

UNIVERSITY POLYTECHNIC BIRLA INSTITUTE OF TECHNOLOGY MESRA, RANCHI



B.Sc. MEDICAL LAB TECHNOLOGY (BMLT) Course Structure as per CBCS -2023

UNIVERSITY POLYTECHNIC BIT, MESRA

Course Structure as per CBCS

B. Sc. (Medical Lab Technology)

Institute Vision (University Polytechnic)

To emerge as a leading technical training institution in the country and serve the nation and engineering profession with distinction by developing the most skilled human resources with comprehensive and modern training and skillsets in selected engineering disciplines and trades.

Institute Mission (University Polytechnic)

- 1. To administer a technical training institute of highest standard of education and training commensurate with modern engineering practices.
- 2. To offer technical degree, diploma, and certificate courses to cater to contemporary demand and relevance to the engineering industry.
- 3. To adopt and implement modern curriculum of technical education and training.
- 4. To continuously upgrade the infrastructure necessary for practical training with new and contemporary machines and methods.
- 5. To arrange on job training and internships for the students and staff members with proper supervision.
- 6. To liaise with industry for internship and collaboration, and also, for arranging periodic review of infrastructure and training methods and modernizing teaching and training curriculum.

Vision of Medical Lab Technology Department

To be a leading source of proficient medical laboratory technicians with excellent skills and sound technical knowledge to aid the healthcare personnels in the correct and accurate diagnosis of diseases and to monitor the progress of the treatment.

Mission of Medical Lab Technology Department

- 1. To act a resource of skilled medical laboratory technicians with a true spirit of service to the community and society.
- 2. To create pool of opportunities for medical laboratory technicians from economically backward backgrounds in field of the healthcare industry.
- 3. To develop partnerships with hospitals of repute and pathological labs and aid them in developing error free diagnostic procedures.

PROGRAM OUTCOMES (POs)

PO1	Medical Lab Technology professionals may work as technologists or
	technicians at clinics/hospitals/medical laboratories etc.
PO2	A productive, environment sustainable and challenging field that can extend
	and prepare the data that helps the doctors for diagnosing the various types
	of disease or ailments.
PO3	The Professional shall be capable of working in a variety of laboratory
	settings, handling various types of instruments and understand the various
	laboratory skills and procedures.
PO4	As a health professional the students shall gain medical laboratory
	knowledge and have a value-added responsibility towards the community
	health issues.
PO5	To understand and manage the prevailing health problems, focus on socio-
	economical process and apply suitable remedial measures.
PO6	After successful completion the students shall be capable for new startup as
	per knowledge, skills and having lots of future prospects in higher and
	research based studies.

PROGRAM EDUCATIONAL OUTCOMES OF MEDICAL LAB TECHNOLOGY

PEO 1. To provide thorough knowledge in various subjects of medical laboratory including theoretical and practical training for appropriate continuing education opportunities to medical laboratory professionals.

PEO 2. To Provide educational experiences to provide academic depth to support professional advancement. To prepare graduates to excel as entry-level technologists

PEO 3. To prepare medical laboratory graduates for employment in hospitals and related research settings. To provide an equal opportunity for all the graduates to become an entrepreneur through visit of various labs and clinical internship.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO1.Successful blood specimen collection techniques and morphological identification of blood cell variations with clinical significance. Understanding of blood banking, including ABO-Rh and other blood group systems, and transfusion therapy.

PSO2. Identification of the various organisms such as gram positive and gram-negative bacteria, viruses, Protozoa and fungi. Understand pathogenesis and lab diagnosis of various disease-causing microbes.

PSO3. Understand the rationale uses and interpretation of routine biochemical tests for organism identification. Demonstrate proficient use of routine biochemical tests. **PSO4.** Understand routine tissue processing (micro techniques) and freeze-drying technique in histopathology and their significance for identification of premalignant or malignant condition.

UNIVERSITY POLYTECHNIC BIT, MESRA

Course Structure BMLT Syllabus as per CBCS System

THREE WEEKS INDUCTION PROGRAM

Including UNIVERSAL HUMAN VALUE (UHV-I)

First Semester									
Course No	Subject	Segment	L	Т	Р	Credit			
BMT 101	Human Anatomy &	CC	3	1	0	4			
	Physiology –I								
BMT 103	Chemistry for MLT	BS	3	0	0	3			
BMT 105	Basics of Electrical &	ES	3	0	0	3			
	Electronics								
BMT 107	Laboratory Mathematics	BS	3	0	0	3			
BMT 109	Communication and	HS	3	0	0	3			
	Professional Skill								
BMT 102	Human Anatomy &	CC	0	0	3	1.5			
	Physiology LabI								
BMT 104	Chemistry for MLT Lab.	BS	0	0	2	1			
BMT 106	Basics of Electrical &	ES	0	0	2	1			
	Electronics Lab								
BHS 108/110/112/114	Sports &	HS	0	0	2	1			
	Yoga/NSS/NCC/CA								
BMT 116	Basic Workshop I	CC	0	0	3	1.5			
	(Health care)								
Periods per week		15	1	12	-				
Total Credit			-	-	-	22			
Total periods per w	eek		-	-	-	28			

Where; L= Lecture, T= Tutorial and P= Practical

Second Semester									
Course No	Subject	Segment	L	Т	Р	Credit			
BMT 201 Human Anatomy &		CC	3	0	0	3			
	Physiology – II								
BMT 203	Hematology – I	CC	3	0	0	3			
BMT 205	Clinical Chemistry- I	CC	3	0	0	3			
BMT 207	IT SKILLS	ES	3	0	0	3			
BMT 209	Histology	CC	3	0	0	3			
BMT 202	Human Anatomy &	CC	0	0	2	1			
	Physiology LabII								
BMT 204	Hematology LabI	CC	0	0	2	1			
BMT 206	Clinical Chemistry Lab-	CC	0	0	2	1			
	I								
BMT 208	IT Lab.	ES	0	0	2	1			
BMT 211	Essentials of	AUDIT	2	0	0	Non-			
	Environmental Science					Credit			
BHS 210/212/214/216	Sports & Yoga	HS	0	0	2	1			
	/NSS/NCC/CA								
BMT 218	Basic Workshop II	CC	0	0	2	1			
	(Health care)								
Periods per week		17	00	12	-				
Total Credit		-	-	-	21				
Total periods per w		-	-	-	29				

	Third Semester						
Course No.	Subject	Segment	L	Т	Р	Credit	
BMT 301	Clinical Chemistry- II	CC	3	0	0	3	
BMT 303	Biomedical	ES	2	1	0	3	
	Instrumentations						
BMT 305	Digital Electronics	ES	2	1	0	3	
	system						
BMT 307	Microbiology –I	CC	3	0	0	3	
BMT 309	Instrumentation &	ES	2	1	0	3	
	Measurement System						
BMT 311	UHV- II	AUDIT	2	-	-	Non-credit	
BMT 302	Clinical Chemistry	CC	0	0	3	1.5	
	LabII						
BMT 310	Instrumentation &	ES	0	0	2	1	
	Measurement System						
	Lab.						
BMT 306	Digital Electronics	ES	0	0	2	1	
	Lab.						
BMT 308	BMT 308 Microbiology LabI		0	0	3	1.5	
Periods per week			14	03	10	-	
Total Credit		-	-	-	20		
Total periods p	er week		-	-	-	27	

$\begin{array}{c c c c c c c c c c c c c c c c c c c $		Fourth Semester							
BMT 401 Microbiology - II CC 3 1 0 4 BMT 403 Hematology - II CC 3 1 0 4 BMT 405 Histopathology and kHistotechniques CC 3 1 0 4 BMT 402 Microbiology LabII CC 0 0 3 1.5 BMT 404 Hematology LabII CC 0 0 3 1.5 BMT 406 Histopathology & CC 0 0 3 1.5 BMT 406 Histopathology & CC 0 0 3 1.5 BMT 406 Histopathology & CC 3 1 0 4 (Group-I) Immunopathology & CC 3 1 0 4 (Group-I) Immunopathology & CC 3 1 0 4 Microprocessor(Group-I) Immunopathology & CC 3 1 0 4 BMT 408 Parasitology & CC 0 0 3 1.5 <t< th=""><th>Course No</th><th>Subject</th><th>Segment</th><th>L</th><th>Т</th><th>Р</th><th>Credit</th></t<>	Course No	Subject	Segment	L	Т	Р	Credit		
BMT 403 Hematology - II CC 3 1 0 4 BMT 405 Histopathology &Histotechniques CC 3 1 0 4 BMT 402 Microbiology LabII CC 0 0 3 1.5 BMT 404 Hematology LabII CC 0 0 3 1.5 BMT 406 Histopathology &Histotechniques CC 0 0 3 1.5 BMT 406 Histopathology &Cistotechniques CC 0 0 3 1.5 BMT 407 Parasitology & (Group-I) CC 3 1 0 4 Microbiology Lab. (Group-I) Immunopathology (Group-I) CC 3 1 0 4 BMT 408 Parasitology & (Group-II) CC 3 1 0 4 BMT 410 Bio-signal Acquisition System (Group-II) ES 3 1 0 4 Microprocessor(Group- II) Introduction to Microprocessor(Group- II) ES 3 1	BMT 401	Microbiology- II	CC	3	1	0	4		
BMT 405 Histopathology &Histotechniques CC 3 1 0 4 BMT 402 Microbiology LabII CC 0 0 3 1.5 BMT 404 Hematology LabII CC 0 0 3 1.5 BMT 406 Histopathology &Histotechniques Lab1 CC 0 0 3 1.5 BMT 407 Parasitology & Cytology (Group-I) CC 3 1 0 4 BMT 409 Immunopathology (Group-I) CC 3 1 0 4 BMT 408 Parasitology & Cytology Lab. (Group-I) CC 3 1 0 4 BMT 411 Bio-signal Acquisition System (Group-II) ES 3 1 0 4 Microprocessor (Group- II) Introduction to Microprocessor (Group- II) ES 3 1 0 4 Microprocessor Lab. (Group-II) ES 0 0 3 1.5 BMT 413 Introduction to Microprocessor Lab. (Group-II) ES 0 <t< td=""><td>BMT 403</td><td>Hematology – II</td><td>CC</td><td>3</td><td>1</td><td>0</td><td>4</td></t<>	BMT 403	Hematology – II	CC	3	1	0	4		
&Histotechniques Image: Constraint of the second seco	BMT 405	Histopathology	CC	3	1	0	4		
BMT 402 Microbiology LabII CC 0 0 3 1.5 BMT 404 Hematology LabII CC 0 0 3 1.5 BMT 406 Histopathology & Histotechniques LabI CC 0 0 3 1.5 BMT 407 Parasitology & Cytology (Group-I) CC 3 1 0 4 BMT 409 Immunopathology (Group-I) CC 3 1 0 4 BMT 408 Parasitology & Cytology Lab. (Group-I) CC 3 1 0 4 BMT 408 Parasitology & Cytology Lab. (Group-I) CC 0 0 3 1.5 BMT 411 Bio-signal Acquisition System (Group-II) ES 3 1 0 4 Microprocessor Lab. (Group-II) ES 3 1 0 4 BMT 415 Essence of Indian Knowledge and tradition AUDIT 2 0 0 3 1.5 Open Elective- I Indian constitutions AUDIT 2		&Histotechniques							
BMT 404 Hematology LabII CC 0 0 3 1.5 BMT 406 Histopathology &Histotechniques LabI CC 0 0 3 1.5 BMT 407 Parasitology & Cytology (Group-I) CC 3 1 0 4 BMT 407 Parasitology & Cytology (Group-I) CC 3 1 0 4 BMT 409 Immunopathology (Group-I) CC 3 1 0 4 BMT 408 Parasitology & Cytology Lab. (Group- I) CC 0 0 3 1.5 BMT 411 Bio-signal Acquisition System (Group-II) ES 3 1 0 4 Microprocessor(Group- II) ES 3 1 0 4 Microprocessor(Group- II) Essence of Indian Knowledge and tradition AUDIT 2 0 0 Non- credit Dyen Elective- I Indian constitutions AUDIT 2 0 - Non- credit BMT 417 Indian constitutions AUDIT 2	BMT 402	Microbiology LabII	CC	0	0	3	1.5		
BMT 406Histopathology &Histotechniques LabICC0031.5BMT 407Parasitology & Cytology (Group-I)CC3104BMT 407Parasitology & Cytology (Group-I)CC3104BMT 409Immunopathology (Group-I)CC3104BMT 408Parasitology & (Group-I)CC0031.5BMT 418Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor(Group- II)ES0031.5BMT 414Microprocessor(Group- II)ES3104Microprocessor(Group- II)BS3003BMT 415Essence of Indian Knowledge and traditionAUDIT2003BMT 417Indian constitutionsAUDIT20-Non- creditBMT 417Indian constitutionsAUDIT20-Non- creditBMT 417Indian constitutionsAUDIT20-Non- creditCredit29Credit29BMT 41729BMT 417	BMT 404	Hematology LabII	CC	0	0	3	1.5		
&Histotechniques Lab IList of Elective(Two groups)BMT 407Parasitology & Cytology (Group-I)CC3104BMT 409Immunopathology (Group-I)CC3104BMT 408Parasitology & (Group-I)CC0031.5BMT 411Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor(Group- (Group-II)ES3104BMT 415Essence of Indian Knowledge and traditionAUDIT2003BMT 417Indian constitutionsAUDIT20-creditBMT 417Indian constitutionsAUDIT20-29Credit29-	BMT 406	Histopathology	CC	0	0	3	1.5		
Lab I Image: Constraint of the sector of the		&Histotechniques							
Image: book state of elective (Two groups) BMT 407 Parasitology & Cytology (Group-I) CC 3 1 0 4 BMT 409 Immunopathology (Group-I) CC 3 1 0 4 BMT 409 Immunopathology (Group-I) CC 3 1 0 4 BMT 408 Parasitology & Cytology Lab. (Group-I) CC 0 0 3 1.5 BMT 411 Bio-signal Acquisition System (Group-II) ES 3 1 0 4 Microprocessor(Group- II) ES 3 1 0 4 BMT 413 Introduction to Microprocessor(Group- II) ES 0 0 3 1.5 BMT 414 Microprocessor Lab. (Group-II) ES 0 0 3 1.5 BMT 415 Essence of Indian Knowledge and tradition AUDIT 2 0 0 Non- credit BMT 417 Indian constitutions AUDIT 2 0 - Non- credit BMT 417 Indian constit		Lab I							
BMT 407Parasitology & Cytology (Group-I)CC3104BMT 409Immunopathology (Group-I)CC3104BMT 408Parasitology & (Group-I)CC0031.5BMT 408Parasitology Lab. (Group-I) I)CC0031.5BMT 411Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor (Group- II)ES3104BMT 414Microprocessor Lab. (Group-II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IBS30031.5BMT 417Indian constitutionsAUDIT20-Non- creditDeriods per week22512-Credit2920			List of El	ective(Two g	groups)				
Cytology (Group-I)Cytology (Group-I)CC3104BMT 409Immunopathology (Group-I)CC3104BMT 408Parasitology & Cytology Lab. (Group-I)CC0031.5BMT 411Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor (Group- II)ES3104BMT 414Microprocessor Lab. (Group-II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IBS30033BMT 417Indian constitutionsAUDIT20-Non- creditCredit2929	BMT 407	Parasitology &	CC	3	1	0	4		
$\begin{array}{ c c c c c c c } \hline (Group-I) & c c c c c c c c c c c c c c c c c c $		Cytology							
BMT 409Immunopathology (Group-I)CC3104BMT 408Parasitology & Cytology Lab. (Group- I)CC0031.5BMT 411Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor(Group- II)ES3104BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IIndian constitutionsAUDIT20-Non- creditBMT 417Indian constitutionsAUDIT20-Non- creditTotal paried per week22512Total paried per week29-		(Group-I)							
Image: constraint of the second systemImage: co	BMT 409	Immunopathology	CC	3	1	0	4		
BMT 408Parasitology & Cytology Lab. (Group- I)CC0031.5BMT 411Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor(Group- II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IIndian constitutionsAUDIT20033BMT 417Indian constitutionsAUDIT20-Non- creditTotal period per week22512Total period per week2020		(Group-I)							
Cytology Lab. (Group-I)Cytology Lab. (Group-I)BMT 411Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor(Group- II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IIndian constitutionsAUDIT20-Non- creditBMT 417Indian constitutionsAUDIT20-Non- creditTatal period per week22512-Tatal period per week29	BMT 408	Parasitology &	CC	0	0	3	1.5		
I)I)IIIIBMT 411Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor(Group- II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IIndian constitutionsAUDIT2003BMT 417Indian constitutionsAUDIT20-Non- creditBMT 417Indian constitutionsAUDIT20-Non- creditTotal period per week22512-Total period per week29		Cytology Lab. (Group-							
BMT 411Bio-signal Acquisition System (Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor Lab. (Group-II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IIndian constitutionsBS30033BMT 417Indian constitutionsAUDIT20-Non- creditBMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512-Credit29		I)							
System (Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor Lab. (Group-II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IIndian constitutionsBS30033BMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512Credit29-29	BMT 411	Bio-signal Acquisition	ES	3	1	0	4		
Image: Group-II)Image: Group-II)ES3104BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor Lab. (Group-II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IImage: Group-II between the second s		System							
BMT 413Introduction to Microprocessor(Group- II)ES3104BMT 414Microprocessor Lab. (Group-II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IBS30033BMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512-Credit29		(Group-II)							
Microprocessor(Group-II)ES0031.5BMT 414Microprocessor Lab. (Group-II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IBS3003BMT 417Indian constitutionsAUDIT20-Non- creditBMT 417Indian constitutionsAUDIT20-Non- creditCredit29	BMT 413	Introduction to	ES	3	1	0	4		
II)III)IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		Microprocessor(Group-							
BMT 414Microprocessor Lab. (Group-II)ES0031.5BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IBS3003BMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512-Credit29									
BMT 415Essence of Indian Knowledge and traditionAUDIT200Non- creditOpen Elective- IIndian constitutionsBS3003BMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512-Credit29	BMT 414	Microprocessor Lab.	ES	0	0	3	1.5		
BMT 415Essence of Indian Knowledge and traditionAUDIT2000Non- creditOpen Elective- IIndian constitutionsBS3003BMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512-Credit29		(Group-II)			0				
Knowledge and traditionKnowledge and traditioncreditOpen Elective- IBS3003BMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512-Credit29	BMT 415	Essence of Indian	AUDIT	2	0	0	Non-		
Open Elective- IIndian constitutionsBS3003BMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512-Credit29		Knowledge and					credit		
Open Elective- IBS3003BMT 417Indian constitutionsAUDIT20-Non- creditPeriods per week22512-Credit29		tradition							
Open Elective- I BS 5 0 0 5 BMT 417 Indian constitutions AUDIT 2 0 - Non- credit Periods per week 22 5 12 - Credit - - 29			DC	2	0	0	2		
I I Image: Constitution of the sector of th	Open Elective-		BS	3	0	0	3		
BMT 417 Indian constitutions AUDIT 2 0 - Non-credit Periods per week 22 5 12 - Credit - - 29				2	0		NL		
Periods per week 22 5 12 - Credit - - 29	BM1 417	Indian constitutions	AUDII	2	0	-	NON-		
Periods per week 22 5 12 Credit - - 29 Total period per week - - 20		Dominda non wool		22	5	10	credit		
Total pariod per weak 20		Crodit			5	12	- 20		
		Total pariod par wask		-	-	-	29		

	Fifth Semester					
Course No.	Subject	Segment	Theory	Tutorial	Lab.	Credit
BMT 501	Clinical Chemistry- III	CC	3	1	0	4
BMT 503	Forensic & Medical Ethics	CC	3	1	0	4
BMT 505	Laboratory Management	HS	2	1	0	3
BMT 502	Clinical Chemistry LabIII	CC	0	0	3	1.5
BMT 504	Histopathology & Histotechniques Lab II	CC	0	0	3	1.5
BMT 506	Bacteriology Lab.	CC	0	0	3	1.5
BMT 507	Summer Internship Project	AUDIT	0	0	0	Non- credit
		List of Elec	ctives (Two	Groups)		
BMT 509	Serology & Virology	CC	3	0	0	3
BMT 511	Hematology & Blood Banking (Group-I)	CC	3	0	0	3
BMT 512	Hematology and Blood Banking Lab. (Group-I)	CC	0	0	3	1.5
BMT 513	Clinical Instrumentation (Group-II)	ES	3	0	0	3
BMT 515	Biomedical imaging Devices and Concept (Group-II)	ES	3	0	0	3
BMT 514	Clinical Instrumentation Lab. (Group-II)	ES	0	0	3	1.5
Open Elective U		DC	2	0	0	2
Deriods per u		в2	17	02	12	3
Total Credit	/ UK		1/	05	12	- 26
Total periods	ner week		-	-	-	32
\mathbf{I} \mathbf{I} \mathbf{U}	pu wuun	1	-	-		34

	Sixth Semester									
Course No	Subject	Segment	Theory	Tutorial	Lab.	Credit				
BMT 601	Clinical Internship	SE	-	-	-	5				
	Project									
BMT 602	Seminar	SE	-	-	-	2				
Total Credi	t		_	_	-	7				
Total period	Total periods per week									

Total Credit: 125

	BOE 401	Preventive & Social Medicine					
Open	BOE 403	Life Support	BS	3	0	0	3
Elective I		Skills and					
		Emergency					
	BOE 405	Instrumental					
		Method of					
		Analysis					
	BOE 501	Healthcare					
		System					
Open	BOE 503	Quality	BS	3	0	0	3
Elective-II		Assurance					
	BOE 505	Research					
		Methodology					

List of Open Electives