



Academic Year 2024-2025

Department of Medical Laboratory Technology

**School of Health Sciences
Central University of Rajasthan
Bandarsindri, Kishangarh, Ajmer
Rajasthan 305817**

Medical Laboratory Technology



Preamble:

The central university of Rajasthan was established in 2009 by an act of Parliament by the Indian government with the mission of providing quality education to all sections of society, particularly the poor, and with a vision of education for sustainable development. Continuing with the motto and concept of its establishment and concept, we are in the continuous process of imparting quality education for all sections of society, equipping them with informed knowledge in their area, and making them inclined towards their goals both professionally, personally, and socially. We are committed to producing graduates capable of leading society in the direction of prosperity and fraternity. The university has master's program in Biotechnology, Biochemistry, Microbiology, and a B.Tech. program in Biomedical Engineering. Soon, the School of Health Sciences will be established.

Now, we started M.Sc. in Medical Lab Technology under school of Interdisciplinary Health Sciences. The M.Sc. in Medical Laboratory Technology is a two-year postgraduate program designed for students who want to work as a Medical Lab Technician. Students will gain theoretical and practical knowledge of Microbiology, Hematology, Cytology, Blood Bank, Biochemistry, Toxicology, and other related fields. The M.Sc. Medical Lab Technology program trains professionals to work in private hospitals and biomedical laboratory centers by providing them with practical experience and technical knowledge. It is a paramedical program that teaches both practical and theoretical knowledge about the diagnosis, treatment, and prevention of various illnesses and health problems using clinical laboratory tests. Students will learn how to analyze various body fluids during their studies, including hematological, bacteriological, immunological, chemical, histopathological, and microscopical evaluation.

For Admission in the M.Sc.-Medical Laboratory Technology program, students must have a valid B.Sc. Medical Laboratory Technology, Life Sciences, Biological Sciences, Biomedical Sciences, Biochemistry, Microbiology, Biotechnology, BAMS, MBBS degree in the relevant field.



The Vice Chancellor of Central University of Rajasthan

Vision and objective of program

The primary goal of the course is to provide students with a comprehensive understanding of various testing techniques used in the diagnosis of various diseases, such as blood tests, blood typing, urine analysis, and other tests that are error-free. The course covers the study of disease diagnosis using a clinical laboratory. It also entails a thorough examination of the results of laboratory tests required to treat a specific disease using the most advanced medical procedures and facilities. In the modern era of medical science, treatment for any disease is entirely dependent on diagnostic tests performed in the laboratory. This emphasizes the importance of this program in the medical and health sectors. After completing this course, the average annual salary ranges from INR 3 Lakhs to INR 8 Lakhs per annum. However, as experience and expertise grow, so does the salary.

After completing the course, technologists will have numerous opportunities to advance their careers in a variety of fields. The technician's academic and technical abilities determine his or her job opportunities in this field. These Postgraduates can work as Medical Laboratory Technician, Clinical Laboratory Technician, Lab Technician, Biochemist, Clinical Laboratory Technician, Medical Laboratory Technician. A skilled and efficient graduate in this field is likely to obtain challenging positions in various hospitals, both public and private, such as emergency rooms, blood donation centers, laboratories, and so on.

Scope

This course has a very broad scope. Candidates with a M.Sc. MLT degree have a plethora of excellent opportunities in a variety of fields all over the world. The course's scope includes the following:

- A career in This is one of the most challenging and rewarding careers available today. A technician/technologist learns something new every day, which is beneficial to their career.
- A variety of Medical Laboratory Technicians can find work in pathology labs, research labs, urology labs, the pharmaceutical industry, hospitals, and a variety of other settings.
- Aside from the opportunities listed above, an aspirant can also pursue a career as an allied health professionals which includes dental hygienists, diagnostic medical sonographers, dietitians, medical technologists, occupational therapists, physical therapists, radiographers, respiratory therapists, and speech language pathologists.
- Medical Laboratory Technology encompasses fields such as blood banking, clinical chemistry, hematology, immunology, microbiology, and cytotechnology, urine testing, blood sampling, and so on. There are numerous fields that can serve as suitable career options for graduates.
- A M.Sc. MLT degree opens a plethora of job opportunities in the healthcare sector. Clinical lab technicians are required in every hospital and healthcare sector to detect problems and diseases that affect patients. As a result, it is increasing the number of job opportunities for M.Sc. MLT graduates. The Medical Laboratory Technology profession has a positive impact on people's health.

M.Sc. in Medical Laboratory Technology Course Highlights

Some of the major highlights of M.Sc. in Medical Laboratory Technology course are as follows:

Level	Postgraduate
Name of the course	Master of Science in Medical Laboratory Technology
Short Name	M.Sc. in MLT
Eligibility for M.Sc. MLT admission	B.Sc. Medical Laboratory Technology, Life Sciences, Biological Sciences, Biomedical Sciences, Biochemistry, Microbiology, Biotechnology, BAMS, MBBS degree in the relevant field.
Duration	2 Years
Intake	30
Mode	Regular
Exam Type	Semester
Minimum Qualification	Graduation Degree
Selection Process	Through NTA Entrance Exam
Tuition Fee	Rs. 55,520 Per Semester {The prices of the hostel, mess, Internet and library must be paid separately if a student wishes to use these facilities inside the campus. Its available on University website}.
Employment Sectors	Hospitals, Clinics, Nursing Homes, Public health facilities, Clinical Laboratories, Pathological Labs in India as well as abroad
Job Profiles	Laboratory manager, Consultant, Health care administrator, Hospital outreach coordinator, educational consultant, Supervisors of clinical laboratories, Laboratory information system analyst, Health and Safety Officer etc.

M.Sc. in Medical Laboratory Technology Tuition Fee

Rs. 55,520 Per Semester

{The prices of the hostel, mess, Internet and library must be paid separately if a student wishes to use these facilities inside the campus, Its available on University website}.

M.Sc. in Medical Laboratory Technology Syllabus

The semester-wise syllabus for M.Sc. in Medical Laboratory Technology courses as follows:

1st Semester: -

S.No.	Major Topic to be study	Course Type	Credits
1	Human anatomy and physiology		3
2	Molecular Biology		3
3	Clinical Biochemistry		3
4	Haematology		3
5	Hospital managements		3
6	Clinical Biochemistry lab		3
7	Modern diagnostics		3
8	Elective I (Research methodology)		3
	Total Credits		24

2nd Semester: -

S.No.	Major Topic to be study		Credits
1	Clinical Microbiology		3
2	Immunology		3
3	Serology		3
4	Blood bank		3
5	Clinical Microbiology lab		3
6	Biomedical waste management		3
7	Histopathology		3
8	Elective II Community medicine epidemiology		3
	Total Credits		24

3rd Semester: -

S.No.	Major Topic to be study		Credits
1	Urine analysis		3
2	Human disorder		3
3	Stool examinations		3
4	Sputum analysis		3
5	Haematology Lab		3
6	Forensic science		3
S.No. 7	Major Topic to be study		3
1	Elective III Non-Invasive Techniques		3
2	Toxicology		3
3	Telemedicine and telehealth		3
3	Elective IV Project/ Dissertation Modern Medical Practices		18
	Total Credits		24
	Total Credits		24

4th
Semester:
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List Of the electives

1. Research methodology
2. Community Medicine epidemiology
3. Toxicology
4. Modern medical practice

5. Basic Patient care and safety

DISSERTATION / PROJECT WORK

The dissertation / project work will be carried out under the supervision of an allotted subject guide. The work will be related to lab investigations and quality management in the medical laboratory technology specialisation area.

1-Clinical Biochemistry lab

1. Identification of substances of Physiological importance – Carbohydrates, Proteins, Lipids.
2. Urine analysis – Normal & Pathological.
3. Colorimetric estimation – Glucose, Urea, Creatinine etc.
4. Estimation using semi & fully automated analyzers:
 0. Glucose
 1. Components of LFT, RFT, Lipid profile, diabetic profile etc.
 2. Enzymes of diagnostic importance- amylase, lipase, CPK, CPK-MB, Troponin I, LDH etc.
5. Estimation of hormones, vitamins, tumor markers and other biomarkers by ELISA, RIA, CLIA etc.
6. Biochemical analysis of fluids: CSF, ascitic & pleural fluids etc.
7. Analysis of arterial blood gases & electrolytes
8. Fractionation & Identification of, a) Amino acids b) Sugar c) Proteins d) Lipoproteins by
 0. Thin Layer & Paper Chromatography.
 1. Various diagnosis using HPLC
 2. Gel electrophoresis & Paper Electrophoresis.
 3. Capillary electrophoresis of Plasma proteins
9. Calculation of coefficient of variation, coefficient of correlation, plotting LJ charts
10. Total Quality Management of Laboratory:
 0. Specimen collection, handling & storage of sample.
 1. Methods of standardization & calibration.
 2. Methods of quality control & assessment.
11. Interpretation and correlation of various biochemical parameters with different clinical conditions.

2-Clinical Microbiology lab

1. Microscopy-Handling and general maintenance
2. Staining procedures-Preparation of stains and staining methodology
3. Cultivation-Media preparation – details of ingredients, pH measurement, preparation of reagents, buffers, glass wares etc and quality control
4. Antimicrobial agents-Preparation, susceptibility testing, quality control, MIC, MBC
5. Sterilization and disinfection-Handling of main types of filters, preparation procedures for autoclaving hot air oven, testing of disinfectants

6. Collection of specimens for Microbiological investigations such as Blood, Urine, Throat swab, Rectal swab, Stool, Pus (swabs), OT and other specimens
7. Complete Characterization of bacteria of medical importance including morphology, cultural, biochemical, serological, antimicrobial, susceptibility pattern and any other biological properties as well as molecular methods.
8. Collection of relevant clinical samples: Blood for culture and serological test, Urine for culture, Swabs for microscopy and culture
9. Body fluids for microscopy and culture
10. Storage and transport of the clinical specimens: Preparation of smears from clinical material, Microscopic Examination
11. Gram stain: Ziehl – Nielsen stain, Stool for ova and cyst, Blood smear for parasites (MP, Mf), Albert stain for diphtheria
12. Negative Staining

3-Hematology lab:

1. Hemoglobin estimation
 2. Total leukocytes count
 3. Total RBC count
 4. Platelet count
 5. Staining of blood film & interpretation of PBF
 6. Differential leukocytes count
 7. Packed cell volume (PCV)
 8. Erythrocyte sedimentation rate (ESR)
 9. Reticulocyte count
 10. Sickling test
1. Osmotic fragility test
 2. Prothrombin time (PT)
 3. Activated partial thromboplastin time (APTT)
 4. Cytochemistry of bone marrow smears like myeloperoxidase, periodic acid Schiff's
 5. ABO & Rh blood grouping Coomb's test

M.Sc. in Medical Laboratory Technology Career Options and Job Prospects

Some of the popular employment sectors and job profiles for candidates who completed their M.Sc. in Medical Laboratory Technology course are mentioned below:

Employment Sectors	Hospitals/Clinics
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	Nursing Homes Commercial Clinical Laboratories Pathological Labs
Job Profile	Laboratory Manager Healthcare Administrator Hospital outreach coordinator Lab Technician Biomedical Analyst Sample Analyst