MSc- Medical Lab Technology

Programme Outcomes (POs)

PO1. Employ critical thinking and innovation to analyze challenges, concepts, research, and clinical outcomes and apply them to professional practice

PO2. Demonstrate a broad-based and integrative understanding of physiological, pathological & diagnostic concepts that prepare them for careers in health science.

PO3. Approach patient care from a cultural diversity perspective that respecting but not limited to: cultural, social, religious, racial, gender, and ethnic diversity of the patient and family regarding disease and their health.

PO4. Integrate concepts from various scientific fields to meet the requirements for healthcare technical & administrative positions and/or higher education.

PO5. Analyze critically the given scientific data ascribe meaning to them and draw objective conclusions.

PO6. Demonstrate empathetic social concern, skills to effectively participate in health affairs and critical decision making.

PO7. Imbibe ethical, moral and social values to become cultured and civilized global citizens.

PO8. Apply concepts of sustainable development to make a difference in social and environmental issues.

PO9. Develop multidimensional skills and habits as lifelong learners.

Programme Specific Outcomes (PSOs)

PSO1. The program will provide students with a comprehensive understanding of advanced concepts and techniques in medical laboratory technology, including molecular biology, genomics, and proteomics.

PSO2. Students will develop the ability to design, conduct, and interpret research in medical laboratory technology, advancing their knowledge of the field and contributing to new discoveries.

PSO3. The program will provide students with exposure to the latest technology and equipment used in medical laboratory technology, allowing them to stay current and adapt to new developments in the field.

PSO4. Students will learn about the importance of patient-centered care in medical laboratory technology and how to prioritize patient comfort and safety during procedures.

PSO5. Students will learn about the ethical and legal issues related to medical laboratory technology, including patient confidentiality, informed consent, and medical malpractice.

PSO6. Students will develop leadership skills, including the ability to lead teams, mentor others, and contribute to the advancement of medical laboratory technology.

Course Outcomes

2021-2023

Semester	Subject Code	Subject	Course Outcomes
1	**21MASMLT101**	**BIOMOLECULES**	CO1: Understand the chemical and physical properties of biological macromolecules (carbohydrates, lipids, nucleic acids, and proteins) CO2: Acquire knowledge of the structure and function of the different biomolecules and how they participate in cellular processes CO3: Analyse the relationship between the structure and function of biomolecules, including enzymes and other proteins CO4: Acquire Knowledge of the medical and industrial applications of biomolecules
	21MASMLT202	**CLINICAL IMMUNOLOGY**	CO1: Understand the basic principles of immunology and how the immune system works. CO2: Acquire Knowledge of the different types of immune responses, including innate and adaptive immunity. CO3: Understand the role of immunological tests in the diagnosis and management of various diseases, including autoimmune
	21MASMLT103	**METABOLISM**	CO1: To demonstrate an understanding of structure and metabolism of CO2: To understand various pathway in carbohydrate metabolism including disorder. CO3: To realize mechanism behind amino acid metabolism and various inborn error of metabolism. CO4: To appreciate lipid metabolism with emphasis on cardiovascular diseases. CO5: To know the synthesis of various nucleotides and its degradation.
	21MASMLT104	**PHYSIOLOGY**	CO1: Understand the basic physiological concepts and processes CO2: Acquire knowledge of physiological control systems CO3: Familiarity with measurement techniques. CO4: Understand of normal and abnormal physiology CO5: Knowledge of medical applications

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	21MASMLT105	**ENZYMOLOGY**	CO1: Understand the structural and functional features of the enzymes. CO2: Outline the mechanism of action of different enzymes. CO3: Study the kinetics of enzymes in depth. CO4: Apply the enzymes and their activities in various fields. CO5: Gain knowledge about enzymes and their industrial production.
	21MASMLT106L	**LAB COURSE I**	CO1: To have practical knowledge of various biochemical regents CO2: To have a hand on experience in preparation of glucose standard curve CO3: To be able to apply the knowledge of TLC and separate the lipids CO4: To be able to calculate the Rf value of amino acids and estimation of electrolytes in biological fluids

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Semester	Subject Code	Subject	Course Outcomes
2	**21MASMLT201**	**CLINICAL MOLECULAR BIOLOGY**	CO1: Understand of molecular biology techniques CO2: Acquire knowledge of genetic diseases and mutations CO3: Learn about genomics and genotyping: CO4: Acquire knowledge of genetic testing and interpretation CO5: Understand of ethical and legal considerations in genetic testing
	21MASMLT202	**CLINICAL IMMUNOLOGY**	CO1: Understand the working mechanism of the human immune system. CO2: Gain knowledge about various aspects of immunity in the human body. CO3: Study the various cellular and physiological mechanisms of immunity. CO4: Apply various techniques for identification of antigen and antibodies. CO5: Apply strategy of vaccination against pathogenic diseases.

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	21MASMLT203	**CLINICAL PATHOLOGY I**	CO1: Understand the various laboratory procedures and techniques used in clinical pathology, such as hematology, clinical chemistry, and microbiology. CO2: Acquire knowledge of normal and abnormal results and their significance in the diagnosis and treatment of disease. CO3: Acquire familiarity with various laboratory equipment and instruments used in clinical pathology, such as analyzers, microscopes, and centrifuges. CO4: Acquire knowledge of quality control and assurance and understand the importance of quality control and quality assurance in clinical pathology, including the use of control materials and the interpretation of quality control results.
	21MASMLT204	**CLINICAL BIOCHEMISTRY**	CO1: Understand the basic principles of clinical biochemistry and its applications in medical diagnosis and treatment. CO2: Develop practical skills in performing laboratory tests and analyzing results. CO3: Gain knowledge of the normal range and interpretation of clinical biochemistry parameters, such as glucose, electrolytes, liver function tests, and kidney function tests. CO4: Learn about the role of biochemistry in the diagnosis of various diseases, such as diabetes, liver disease, and kidney disease. CO5: Acquire knowledge about the principles of quality control and quality assurance in clinical biochemistry.

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	21MASMLT205	**HOSPITAL MANAGEMENT**	CO1: Develop a comprehensive understanding of the healthcare industry and the role of hospitals in the delivery of care. CO2: Gain knowledge of the principles of healthcare administration, including organizational structure, finance, and operations management. CO3: Develop skills in strategic planning and decision-making, including financial analysis and budgeting. CO4: Learn about the importance of effective communication and leadership in healthcare organizations. CO5: Acquire an understanding of the legal and regulatory framework for healthcare organizations, including issues related to patient privacy and medical ethics. CO6: Develop a comprehensive understanding of the challenges faced by healthcare organizations, including healthcare reform, payment systems, and workforce issues.
	21MASMLT206L	**LAB COURSE II & III**	CO1: To acquire the practical knowledge of lab management CO2: To acquire advanced knowledge and skills in various laboratory techniques CO3: To develop the ability to critically analyze and interpret laboratory data CO4: To acquire the practical knowledge of antigen antibody assay, ELISA tests, Immuno- electrophoresis, etc and their application

Course Outcomes

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Semester	Subject Code	Subject	Course Outcomes
3	21MASMLT301	MEDICAL LABORATORY TECHNIQUES	CO1: Understand the design and working principle of molecular diagnostics laboratories. CO2: Estimate the clinically significant biomolecules in the various biological fluids. CO3: Basic knowledge on quality control and quality assurance in molecular diagnostics laboratories. CO4: Analyze the various biological specimens for pathological conditions. CO5: Apply appropriate molecular diagnostics techniques in detection of pathogens.
	21MASMLT302	MEDICAL MICROBIOLOGY	CO1: Develop a comprehensive understanding of the role of microorganisms in human health, including the causes, diagnosis, and treatment of infectious diseases. CO2: Acquire knowledge of the basic principles of microbiology, including the structure, function, and classification of microorganisms. CO3: Learn about the mechanisms of pathogenesis, including the interactions between microorganisms and host defenses. CO4: Develop an understanding of the principles of epidemiology and public health, including the control and prevention of infectious diseases. CO5: Gain practical experience in the laboratory diagnosis of infectious diseases, including the use of various laboratory techniques and instruments.

Semester	Subject Code	Subject	Course Outcomes
	21MASMLT303	**CLINICAL PATHOLOGY II**	CO1: Acquire knowledge of the principles and applications of advanced laboratory techniques, such as flow cytometry, molecular diagnostics, and immunohistochemistry. CO2: Understand the role of laboratory tests in the diagnosis, management, and treatment of various diseases, including infectious diseases, hematological disorders, and cancer. CO3: Interpret and analyze laboratory test results, including the use of reference ranges, normal values, and quality control procedures. Co5: Identify potential sources of error in laboratory testing and the importance of quality assurance in laboratory medicine.
	21MASMLT304	**BODY FLUID ANALYSIS**	CO1: To understand the various techniques used for the collection, processing, and analysis of body fluids, including centrifugation, filtration, and staining. CO2: Knowledge of the anatomy and their role in the diagnosis and management of disease. CO3: Perform laboratory examination of different body fluids, such as blood, urine, cerebrospinal fluid, and synovial fluid, among others. CO4: Acquire knowledge about the normal and abnormal ranges for various body fluids and the interpretation of results in the context of disease.

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	21MASMLT305	**IPR & ETHICS**	CO1: Legal aspects of IPR: Students learn about the different forms of IPR, including copyrights, trademarks, patents, and trade secrets CO2: Understand issues related to plagiarism, copyright infringement, and piracy. CO3: Understand the role of IPR in the global economy and impact of IPR on international trade, including the negotiation and implementation of international IPR agreements. CO4: Acquire knowledge about the impact of new technologies on IPR, including the challenges posed by digital media and the Internet. They also learn about CO5: Summarize the role of IPR in promoting innovation and the protection of technological innovations. CO6: Appraise the importance of ethical considerations in the use and protection of IPR

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4	**RESEARCH METHODOLOGY**	CO-1: Define the role and objectives of research in research process. CO-2: Scale up the measurements of concepts in research. CO-3: Endeavour to discover facts by scientific study, course of critical investigation and to formulate a research proposal CO-4: To innovate new ideas and gain information about the research design in terms of instrumentation and analysis for qualitative research. CO-5: Look into the code of conduct in terms of research ethics.
	NON INVASIVE TECHNIQUES	CO1: Understand the principles and theories behind non-invasive techniques, including their advantages and limitations compared to invasive techniques. CO2: Acquire knowledge about different types of non-invasive techniques, such as imaging techniques (e.g., MRI, CT, ultrasound), spectroscopy (e.g., NMR, Raman), and biophysical techniques (e.g., electrophysiology, optical techniques). Co3: applications of non-invasive techniques in various fields, including medicine, biology, and materials science. The data acquisition and analysis methods used in non-invasive techniques, including image processing and signal processing. The ethical, legal, and social implications of using non-invasive techniques, such as privacy and informed consent.
	PHARMACEUTICAL CHEMISTRY	CO-1: To understand the basics of drug classification and pharmaceutical aids. CO-2: The plan the drug designing and screening in terms of dosage forms. CO-3: To gain knowledge about the analytical techniques involved in pharmacology of the drug. CO-5: To analyze the pharmacokinetic study of the drugs with regard to drug clearance.
	BLOOD TRANSFUSION	CO1: Understand the anatomy and physiology of the blood and the circulatory system. CO2: Acquire knowledge about different blood groups and the principles of blood typing and cross-matching. CO3: Learn about indications, contraindications, and risks associated with blood transfusions. CO4: Perform the pre-transfusion testing procedures, including blood typing, cross-matching, and infectious disease screening. CO5: Prepare, administer, and monitor of blood transfusions.

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	BIOSTATISTICS	CO1: Understanding the meaning of biostatistics, scope and limitations, types of data and method of data collection CO2: Analysing the data graphically using frequency distributions CO3: Describe the data using measure of central tendency CO4: Identifying the scatteredness of data using measure of dispersion CO5: Analysing and evaluating the data using correlation and regression