ALLIED HEALTH SCIENCES

Programme Name -BMLT

VISION

- To impart quality education through outcomes-based teaching & Hands-On clinical practice.
- To encourage innovation & interdisciplinary collaboration in solving real world challenges.
- To produce skilled, ethical, ALLIED HEALTH Professionals, who contribute holistic Health Care & enhancement of community health at local & global level.

MISSION

- To educate & professionals who contribute to the promotion of health prevention of disease & delivery of high-quality patient care.
- Developing next generation of Allied Health leaders through membership, education & innovation.
- To encourage creative solution and best practice in patient care.

PROGRAMME EDUCATIONAL OBJECTIVES:

PEO1: To produce skilled and competent individuals capable of performing, analyzing, and interpreting various diagnostic laboratory tests with accuracy, efficiency, adhering to quality standards in healthcare and research settings.
PEO 2: To develop professionals with strong ethical values, effective communication skills, and lifelong learning habits who can contribute to public health, research, and laboratory management while adapting to technological advancements in medical diagnostics.

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques for accurate analysis, diagnosis, and monitoring of diseases.
PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

PROGRAMME OUTCOMES:

At the end of the program students should be able to:

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.
PO2: Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
PO3: Identify, analyse and interpret laboratory data to assist in clinical decision making and problem solving in patient care.
PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
PO5: Communicate effectively with healthcare professionals, patients and work

collaboratively as part of a multidisciplinary healthcare team.
PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.
PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.
PO8: Detecting the outbreaks and preventing the spread of infectious diseases,which contributes to a healthier community

Credit Definition

Type	Duration (in hours)	Credit
Lecture (L)	1	1
Tutorial (T)	0	0
Practical (P)	2	1

Total Credit Distribution for the Entire Programme:

Semester	Credit						
	CC	DSE	GE	AECC	SEC	USC	Total/Sem
First	18			2			20
Second	18		4	2	1		25
Third	12	6	4	2	1	2	27
Fourth	12	6	4	2	1	2	27
Fifth	18	6			1	2	27
Sixth	18	6				2	26
Total Credit/ Course	90	30	12	8	4	8	
Total Credit							152

Category Definition:

Definition of Category/Type	Abbreviation
Core Courses;	CC
General Elective	GE
Ability Enhancement Compulsory Course	AECC
Skill Enhancement Courses;	SEC
Discipline Specific Elective	DSE
University specified course	USC
Skill Enhancement Courses	SEC

FIRST YEAR

SEMESTER-I & II:

Category	Course Name	Credit	Teaching Scheme		
			L	T	P
Semester –I					
CC – 1	Basic & Applied Human Anatomy	4	4	0	0
	Basic & Applied Human Anatomy Lab	2	0	0	4
CC – 2	Basic & Applied Human Physiology	4	4	0	0
	Basic & Applied Human Physiology lab	2	0	0	4
CC– 3	Basic Instrument & Equipment	4	4	0	0
	Basic Instrument & Equipment lab	2	0	0	4
AECC – 1	Communicative English – I	2	2	0	0
Total Credit = 20			Teaching Hour = 24		
Semester –II					
CC – 4	Biochemistry & Biophysics	4	4	0	0
	Biochemistry & Biophysics Lab	2	0	0	4
CC – 5	Basic & Clinical Hematology	4	4	0	0
	Basic & Clinical Hematology Lab	2	2	0	2
CC-6	Diagnostic laboratory Instrument & Equipment	4	4	0	0
	Diagnostic laboratory Instrument & Equipment Lab	2	0	0	4
GE – 1	General Elective (Clinical Psychology)	4	4	0	0
AECC – 2	Communicative English – II	2	2	0	0
SEC – 1	Mentored Seminar – I	1	1	0	0
Total Credit = 25			Teaching Hour = 31		

SECOND YEAR

SEMESTER-III & IV

Category	Course Name	Credit	Teaching Scheme		
			L	T	P
Semester – III					
CC – 7	Clinical Pathology	4	4	0	0
	Clinical Pathology Lab	2	0	0	4
CC – 8	Clinical Immunology & Serology	4	4	0	0
	Clinical Immunology & Serology Lab	2	0	0	4
DSE – 1	Pharmacology & Toxicology	4	4	0	0
	Pharmacology & Toxicology – Lab	2	0	0	4
GE – 2	General Elective-II	4	4	0	0
AECC – 3	Fundamentals of Computer Science	2	2	0	0
SEC – 2	Mentored Seminar – II	1	1	0	0
USC – 1	Environmental Science-I	2	2	0	0
Total Credit = 27			Teaching Hour = 33		
Semester – IV					
CC – 9	Clinical Biochemistry	4	4	0	0
	Clinical Biochemistry Lab	2	0	0	4
CC – 10	Medical Microbiology -I Bacteriology	4	4	0	0
	Medical Microbiology -I Bacteriology lab	2	0	0	4
DSE – 2	Medical Biotechnology	4	4	0	0
	Medical Biotechnology LAB	2	0	0	4
GE – 3	General Elective-III	4	4	0	0
AECC – 4	Medical Law & Ethics	2	2	0	0
SEC – 3	Mentored Seminar – III	1	1	0	0
USC – 2	Environmental Science-II	2	2	0	0
Total Credit = 27			Teaching Hour = 33		

THIRD YEAR

SEMESTER V & VI:

Category	Course Name	Credit	Teaching Scheme		
			L	T	P
Semester – V					
CC – 11	Applied Cytopathology	4	4	0	0
	Applied Cytopathology Lab	2	0	0	4
CC – 12	Medical Microbiology –II Mycology & virology	4	4	0	0
	Medical Microbiology –II Mycology & virology Lab	2	0	0	4
CC – 13	Applied Histopathology	4	4	0	0
	Applied Histopathology – lab	2	0	0	4
DSE – 3	Clinical Parasitology & Entamology	4	4	0	0
	Clinical Parasitology & Entamology Lab	2	0	0	4
SEC – 4	Mentored Seminar – IV	1	1	0	0
USC – 3	Health Statistics	2	2	0	0
Total Credit = 27			**Teaching Hour = 33**		
Semester – VI					
CC – 14	Immunohematology & blood banking	4	4	0	0
	Immunohematology & blood banking Lab	2	0	0	4
CC – 15	Clinical Endocrinology and Andrology	4	4	0	0
	Clinical Endocrinology and Andrology Lab	2	0	0	4
CC – 16	Advanced Diagnostic Molecular Biology	4	4	0	0
	Advanced Diagnostic Molecular Biology Lab	2	0	0	4
DSE-4	Project	6	0	0	12
USC-4	Research Methodology	2	2	0	0
Total Credit = 26			**Teaching Hour 38**		

COURSE CO-PO-PSO MAPPING

SEMESTER-I

COURSE 1 (BMLT)

PAPER: BASIC & APPLIED HUMAN PHYSIOLOGY

Course Outcomes:

CO1: Students will be able to classify the various blood components and their transfusion according to the clinical physiology.
CO2: Students will be able to demonstrate the physiology of cardio-vascular system, pulmonary system, and renal system, and its abnormalities.
CO3: Students will be able to detect hormonal imbalance.
CO4: Students will be able to monitor cardio-pulmonary parameters and management. CO5: Students will be able to check the reflexes of neuro-muscular system.

At the end of the program students should be able to:

PO1- Demonstrate sufficient concepts in performing routine clinical laboratory tests.
PO2- Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
PO3- analyse and interpret laboratory data to assist in clinical decision making and problem-solving in-patient care.
PO4- Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
PO5- Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6- Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.
PO7- Engage in continuous learning, professional development and adopt research-based approaches to keep pace.
PO8: Detecting the outbreaks and preventing the spread of infectious diseases, which contributes to a healthier community.

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques including haematology, clinical biochemistry, microbiology, histopathology, and immunology for accurate analysis, diagnosis, and monitoring of diseases.
PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.
PEO 1: To produce skilled and competent medical laboratory technologists capable of performing, analysing, and interpreting various diagnostic laboratory tests with accuracy, efficiency, and
adherence to quality standards in healthcare and research settings.

PEO 2: To develop professionals with strong ethical values, effective communication skills, and lifelong learning habits who can contribute to public health, research, and laboratory management while adapting to technological advancements in medical diagnostics.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	2	1	2	1
CO2	3	3	3	2	1	2	1
CO3	3	3	3	2	1	2	2
CO4	3	3	3	2	2	3	2
CO5	3	2	2	2	1	2	1
TOTAL	15	14	13	10	6	11	7

CO / PO–PSO–PEO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PEO1	PEO2
CO1	3	3	2	2	1	2	1	2	3	2	3	2
CO2	3	3	3	2	1	2	1	2	3	3	3	3
CO3	3	3	3	2	1	2	2	2	3	2	3	2
CO4	3	3	3	2	2	3	2	3	3	3	3	3
CO5	3	2	2	2	1	2	1	2	2	2	2	2
Total	**15**	**14**	**13**	**10**	**6**	**11**	**7**	**11**	**14**	**12**	**14**	**12**

PAPER: BASIC INSTRUMENT& INSTRUMENT &EQUIPMENT

Course Outcomes:

CO1: Students will be able to identify the parts and functions of basic clinical equipment.
CO2: Students will be able to demonstrate the use of basic diagnostic tools.
CO3: Students will be able to compare various patient care accessories used in clinical practice.
CO4: Students will be able to differentiate between types of surgical instruments.
CO5: Students will be able to evaluate the handling strategies of surgical and emergency instruments in clinical settings.

Program Outcomes (POs)

At the end of the program, students should be able to:
PO1. Demonstrate sufficient concepts in performing routine clinical laboratory tests.
PO2. Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
PO3. Analyse and interpret laboratory data to assist in clinical decision making and problem-solving in-patient care.
PO4. Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
PO5. Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6. Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.

PO7. Engage in continuous learning, professional development and adopt research-based approaches to keep pace.
PO8. Detecting the outbreaks and preventing the spread of infectious diseases,which contributes to a healthier community.

Program Specific Outcomes (PSO)
PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques including hematology, clinical biochemistry, microbiology, histopathology, and immunology for accurate analysis, diagnosis, and monitoring of diseases.
PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

Program Educational Objectives (PEO)
PEO 1: To produce skilled and competent medical laboratory technologists capable of performing, analyzing, and interpreting various diagnostic laboratory tests with accuracy, efficiency, and adherence to quality standards in healthcare and research settings.
PEO 2: To develop professionals with strong ethical values, effective communication skills, and lifelong learning habits who can contribute to public health, research, and laboratory management while adapting to technological advancements in medical diagnostics.

CO-PO and PSO mapping:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2
CO1	3	3	2	2	1	2	1	2	3	3
CO2	3	3	3	2	1	2	1	2	3	2
CO3	2	3	3	2	1	2	2	1	3	2
CO4	2	2	3	2	2	3	2	3	2	3
CO5	3	3	2	2	1	2	1	1	3	2
TOTAL	13	14	13	10	6	11	7	9	14	12

PAPER-BASIC & APPLIED HUMAN ANATOMY

PROGRAM OUTCOMES (PO)

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.
PO2: Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
PO3: Identify, analyze and interpret laboratory data to assist in clinical decision making and problem solving in patient care.
PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.

PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.

PO8: Detecting the outbreaks and preventing the spread of infectious diseases, which contributes to a healthier community.

Program Specific Outcomes (PSO)

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques including hematology, clinical biochemistry, microbiology, histopathology, and immunology for accurate analysis, diagnosis, and monitoring of diseases.

PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

Course outcome

CO1.Students will be able to outline position, specified function of skeletal system and respiratory system.
CO2 Students will be able to Demonstrate the parts and functions of Cardiovascular system of human body.
CO3.Students will be able to think critically to differentiate the anatomical position and function of Excretory system of human body.
CO4.Students will be able to Monitoring the functions of gastro-intestinal system with position.
CO5.Students will be able to Design the pathways and correlation of Nervous system with other systems including cardiovascular system, excretory system.

CO PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	3	3	1	1	2	3	3
CO2	3	3	2	1	1	2	2	3	3	3
CO3	2	2	3	2	1	2	3	1	2	3
CO4	2	2	3	1	1	2	2	2	3	3
CO5	2	2	3	1	2	3	3	3	3	3
TOTAL	12	11	12	8	8	10	11	11	14	15

SEMESTER-II

PAPER: BASIC BIOCHEMISTRY AND BIOPHYSICS:
CO1: Discuss fundamental chemistry concepts used in physiology.
CO2: Describe the structure, classification, sources and functions of biomolecules like carbohydrate, protein and lipid.
CO3: Recognize the significance of vitamins and minerals in physiology.
CO4: Discuss enzyme functions and classifications.
CO5: Comprehend metabolic pathway for carbohydrates, lipids, and proteins.

PROGRAMME-OUTCOME (PO)
At the end of the program students should be able to:
PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.
PO2: Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
PO3: Identify, analyze and interpret laboratory data to assist in clinical decision making and problem-

solving in-patient care.
PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.
PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.
PO8: Detecting the outbreaks and preventing the spread of infectious diseases, which contributes to a healthier community.

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques including haematology, clinical biochemistry, microbiology, histopathology, and immunology for accurate analysis, diagnosis, and monitoring of diseases.
PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

PEO 1: To produce skilled and competent medical laboratory technologists capable of performing, analysing, and interpreting various diagnostic laboratory tests with accuracy, efficiency, and adherence to quality standards in healthcare and research settings.
PEO 2: To develop professionals with strong ethical values, effective communication skills, and lifelong learning habits who can contribute to public health, research, and laboratory management while adapting to technological advancements in medical diagnostics.

CO-PO-PSO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	2	1	0	1	2	1	3	2
CO2	3	2	2	1	2	2	2	1	3	2
CO3	2	1	2	1	2	1	3	2	2	2
CO4	3	1	3	1	0	2	2	1	3	2
CO5	3	2	3	1	1	3	3	2	3	3
TOTAL	13	7	12	5	5	9	12	7	14	11

Paper: Basic and Clinical Haematology
Course Outcomes (COs)

CO1. Demonstrate standardized procedures for blood collection and handling, including phlebotomy techniques, use of anticoagulants, and post-procedural care.

CO2. Explain and apply the principles, advantages, and precautions of automation in haematology for accurate laboratory analysis.

CO3. Describe the process of haematopoiesis and identify morphological features and clinical significance of WBCs and platelets in normal and pathological conditions.

CO4. Analyze and interpret laboratory findings in anaemia and haemoglobin disorders, including thalassemia, using diagnostic tests such as Hb estimation, ESR, electrophoresis, and RBC indices.

CO5. Evaluate the mechanism of blood coagulation, identify coagulation factors, and differentiate between normal haemostasis and coagulation disorders.

Program Outcomes – (PSO)

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.

PO2: become skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.

PO3: Identify, analyse and interpret laboratory data to assist in clinical decision making and problem solving in patient care.

PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.

PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.

PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.

PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.

PO8: be involved in detecting the outbreaks and preventing the spread of infectious diseases, contributing to a healthier community.

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques for accurate analysis, diagnosis, and monitoring of diseases.

PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

PEO 1: To produce skilled and competent individuals capable of performing, analyzing, and interpreting various diagnostic laboratory tests with accuracy, efficiency, adhering to quality standards in healthcare and research settings.

PEO 2: To develop professionals with strong ethical values, effective communication skills, and lifelong learning habits who can contribute to public health, research, and laboratory management while adapting to technological advancements in medical diagnostics.

CO-PO-PSO-MAPPING:

Course Outcomes (COs)	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PS O2
CO1 –	3	3	2	2	2	2	1	2	3	2
CO2 –	3	3	3	1	1	3	2	2	3	3
CO3 –	3	2	3	1	1	2	2	2	3	2
CO4 –	3	3	3	2	2	2	2	3	3	3
CO5 –	3	2	3	2	1	2	2	2	3	2

PAPER-DIAGNOSTIC LABORATORY INSTRUMENT AND EQUIPMENT

COURSE OUTCOME

CO1.Students will be able to outline parts and functions of various microscopes, colorimeter, spectrophotometer.

CO2 Students will be able to Demonstrate parts and functions of various centrifuge machines, bio-safety cabinets, laminar airflow.

CO3.Students will be able to Differentiate the working principles of ELISA, RIA, CLIA.

CO4.Students will be able to Monitoring functions of blood cell counter, semi and full autoanalyzer.

CO5.Students will be able to design the parts and functional process of Electrophoresis, HPLC, Real time PCR.

PROGRAMME: PO

1. Demonstrate sufficient concepts in performing routine clinical laboratory tests.
2. Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
3. Identify, analyze and interpret laboratory data to assist in clinical decision making and problem solving in patient care.
4. Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
5. Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
6. Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.
7. Engage in continuous learning, professional development and adopt research-based approaches to keep pace.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	2	3	2
CO2	3	3	2	2	1	3	2
CO3	3	2	3	2	1	3	3
CO4	3	3	3	2	2	3	2
CO5	3	3	3	2	2	3	3
TOTAL	15	13	13	10	8	15	12

Semester -III

PAPER: Clinical Pathology

Program Educational Objectives (PEOs)

PEO 1: Graduates will develop strong foundational knowledge and technical competence in clinical pathology to perform and interpret laboratory investigations.

PEO 2: Graduates will demonstrate professionalism, ethics, communication, and teamwork in healthcare and laboratory practice.

PEO 3: Graduates will pursue lifelong learning, research, and innovation to improve healthcare outcomes.

PEO 4: Graduates will contribute responsibly to society by ensuring safety, quality, and ethical standards in healthcare services.

Program Specific Outcomes (PSOs)

PSO 1: Apply advanced knowledge and laboratory skills in clinical pathology for accurate diagnosis and ethical practice.

PSO 2: Design, implement, and evaluate laboratory procedures for body fluid, hematology, and inflammatory investigations to support patient care and public health.

Program Outcomes (POs)

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.
PO2: Skilled in specimen collection, handling, processing, and analysis.
PO3: Identify, analyze, and interpret laboratory data for clinical decision making.
PO4: Exhibit professional conduct, ethical values, and accountability.
PO5: Communicate effectively and collaborate within a multidisciplinary healthcare team.
PO6: Use modern instruments, information systems, and quality assurance practices.
PO7: Engage in continuous learning and adopt research-based approaches.
PO8: Apply professional responsibility and contribute to community health and national development. (added for PSO mapping consistency)

Course Outcomes (COs)

CO1: Explain principles and procedures of collection and processing of CSF and its investigations.
CO2: Demonstrate examination techniques for urine analysis.
CO3: Differentiate between transudate and exudate in serous fluids.
CO4: Appraise diagnostic significance of bone marrow aspiration and biopsy.
CO5: Design a laboratory workflow for inflammation analysis including granuloma identification.

Integrated CO–PO–PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	3	2	1	3	2	2	2	3	2
CO2	3	3	2	2	3	3	2	2	3	3
CO3	2	2	3	2	1	2	1	2	2	3
CO4	2	2	3	2	1	2	3	2	3	3
CO5	2	2	3	2	2	3	3	3	3	3

PAPER: PHARMACOLOGY & TOXICOLOGY

PROGRAM OUTCOMES (PO):

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.

PO2: become skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.

PO3: Identify, analyze and interpret laboratory data to assist in clinical decision making and problem solving in patient care.

PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.

PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.

PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.

PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.

PO8: be involved in detecting the outbreaks and preventing the spread of infectious diseases, contributing to a healthier community.

Program Specific Outcomes (PSO):

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques for accurate analysis, diagnosis, and monitoring of diseases.

PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

Course Outcome (CO):

CO1: Define the key concept of PK & PD.

CO2: Explain the concepts of drug metabolism, including biotransformation of drug.

CO3: Apply knowledge of receptor subtypes to understand drug selectivity and specificity.

CO4: Examine dose-response curves and identify key parameters.

CO5: Evaluate the effectiveness of different risk management strategies for reducing workplace exposure to Drug & hazardous chemicals.

CO PO and PSO Mapping:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2
CO1	2	0	1	2	0	0	2	0	3	1
CO2	2	3	3	0	1	1	2	0	0	1
CO3	2	0	3	1	1	0	2	0	0	1
CO4	3	0	3	0	0	0	2	3	2	3
CO5	3	0	2	0	0	3	2	0	1	3
TOTAL	**12**	**3**	**12**	**3**	**2**	**4**	**10**	**3**	**6**	**9**

PAPER- Clinical Immunology and Serology

PO

At the end of the program students should be able to:

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.

PO2: become skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.

PO3: Identify, analyse and interpret laboratory data to assist in clinical decision making and problem-solving in-patient care.

PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.

PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.

PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.

PO8: be involved in detecting the outbreaks and preventing the spread of infectious diseases, contributing to a healthier community.

PSO

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques for accurate analysis, diagnosis, and monitoring of diseases.

PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

PEO

PEO 1: To produce skilled and competent individuals capable of performing, analysing, and interpreting various diagnostic laboratory tests with accuracy, efficiency, adhering to quality standards in healthcare and research settings.

PEO 2: To develop professionals with strong ethical values, effective communication skills, and lifelong learning habits who can contribute to public health, research, and laboratory management while adapting to technological advancements in medical diagnostics.

COURSE OUTCOME:

1. Compare innate and acquired immunity
2. Illustrate the concept of immunosuppression
3. Distinguish between the concepts of autoimmunity and immunization
4. Select the right diagnostic immunological/serological test for specific diseases
5. Plan experimental set-up for antigen-antibody reactions

CO-PO-PSO MAPPING:

	PO								PSO	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO 1**	**PSO 2**
CO1	1	0	1	0	2	3	3	1	3	1
CO2	1	0	1	1	3	3	3	0	3	1
CO3	3	3	3	2	3	3	3	3	3	2
CO4	3	3	3	3	3	3	2	3	3	3
CO5	3	3	1	0	2	3	3	3	3	3
TOTAL	**11**	**9**	**9**	**6**	**13**	**15**	**14**	**10**	**15**	**10**

SEMESTER-V

COURSE NAME-BMLT

PAPER- ADVANCED HISTOPATHOLOGY AND HISTOTECHNIQUES

CO1: Students will be able to **define, identify, and explain** the principles and applications of cryostat sections, special stains, connective tissue staining, and immunohistochemistry.
CO2: Students will be able to **demonstrate and execute** various histological staining methods for carbohydrates, glycogen, amyloid, lipids, enzymes, microorganisms, and reticulin fibers.

CO3 : Students will be able to **differentiate, examine, and interpret** diagnostic outcomes from special stains, enzyme histochemistry, microorganism detection, and immunohistochemistry.
CO4 : Students will be able to **appraise, check, and verify** quality control procedures, diagnostic reliability, and museum specimen preservation techniques in histopathology.
CO5 : Students will be able to **design, formulate, and compile** comprehensive protocols for advanced histopathology and histotechniques in clinical and research applications.

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.
PO2: Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
PO3: Identify, analyze and interpret laboratory data to assist in clinical decision making and problem solving in patient care.
PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6: Use modern laboratory instruments, information systems and quality assurance

practices to maintain reliability and accuracy in laboratory results.
PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.

PO8: Detecting the outbreaks and preventing the spread of infectious diseases,which contributes to a healthier community.

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques including hematology, clinical biochemistry, microbiology, histopathology, and immunology for accurate analysis, diagnosis, and monitoring of diseases.

PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

PEO 1: To produce skilled and competent medical laboratory technologists capable of performing, analyzing, and interpreting various diagnostic laboratory tests with accuracy, efficiency, and adherence to quality standards in healthcare and research settings.

PEO 2: To develop professionals with strong ethical values, effective communication skills, and lifelong learning habits who can contribute to public health, research, and laboratory management while adapting to technological advancements in medical diagnostics.

CO-PO Mapping:

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	2	1	1	2	1	0

CO2	3	3	2	1	1	3	2	0
CO3	2	2	3	1	1	2	2	1
CO4	2	2	2	3	1	3	2	1
CO5	2	2	3	2	2	3	3	1
TOTAL	**12**	**11**	**12**	**8**	**6**	**13**	**10**	**3**

CO-PSO Mapping:

COs / PSOs	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	3
CO4	2	3
CO5	3	3

PAPER: HEMATOLOGY AND BLOOD BANKING

CO1: Students will be able to define and identify the principles of blood banking, blood grouping, anticoagulants, donor selection, transfusion reactions, and blood components.
CO2: Students will be able to demonstrate and execute blood grouping methods, cross-matching, antibody screening, grading of agglutination, and processing of blood components.
CO3 : Students will be able to differentiate, examine, and interpret transfusion-transmitted infections, compatibility testing, transfusion reactions, and clinical indications of blood components.
CO4 : Students will be able to appraise, check, and verify the quality of blood collection, preservation, transportation, and transfusion practices for patient safety.
CO5 : Students will be able to design, formulate, and compile standard operating procedures for safe and effective blood banking and transfusion services.

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.

PO2: Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
PO3: Identify, analyze and interpret laboratory data to assist in clinical decision making and problem solving in patient care.
PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.
PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.

PO8: Detecting the outbreaks and preventing the spread of infectious diseases, which contributes to a healthier community.

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	2	2	1	2	1	1
CO2	3	3	3	2	1	3	1	3
CO3	3	3	3	2	1	2	2	3
CO4	3	3	3	3	2	3	2	1
CO5	3	2	2	2	1	2	2	2
TOTAL	15	14	13	11	6	12	8	10

ADVANCED CLINICAL NUTRITION

Course Outcomes (CO):

CO1: Recall and list the sources, functions, deficiency symptoms, and toxicities of major vitamins and minerals essential to human health and the techniques used in nutritional assessment and describe the structure and goals of national nutrition programs in India.

CO2: Demonstrate the principles of therapeutic nutrition in the planning of diet charts for common liver, cardiovascular, renal, and gastrointestinal disorders.

CO3: Differentiate between dietary requirements for various pathological states and analyze the impact of diet modifications in chronic diseases.

CO4: Monitor the Micronutrients deficiencies by observing Clinical signs and the effectiveness of community nutrition programs and evaluate nutritional interventions based on clinical and biochemical indicators

CO5: Designing diagnosis plan for confirmation of deficiencies and biochemical markers for the nutritional deficiencies based on clinical manifestations.

Program Outcomes (PO):

• At the end of the program students should be able to:
PO1- Demonstrate sufficient concepts in performing routine clinical laboratory tests
PO2- Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens
PO3-analyse and interpret laboratory data to assist in clinical decision making and problem-solving in-patient care.
PO4- Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery
PO5- Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6- Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.

PO7- Engage in continuous learning, professional development and adopt research-based approaches to keep pace.
PO8: Detecting the outbreaks and preventing the spread of infectious diseases, which contributes to a healthier community.

Program Specific Outcomes (PSO):

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques including hematology, clinical biochemistry, microbiology, histopathology, and immunology for accurate analysis, diagnosis, and monitoring of diseases.

PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	3	1	2	0	3	2	2	1
CO2	2	2	3	1	3	1	3	1	1	1
CO3	2	3	3	1	3	1	3	3	2	1
CO4	1	1	3	1	2	0	2	2	2	1
CO5	3	2	3	2	3	2	2	2	3	2
TOTAL	**11**	**10**	**15**	**6**	**13**	**4**	**13**	**10**	**10**	**6**

SEMESTER -VI

COURSE NAME-BMLT

PAPER: Clinical Enzymology, Endocrinology & Toxicology
CO–PO–PSO Mapping
Course Outcomes (COs)
CO1: Explain the classification, secretion, and mechanism of hormone action along with the regulation of endocrine system functions.
CO2: Interpret thyroid function tests and evaluate disorders related to thyroid dysfunction such as hypothyroidism and hyperthyroidism.
CO3: Analyze infertility profiles and assess hormonal assays including LH, FSH, Estrogen, Progesterone, and Testosterone for clinical significance.
CO4: Evaluate adrenal and pituitary hormones (ACTH, Aldosterone, Cortisol, Growth Hormone) and identify hypo- and hyper-secretion disorders.
CO5: Demonstrate understanding of enzymology and toxicology principles including enzyme classification, enzyme kinetics, inhibition, isoenzymes, and toxic agents' clinical effects and diagnostic tests.

PROGRAM OUTCOMES (PO)

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.
PO2: Skilled in the different types of specimen collection, handling, processing and analysis of patient specimensPO3: Identify, analyze and interpret laboratory data to assist in clinical decision making and problem solving in patient care.
PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in

laboratory practice and healthcare delivery.
PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.
PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.
PO8: Detecting the outbreaks and preventing the spread of infectious diseases, which contributes to a healthier community.
Program Specific Outcomes (PSO)

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques including haematology, clinical biochemistry, microbiology, histopathology, and immunology for accurate analysis, diagnosis, and monitoring of diseases.

PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

Course outcome

CO1.Students will be able to outline the basic structure and function of cells.
CO2.Students will be able to Demonstrate the functions of various microscopes.
CO3.Students will be able to Differentiate the benign and malignant tumour.
CO4.Students will be able to Monitoring the various techniques and instruments used in various types of cytology.
CO5.Students will be able to design the steps of cytological procedures with staining procedures.

CO PO and PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	2	2	1	2	2	3	2	3
CO2	3	3	2	2	1	3	2	3	3	3
CO3	3	2	3	2	1	2	3	1	2	3
CO4	3	3	3	2	2	3	2	2	2	3
CO5	3	3	3	2	2	3	3	3	3	3
TOTAL	15	13	13	10	7	13	12	12	12	15

PAPER: CLINICAL CYTOLOGY

PROGRAM OUTCOMES (PO)

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests.PO2: Skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.
PO3: Identify, analyze and interpret laboratory data to assist in clinical decision making and problem solving in patient care.
PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.
PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.
PO6: Use modern laboratory instruments, information systems and quality assurance

practices to maintain reliability and accuracy in laboratory results.
PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.
PO8: Detecting the outbreaks and preventing the spread of infectious diseases, which contributes to a healthier community.

Program Specific Outcomes (PSO)
PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques including haematology, clinical biochemistry, microbiology, histopathology, and immunology for accurate analysis, diagnosis, and monitoring of diseases.PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

Course outcome
CO1.Students will be able to outline the basic structure and function of cells.
CO2.Students will be able to Demonstrate the functions of various microscopes.
CO3.Students will be able to Differentiate the benign and malignant tumour.
CO4.Students will be able to Monitoring the various techniques and instruments used in various types of cytology.
CO5.Students will be able to design the steps of cytological procedures with staining procedures.

CO PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	2	2	1	2	2	3	2	3
CO2	3	3	2	2	1	3	2	3	3	3
CO3	3	2	3	2	1	2	3	1	2	3
CO4	3	3	3	2	2	3	2	2	2	3
CO5	3	3	3	2	2	3	3	3	3	3
TOTAL	**15**	**13**	**13**	**10**	**7**	**13**	**12**	**12**	**12**	**15**

PAPER: Advanced Diagnostic Molecular Biology
CO-PO mapping

	PO								**PSO**	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO 1**	**PSO 2**
CO1	3	2	1	2	2	3	3	1	3	1
CO2	3	2	1	2	2	3	3	1	3	1
CO3	3	3	3	2	2	3	3	0	3	2
CO4	3	3	3	3	3	3	3	0	3	3
CO5	3	3	3	2	3	3	3	3	3	3

CO: The students will learn to:
1. Explain DNA structure and DNA replication.
2. Illustrate the processes of RNA and protein syntheses following central dogma
3. Distinguish between different blotting techniques used in molecular biology

4. Select among prenatal diagnostic techniques and compare with stem cell banking technique.
5. Plan the need-based use of molecular diagnostic techniques like conventional PCR and real time PCR.

PO

At the end of the program students should be able to:

PO1: Demonstrate sufficient concepts in performing routine clinical laboratory tests

PO2: become skilled in the different types of specimen collection, handling, processing and analysis of patient specimens.

PO3: Identify, analyze and interpret laboratory data to assist in clinical decision making and problem solving in patient care.

PO4: Exhibit professional conduct, ethical values, confidentiality and accountability in laboratory practice and healthcare delivery.

PO5: Communicate effectively with healthcare professionals, patients and work collaboratively as part of a multidisciplinary healthcare team.

PO6: Use modern laboratory instruments, information systems and quality assurance practices to maintain reliability and accuracy in laboratory results.

PO7: Engage in continuous learning, professional development and adopt research-based approaches to keep pace.

PO8: be involved in detecting the outbreaks and preventing the spread of infectious diseases, contributing to a healthier community.

PSO 1: Apply theoretical knowledge and practical skills in clinical laboratory techniques for accurate analysis, diagnosis, and monitoring of diseases.PSO 2: Demonstrate professional competence, ethical responsibility, and quality assurance in laboratory practices, with the ability to manage laboratory operations, handle biomedical waste safely, and contribute effectively to healthcare and research teams.

PEO 1:To produce skilled and competent individuals capable of performing, analyzing, and interpreting various diagnostic laboratory tests with accuracy, efficiency, adhering to quality standards in healthcare and research settings.

PEO 2:To develop professionals with strong ethical values, effective communication skills, and lifelong learning habits who can contribute to public health, research, and laboratory management while adapting to technological advancements in medical diagnostics.

Bloom's Taxonomy Verbs:

Remember (BT1)	**Understand (BT2)**	**Apply (BT3)**	**Analyze (BT4)**	**Evaluate (BT5)**	**Create (BT6)**
Cite	Add	Acquire	Analyze	Appraise	Abstract
Define	Approximate	Adapt	Audit	Assess	Animate
Describe	Articulate	Allocate	Blueprint	Compare	Arrange
Draw	Associate	Alphabetize	Breadboard	Conclude	Assemble
Enumerate	Characterize	Apply	Break down	Contrast	Budget
Identify	Clarify	Ascertain	Characterize	Counsel	Categorize
Index	Classify	Assign	Classify	Criticize	Code
Indicate	Compare	Attain	Compare	Critique	Combine
Label	Compute	Avoid	Confirm	Defend	Compile

List	Contrast	Back up	Contrast	Determine	Compose
Match	Convert	Calculate	Correlate	Discriminate	Construct
Meet	Defend	Capture	Detect	Estimate	Cope
Name	Describe	Change	Diagnose	Evaluate	Correspond
Outline	Detail	Classify	Diagram	Explain	Create
Point	Differentiate	Complete	Differentiate	Grade	Cultivate
Quote	Discuss	Compute	Discriminate	Hire	Debug
Read	Distinguish	Construct	Dissect	Interpret	Depict
Recall	Elaborate	Customize	Distinguish	Judge	Design
Recite	Estimate	Demonstrate	Document	Justify	Develop
Recognize	Example	Depreciate	Ensure	Measure	Devise
Record	Explain	Derive	Examine	Predict	Dictate
Repeat	Express	Determine	Explain	Prescribe	Enhance
Reproduce	Extend	Diminish	Explore	Rank	Explain
Review	Extrapolate	Discover	Figure out	Rate	Facilitate
Select	Factor	Draw	File	Recommend	Format
State	Generalize	Employ	Group	Release	Formulate
Study	Give	Examine	Identify	Select	Generalize
Tabulate	Infer	Exercise	Illustrate	Summarize	Generate
Trace	Interact	Explore	Infer	Support	Handle
Write	Interpolate	Expose	Interrupt	Test	Import
	Interpret	Express	Inventory	Validate	Improve
	Observe	Factor	Investigate	Verify	Incorporate
	Paraphrase	Figure	Layout		Integrate
	Picture graphically	Graph	Manage		Interface
	Predict	Handle	Maximize		Join
	Review	Illustrate	Minimize		Lecture
	Rewrite	Interconvert	Optimize		Model
	Subtract	Investigate	Order		Modify
	Summarize	Manipulate	Outline		Network
	Translate	Modify	Point out		Organize
	Visualize	Operate	Prioritize		Outline
		Personalize	Proofread		Overhaul
		Plot	Query		Plan
		Practice	Relate		Portray
		Predict	Select		Prepare
		Prepare	Separate		Prescribe
		Price	Subdivide		Produce
		Process	Train		Program
		Produce	Transform		Rearrange
		Project			Reconstruct
		Provide			Relate
		Relate			Reorganize
		Round off			Revise
		Sequence			Rewrite
		Show			Specify
		Simulate			Summarize
		Sketch			
		Solve			
		Subscribe			
		Tabulate			
		Transcribe			

		Translate			
		Use			