Total			400	400	400	1200

N.B.- 1. First year institutional /college level theory examination's awarded marks would be consider as Internal assessment marks and candidate have to get min.50%marks in university theory examination in addition to Internal assessment marks i.e. 100 marks collectively for passing the examination.

2. University Practicalexaminationof100 max. marks is inclusive of viva and candidate should get separate 50% marks i.e. 50 marks to get pass.

SYLLABUS & SCHEME OF EXAMINATION
DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)
PAPER-I: HUMAN ANATOMY & PHYSIOLOGY
SCHEME OF EXAMINATION

Paper	Subject	Theory	Internal Assessment	Practical	Total
Paper- I	Human Anatomy & Physiology	100	100	100	300

INSTRUCTION FOR THE PAPER SETTER

The theory examination shall be of 100marks with **Section–A:Anatomy** and **Section–B :Physiology**.

The theory examination marks for Anatomy shall be 50 and for Physiology 50marks respectively.

There shall be two paper setters /evaluators, one from Anatomy and one from Physiology.

Section-A, which will be set by Anatomy examiner (50marks)and Section-B, by Physiology(50 marks) examiner. Recognized teachers in Anatomy and Physiology with five years of experience shall be on the panel of examiners; 50% shall be the minimum passing marks.

The pattern of theory examination for each section(A and B)will be as under for **50 Max. Marks**.

No. and Type of Questions	Marks for each Question	Total Marks
05 Very short answer Questions <i>Answer to be given in 50-60 words</i>	02	10
03 Short answer Questions <i>Answer to be given in 250-300 words</i>	08	24
01 Essay type Questions <i>Answer to be given in450-500 words</i>	16	16
Total Marks		50

DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)

PAPER-I: HUMAN ANATOMY & PHYSIOLOGY

Total teaching hrs:120hrs

Theaory:80hrs

Practical:40hrs

SYLLABUS CONTENTS:

Applied Anatomy & Physiology:

- Study of the structure of a cell.
Normal anatomical structure, Histology & Functions (Physiology) of the following systems.
- The circulatory system(Heart & Blood Vessels)
The Respiratory system
The Digestive system
Liver & Pancreas
Lymphatic system
Urinary system
Reproductive system–Male & Female
Endocrine system
Central nervous system(Brain & Spinalcord)

PRACTICAL: 40 hrs

Anatomy & Physiology

M.M.100Marks

ANATOMY:-

- (1) Demonstration of parts of body and landmarks on the surface.
- (2) The skeletal system, Head & Neck.

Thorax And Abdomen: -

- Demonstration of various organs within thorax & abdomen.
- Respiratory systems, pleurae, heart, liver, gallbladder, peritoneum stomach & intestine.
- Spleen, pancreas& parts of urinary system
- **GENERAL NERVOUS SYSTEM:-**
- Spinal level and site of lumber puncture.
- Surface anatomy of important organs & blood vessels.
- Identification of models like those of Brain, Heart, embryology, Kidney.

DEMONSTRATION:-

- Fixing, labeling & storage of specimens.
- Drawing diagrams & labelling.
- Demonstration of models, specimens & skeleton.

PHYSIOLOGY:-

- The microscope, its usage, cleaning & maintenance.
- Identification of blood cells under Microscope. RBC, various types of WBC, pallets, Reticulocytes.
- Preparation of anticoagulants.
- Collection of blood samples to obtain plasma & serum samples.
- Ruling area of Neubaur chamber.
- Usage of RBC & WBC pipettes & westergren Pipette & Wintrobe tube.
- Estimation of Hb, preparation of blood smears, staining.
- Demonstration of blood pressure recording and pulse.
- Determination of bleeding, clotting & prothrombin Time.

Note:-

- All theory topics scheduled followed by practicals.
- Minimum 100Hrs. of posting should be in Biochemistry

Minimum 100Hrs. of posting should be in pathology in 1st years to get accustomed with pathology Dept.

SYLLABUS & SCHEME OF EXAMINATION
DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)

PAPER- II: BIOCHEMISTRY

SCHEME OF EXAMINATION

Paper	Subject	Theory	Internal Assessment	Practical	Total
PAPER-II	BIOCHEMISTRY	100	100	100	300

INSTRUCTION FOR THE PAPER SETTER

The University theory examination shall be of 100 marks and question paper will be set by Asst. Professor, Biochemistry, who shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of 100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiner (Asst. Professor, Biochemistry) -one internal Examiner ;from the institute/college and one from other college /institute of the university from the panel of University examiners.

The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60words	02	20
5 short answer Questions Answer to be given in 250-300words	10	50
2 essay type Questions Answer to be given in 450-500words	15	30
Total Marks		100

DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)

PAPER- II: BIOCHEMISTRY

Total teaching hrs:120hrs

Theory:80hrs

Practical:40hrs

SYLLABUS CONTENTS:

Biochemistry:

- **Biochemical structure of the following:**
 - a. Carbohydrates
 - b. Proteins
 - c. Lipids
 - d. Enzymes
- **Clinical Biochemistry:**
 - a. Kidney function tests(Renal profile)
 - b. Liver functions tests(Hepatic profile)
 - c. Cardiac profile
 - d. Lipid profile
- **Estimation of:**
 - a. Blood sugar
 - b. Blood Urea
 - c. S. Cholesterol
 - d. S. Uric Acid
 - e. S. Creatinine
 - f. Diff.S. Enzymes

PRACTICAL

M.M.100

- (1) Demonstration of Kidney function test. Gastric function test & liver function test.
- (2) Demonstration of Enzyme Analysis-Acid and Alkaline phosphates, **SGOT/SGPT**.
Lactic dehydrogenase, CPK.
- (3) Lipid profile.
- (4) Estimation of Blood/serum-Glucose, **G.T.T.** Urea, creatinine, uric Acid, Cholesterol. Bill
Rubin. protein & A/G Ratio, Glycosylated Hb.
- (5) Demonstration of semi automated, Fully automated Biochemical Analyzers.
- (6) Demonstration /Exposure to Radioimmunoassay laboratory.
- (7) Visit to Laboratory of National Importance.)

SYLLABUS & SCHEME OF EXAMINATION

DIPLOMA IN MEDICAL LAB TECHNICIAN(DMLT)

PAPER-III : Pathology–I:HAEMATOLOGY & BLOODBANKING, CLINICAL

PATHOLOGY & PARASITOLOGY

SCHEME OF EXAMINATION

Paper	Subject	Theory	Internal Assessment	Practical	Total
PAPER-III	Pathology –I : Haematology & Blood Banking, Clinical Pathology & parasitology	100	100	100	300

INSTRUCTION FOR THE PAPER SETTER

The University theory examination shall be of 100 marks and question paper will be set by qualified examiner M.D. Pathology, who shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of 100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiner M.D. Pathology- one internal Examiner; from the institute/college and one from other college /institute of the university from the panel of University examiners.

The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

No. and Type of Questions	Marks for each Question	Total Marks
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5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		100

DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)
PAPER-III: Pathology–I:HAEMATOLOGY & BLOOD
BANKING,CLINICAL PATHOLOGY & PARASITOLOGY

Total No. of Hrs.:-100

Theory and Practical – 60 hrs. & 40 hrs.

HAEMATOLOGY:

- a. Composition of blood
- b. Collection of blood & anticoagulants
- c. Hb estimation, TRBC count–ANAEMIAS
- d. Preparation & staining of blood films
- e. Development of WBCS(Leukopoiesis)
- f. TWBC & DWBC count –LEUKAEMIAS
- g. Absolute values ESR, PCV,Reticulocyte count,
- h. Platelet count BT&CT
- i. LE cell preparation, sickling test, osmotic fragility
- j. Bone marrow examination.

BLOOD BANKING:

- a. Blood group–ABO system, Rh typing
- b. Cross matching, Coomb's test,
- c. Donor screening
- d. Blood transfusion & transfusion reactions
- e. Blood components

CLINICAL PATHOLOGY:

- a. Physical, chemical& microscopic examination of urine
- b. Stool examination
- c. Semen examination
- d. CSF exam.& other body fluids

PARASITOLOGY:

- a. Introduction
- b. Parasites in Blood, stool &Urine

SYLLABUS & SCHEME OF EXAMINATION
DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)
PAPER-IV: Pathology-II:MICROBIOLOGY & SEROLOGY
HISTOLOGY & CYTOLOGY
SCHEME OF EXAMINATION

Paper	Subject	Theory	Internal Assessment	Practical	Total
PAPER-III	Pathology-II: Microbiology & Serology Histology & Cytology	100	100	100	300

INSTRUCTION FOR THE PAPER SETTER

The University theory examination shall be of 100 marks and question paper will be set by qualified examiner M.D. Pathology , who shall be on the panel of examiners of internal or external,50%shallbethe minimum passing marks. Internal assessment willbeof100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiner M.D. Pathology - one internal Examiner ; from the institute /college and one from other college /institute of the university from the panel of University examiners. The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

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2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		100

DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)

PAPER-IV: Pathology-II:MICROBIOLOGY, SEROLOGY, HISTOLOGY & CYTOLOGY

Total No. of Hrs.:-100

Theory & Practical hrs.- 60 & 40 hrs.

SYLLABUS CONTENTS:

Microbiology:

- a. Classification
- b. Morphology of Bacteria
- c. Culture & isolation of bacteria
- d. Gram positive & gram negative cocci
- e. Gram positive & Gram negative bacilli
- f. Anaerobic spore bearing bacilli

Serology:

- a. Antigen & Antibodies
- b. Diagnosis of syphilis–VDRL test
- c. RA test
- d. Diagnosis of Typhoid–Widal test
- e. Elisa test

HISTOLOGY:

- a. Fixatives
- b. Tissue processing, impregnation
- c. Block making
- d. Section cutting
- e. Types of Microtomes
- f. Basic staining of sections
- g. Collection of tissue for histology
- h. Method of Decalcification

CYTOLOGY:

- a. Techniques & equipments required
- b. Fixatives & staining procedure
- c. FNAC technique
- d. Pap's staining

Book References:

- I. Text book of medical laboratory – P.B. Godkar
- II. Decei J.A. & Lewis S.M. Practical Haematology – Decei J.A. & Lewis
- III. Essentials Of Hametalogy – Shirish M. Kwathalkar
- IV. Essentials Of Clinical Pathology - Shirish M. Kwathalkar
- V. Modern Blood Banking and Transfusion Practices – F.A. Davis