SYLLABUS FOR THE

B.SC OF MEDICAL LABORATORY TECHNOLOGY (BMLT) COURSE

81, Nilgunj Road, Jagarata Pally, Deshpriya Nagar, Agarpara, Kolkata-700109

West Bengal

B.M.L.T.
B.Sc of Medical Laboratory Technology

Duration: 3 Years (6 semesters)
Level: Graduation
Type: Degree
Eligibility:10+2 (Science)

B.M.L.T. or **B.Sc in Medical Laboratory Technology** is an undergraduate Medical Lab Technologist Programme. B.Sc in Medical Laboratory Technology program aims to provide the aspirant with sufficient knowledge and skills to carry out routine laboratory diagnostic procedures and some sophisticated laboratory diagnostic procedures. The course deals with new advances in Management of Laboratories, instrumentation etc. The duration of the course is three years and it is career orienting in nature and its syllabus is divided into six semesters.

B.Sc in Medical Laboratory Technology Eligibility
Students should have passed in class 12th in Science with minimum 50% (45% for SC/ST) or equivalent CGPA from a recognized board.

B.Sc in Medical Laboratory Technology Course Suitability Candidates should have possessed a good analytical judgment and the ability to work under pressure. They also have a close attention to detail which is essential for Medical Laboratory Technicians because small differences or changes in test substances or numerical readouts can be crucial to a diagnosis. Students should have normal color vision are highly desirable, and able to handle automated laboratory equipment, computer skills are important.

How is B.Sc in Medical Laboratory Technology Course Beneficial?
B.Sc in Medical Laboratory Technology course offers skill and knowledge progress in applying medical standards and technical standards for assessing a lab test. The program will help the aspirants to work in the research area as assistants. After passing their graduation they can go for further master's degree than for research work; they can also become teachers in schools.

B.Sc in Medical Laboratory Technology Employment Areas

Clinics
Commercial Laboratories
Hospitals
Nursing Homes
Public Health Facilities

B.Sc in Medical Laboratory Technology Job Types

Junior Technical Executive
Lab Medicine Technician
Laboratory Technician
R&D Contractual Lab Assistant
System Analyst
X-Ray Technician

Advance Courses in B.Sc in Medical Laboratory Technology

Post Graduate Diploma in Medical Laboratory Technology

M.Sc. (Medical Lab Technology)

Syllabus of Medical Lab Technology as proposed by JIS University will be as follows. The courses will be distributed in six (6) semesters.

Year I	
Sr. No.	**Subjects of Study**
1	Human Anatomy and Physiology
2	General Microbiology
3	Pathology
4	General Biochemistry
5	Fundamentals of Computer Science
6	Communication for Professionals
7	Human Anatomy and Physiology (P)
8	General Microbiology (P)
9	Pathology (P)
10	General Biochemistry (P)

Year II	
Sr. No.	**Subjects of Study**
1	Biomedical Waste Management
2	Bacteriology, Immunology and Parasitology
3	Clinical Biochemistry
4	Hematology and Blood Banking
5	Basic and Clinical Pharmacology
6	Health education and health communication
7	Community Medicine
8	Bacteriology, Immunology and Parasitology (P)
9	Clinical Biochemistry (P)
10	Hematology and Blood Banking (P)

Year III	
Sr. No.	**Subjects of Study**
1	Histotechnology
2	Virology, Mycology and Applied Microbiology
3	Essentials of Medical Pharmacology
4	Histopathology and Cytopathology Techniques
5	Biomedical Techniques, Lab Management and Ethics
6	Diagnostic Molecular Biology
7	Virology, Mycology and Applied Microbiology (P)
8	Histopathology and Cytopathology Techniques (P)
9	Diagnostic Molecular Biology(P)
10	Hospital Training

The syllabus shall come into effect from the academic year 2019-20 under JIS University. The course of study for BMLT shall include semester wise theory and practical as given in table I to VII. The no. of hours to be devoted to each theory and practical course in any semester shall not be less than shown in table I to VII.

COURSE STRUCTURE

1ST YEAR

SEMESTER-I

Sl.	Course Code	Subject	Period			Credit
			L	T	P	Total
1	BML-101	Human Anatomy and Physiology-I (Theory)	3	-	-	3
2	BML-102	Pathology-I (Theory)	3	-	-	3
3	BML-103	General Microbiology-1 (Theory)	3	-	-	3
4	BML-104	Biochemistry-1 (Theory)	3	-	-	3
5	BML-105	Communication for Professionals (Theory)	3	-	-	3
6	BML-191	Human Anatomy and Physiology-I (Practical)	-	-	3	2
7	BML-192	Pathology-I (Practical)	-	-	3	2
8	BML-193	General Microbiology-I (Practical)	-	-	3	2
9	BML-194	Biochemistry-I(Practical)	-	-	3	2
10	BML-181	Skill-X	-	-	-	1
11	BML-182	Seminar and GD	-	-	-	1
		Total				23 + 2 = 25

SEMESTER-II

Sl.	Course Code	Subject	Period			Credit
			L	T	P	Total
1	BML-201	Human Anatomy and Physiology- II (Theory)	3	-	-	3
2	BML-202	Pathology-II (Theory)	3	-	-	3
3	BML-203	General Microbiology-II (Theory)	3	-	-	3
4	BML-204	Biochemistry-II (Theory)	3	-	-	3
5	BML-205	Fundamentals of Computer Science (Theory)	3	-	-	3
6	BML-291	Human Anatomy and Physiology-II (Practical)	-	-	3	2
7	BML-292	Pathology-II (Practical)	-	-	3	2
8	BML-293	General Microbiology-II (Practical)	-	-	3	2
9	BML-294	Biochemistry-II (Practical)	-	-	3	2
10	BML-281	Skill-X	-	-	-	1
11	BML-282	Seminar and GD	-	-	-	1
		Total				23+2 = 25

2ND YEAR

SEMESTER III

Sl.	Course Code	Subject	Period			Credit
			L	T	P	Total
1	BML-301	Hematology and Blood Banking-I(Theory)	3	-	-	3
2	BML-302	Clinical Biochemistry-I (Theory)	3	-	-	3
3	BML-303	Basic and Clinical Pharmacology (Theory)	3	-	-	3
4	BML-304	Health education and health communication (Theory)	3	-	-	3
5	BML-305	Biomedical Waste Management (Theory)	3	-	-	3
7	BML-391	Hematology and Blood Banking-I(Practical)	-	-	3	2
8	BML-392	Clinical Biochemistry-I (Practical)	-	-	3	2
9	BML-381	Skill-X	-	-	-	1
10	BML-382	Seminar and GD	-	-	-	1
		Total				19+2 = 21

SEMESTER IV

Sl.	Course Code	Subject	Period			Credit
			L	T	P	Total
1	BML-401	Hematology and Blood Banking-II(Theory)	3	-	-	3
2	BML-402	Clinical Biochemistry-II (Theory)	3	-	-	3
3	BML-403	Bacteriology, Immunology and Parasitology (Theory)	3	-	-	3
4	BML-404	Community Medicine (Theory)	3	-	-	3
5	BML-491	Hematology and Blood Banking-II (Practical)	-	-	3	2
6	BML-492	Clinical Biochemistry-II (Practical)	-	-	3	2
7	BML-493	Bacteriology, Immunology and Parasitology (Practical)	-	-	3	2
8	BML-481	Skill-X	-	-	-	1
9	BML-482	Seminar and GD	-	-	-	1
		Total				18+2 =20

3rd YEAR

SEMESTER V

Sl.	Course Code	Subject	Period			Credit
			L	T	P	Total
1	BML-501	Virology, Mycology and Applied Microbiology (Theory)	3	-	-	3
2	BML-502	Histopathology and Cytopathology Techniques (Theory)	3	-	-	3
3	BML-503	Histotechnology (Theory)	3	-	-	3
4	BML-504	Clinical enzymology and automation (Theory)	3	-	-	3
5	BML-591	Virology, Mycology and Applied Microbiology (Practical)	-	-	3	2
6	BML-592	Histopathology and Cytopathology Techniques (Practical)	-	-	3	2
9	BML-581	Skill-X	-	-	-	1
`10	BML-582	Seminar and GD	-	-	-	1
		Total				16 + 2 = 18

SEMESTER VI

Sl.	Course Code	Subject	Period			Credit
			L	T	P	Total
1	BML-601	Diagonostic Molecular Biology (Theory)	3	-	-	3
2	BML-602	Essentials of Medical Pharmacology (Theory)	3	-	-	3
3	BML-603	Biomedical Techniques, Lab Management and Ethics (Theory)	3	-	-	3
4	BML-691	Diagonostic Molecular Biology (Practical)	-	-	3	2
5	BML-692	Hospital Training	-	-	-	6
6	BML-681	Skill-X	-	-	-	1
7	BML-682	Seminar and GD	-	-	-	1
		Total				17+2 = 19

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

SYLLABUS FOR B.SC OF MEDICAL LABORATORY TECHNOLOGY (BMLT)

BMLT 1ST YEAR

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

SEMESTER I

BML 101: HUMAN ANATOMY AND PHYSIOLOGY-I (THEORY) 45 Hours

Objective:

- Students will able to gather basic knowledge of cells & tissues and to understand anatomy and physiology of human system.
- This subject will develop an understanding of the structure and function of organs and organ systems in normal human body.
- It will help to develop a vocabulary of appropriate terminology to effectively communicate information related to anatomy and recognize the anatomical structures included in syllabus.
- The prime concern of this syllabus is to integrate basic knowledge of cells, tissues, blood, physiological functions and diseases of system included in syllabus.
- This subject will develop an understanding of the function of organs and organ systems in normal human body. It will help to explain the physiological systems of body and also understand the basis of diseases.

Course Content

Unit -1

Terminology and General Plan of the Body, Body Parts and Areas, Terms of Location and Position, Body Cavities and Their Membranes, Dorsal cavity, Ventral cavity, Planes and Sections

Unit –II

Cells: Structure, function and location, Prokaryotic and eukaryotic cells, Cell organelles, Cell division. Tissue, Types, Structure, Location and Function of Epithelial Tissue, Connective Tissue, Muscle Tissue, Nerve Tissue, Membranes, Glandular tissue. The Integumentary System: structure and function of The Skin, Subcutaneous Tissue

Unit-III

Cell physiology: Structure, membrane, transport across cell membrane, Active, Passive, Organization of the Body, Body Composition, Body Fluid Volumes and its measurement, Diffusion, Osmosis, Tonicity, Homeostasis

Unit-IV

Blood-composition, function, cellular component & their function, haemoglobin & anaemia, blood groups and coagulation. Lymphatic system-Composition & function of lymph, lymphatic tissue, Immunity with the role of thymus

Unit-V

Musculoskeletal System: Basic anatomy of important muscles and bones, Structure of skeletal muscle. Muscle contraction and relaxation.

Unit-VI

Cardiovascular system-general arrange, heart, arteries, veins and capillaries, heart structure and function, cardiac cycle, heart sounds, heart rate, blood pressure, mechanism of circulation, definition of hypertension & shock

Unit-VII

Respiratory system: parts of respiratory system, mechanism of respiration, pulmonary function, pulmonary circulation, lungs volume, Gas transport between lungs and tissues, Definition of hypoxia, dyspnoea, cyanosis, asphyxia and obstructive airways diseases

Course Outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1. Students will able to gather basic knowledge of cells & tissues and to understand anatomy and physiology of human system	3	2	1	-	1
CO2. • This subject will develop an understanding of the structure and function of organs and organ systems in normal human body.	3	2	-	-	1
CO3. It will help to develop a vocabulary of appropriate terminology to effectively communicate information related to anatomy and recognize the anatomical structures included in syllabus.	2	3	2	1	2
CO4.The prime concern of this syllabus is to integrate basic knowledge of cells, tissues, blood, physiological functions and diseases of system included in syllabus.	3	1	1	2	1
CO5.This subject will develop an understanding of the function of organs and organ systems in normal human body. It will help to explain the physiological systems of body and also understand the basis of diseases.	3	-	1	-	2

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML 191: HUMAN ANATOMY AND PHYSIOLOGY-I (Practical) 3 Hours/week

Objective:

- This subject demonstrates major organs through models and permanent slides.
- It demonstrates various body systems through charts and models and recognition of bones and joints.
- It explains the methods of determination of pulse rate, blood pressure, ECG and hemoglobin by different techniques.

1. Demonstration of Major organs through models and permanent slides.
2. Demonstration of parts of circulatory system from models.
3. Demonstration of parts of respiratory system from models.
4. Demonstration of structural differences between skeletal, smooth and cardiac muscles.
5. Demonstration of various bones
6. Demonstration of various joints
7. To measure pulse rate
8. To measure blood pressure
9. Demonstration of ECG
10. To perform Hemoglobin by Sahli's Method
11. To perform Hemoglobin by CMG method.

Course Outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject demonstrates major organs through models and permanent slides.	2	3	2	1	-
CO2: It demonstrates various body systems through charts and models and recognition of bones and joints.	2	3	2	1	-
CO3: It explains the methods of determination of pulse rate, blood pressure, ECG and hemoglobin by different techniques.	1	3	2	1	-

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Recommended Books (Latest Editions)

- Essentials of Medical Physiology: with Free Review of Medical Physiology Paperback – 1 January 2019 by K Sembulingam and Prema Sembulingam.
- Principles of Anatomy and Physiology: Organization, Support and Movement, and Control Systems of the Human Body, 2 Volume (13th Edition) by Gerard J. Tortora, Bryan H. Derrickson.

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML 102: PATHOLOGY I (Theory) 45 Hours

Objective

The curriculum of pathology aims at preparing the students in basic understanding of diseases and their pathogenesis.

The syllabi of pathology compliment and supplements the necessary knowledge students have gained in Physiology.

This curriculum aims to provide an introductory nature and build the concepts of how human system work in altered and diseased stage under the influence of various internal and external stimuli to the students.

Course content

Unit I

Introduction & History of pathology, Basic definitions and familiarization with the common terms used in pathology, Causes and mechanisms of cell injury, reversible and irreversible injury, Introduction of hyperplasia, hypoplasia, hypertrophy, atrophy, metaplasia, necrosis andapoptosis

Unit II

General features of acute and chronic inflammation: Vascular changes, cellular events, Cells and mediators of inflammation, Phagocytosisand its mechanism

Unit III

Tissue Renewal and Repair, healing and fibrosis, cirrhosis, introduction of oedema, hyperaemia, congestion, haemorrhage, haemostasis, thrombosis, embolism, infarction, shock and hypertension.

Unit IV

Protein energy malnutrition, deficiency diseases of vitamins and minerals, nutritional excess and imbalances. Role and effect of metals (Zinc, Iron and Calcium) and their deficiency diseases, Aetiology and pathophysiology of diabetes, arteriosclerosis, myocardial infarction, respiratory diseases (COPD), Parkinson disease, Infectious Diseases: pathogenesis & overview of modes of infections, prevention and control with suitable examples like Typhoid, Dengue

Unit V

Cancer: Definitions, nomenclature, characteristics of benign and malignant neoplasm, metastasis, Carcinogens and cancer, concept of oncogenes, tumour suppressor genes, DNA repair genes and cancers stem cells.

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: The curriculum of pathology aims at preparing the students in basic understanding of diseases and their pathogenesis.	3	2	3	1	-
CO2: The syllabi of pathology compliment and supplement the necessary knowledge students have gained in Physiology.	3	2	3	1	-
CO3: This curriculum aims to provide an introductory nature and build the concepts of how human system work in altered and diseased stage under the influence of various internal and external stimuli to the students.	3	-	3	1	-

BML 192: PATHOLOGY-I (Practical) 3

Hours/week Objective

- The objective of this subject is to enable the students to perform different pathological tests in the laboratory.
- This explains the testing procedures of different components of blood, CSF, urine and sputum by different modern techniques.

1. Hemoglobin by CMG method.
2. To perform Total RBC count.
3. To perform total leucocyte count.
4. To perform differential leucocyte count.
5. To perform PCV
6. To calculate Red cell indices.
7. To perform total platelet count.
8. To perform bleeding time.
9. To perform clotting time.
10. To study about CSF examination.
11. Microscopic examination of urine
12. Examination of urine
13. Examination of sputum

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: The objective of this subject is to enable the students to perform different pathological tests in the laboratory.	2	3	2	1	-
CO2: This explains the testing procedures of different components of blood, CSF, urine and sputum by different modern techniques.	2	3	2	1	-

Recommended Books (Latest Editions)

- Text Book of Pathology, Harsh Mohan, 6th edition, Jaypee publication.

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML 103: GENERAL MICROBIOLOGY-I (Theory) 45 Hours

Objective

- This subject gives a general insight into the history, basics of microbiology and imparts knowledge about equipment used in microbiology.
- This course gives knowledge on handling of instruments and sterilization techniques.
- This subject helps to deliver concepts on antiseptics and disinfectants.

Course content

Unit-I

Development of microbiology as a discipline, Contributions of Anton von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming, Edward Jenner, Introduction to bacterial taxonomy, Classification of Bacteria, Morphology based onsize, shape, arrangement, motility, flagella, spores, capsules, cell wall, plasma membrane, pili, and ribosomes.

Unit-II

Microscopy: Study of compound microscope – magnification, numerical aperture, resolution and components of microscope. Dark ground illumination, care of microscope and common difficulties micrometry. Bright Field Microscope, Dark Field Microscope, Phase Contrast Microscope, Fluorescence Microscope, Transmission Electron Microscope, Scanning Electron Microscope

Unit-III

Cell size, shape and arrangement, cell-wall, composition and detailed structure of Gram-positive and Gram-negative cell walls, Cell Membrane: Structure, function and chemical composition of bacterial cell membranes. Cytoplasm: Ribosome, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids, Endospore: Structure, formation

Unit-IV

General safety measures used in Microbiology laboratory, Sterilization and disinfection: Various physical methods of sterilization – heat, UV radiation, ionizing radiation, filtration, characters affecting sterilization, auto clave control and sterilization indicators. Biomedical waste management in a Medical Microbiology laboratory: Types of the waste generated, Segregation, Treatment, Disposal

Unit-V

Antiseptics & Disinfectants: Definition, types and properties, mode of action, use, qualities of good disinfectants. Chemical disinfectants – phenol and its compounds, alcohol, halogen, heavy metals and quaternary ammonium compounds, aldehyde, gaseous compound. use and abuse of disinfectants. Precautions while using the disinfectants.

Course Outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: This subject gives a general insight into the history, basics of microbiology and imparts knowledge about equipment used in microbiology.	3	1	-	2	1
CO2: This course gives knowledge on handling of instruments and sterilization techniques.	3	2	1	-	2
CO3: This subject helps to deliver concepts on antiseptics and disinfectants.	3	2	-	-	1

BML 193: GENERAL MICROBIOLOGY-I (Practical) 3

Hours/week Objective

- This subject provides practical experience on the various techniques and instruments in Microbiology laboratory.
- It helps to understand and handle instruments like autoclave, laminar air flow and incubators in the laboratory.
- It also explains the method preparation of culture media, culture plates and sterilization of cultures.

Course content

1. Demonstration of Autoclave and sterilization of media
2. Demonstration of Laminar air flow and media preparation
3. Preparation of culture plates
4. Demonstration of Centrifuge.
5. Demonstration of hot air Oven and sterilization of glassware's
6. Demonstration of Incubator and preservation of cultures
7. Preparation of media.
8. Antibiotic sensitivity test.

Course Outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: This subject provides practical experience on the various techniques and instruments in Microbiology laboratory.	2	3	2	1	-
CO2: It helps to understand and handle instruments like autoclave, laminar air flow and incubators in the laboratory.	2	3	2	1	-
CO3: It also explains the method preparation of culture	2	3	2	1	-

media, culture plates and sterilization of cultures.					

Recommended Books (Latest Editions)

- Text book of Microbiology by Ananthanarayan and Paniker.
- Microbiology by Michael J. Pelczar, E.C.S. Chan and N.R. Krieg

BML 104: BIOCHEMISTRY-1 (Theory) 45 Hours

Objective

- This paper aims at understanding the chemical properties of the bio-molecules.
- It delivers concept on the functions and biomedical importance of bio molecules.
- This subject imparts knowledge on the chemistry, function, and biological importance of carbohydrates, proteins, lipids, nucleic acids, enzymes, vitamins and minerals.

Course content

Unit-I

Carbohydrate: Definition, Source, Classification, Functions and Importance, Physiological importance of major type of carbohydrates. Carbohydrate metabolism – Glycolysis, HMP shunt, TCA cycle, Glycogenesis, Glycogenolysis, Neoglucogenesis, Blood sugar level

Unit-II

Protein: Definition, Source, Classification, Function and Importance of major type of proteins. Protein metabolism – Transamination, Transmethylation, Deamylation, Urea synthesis, Inborn error of metabolism.

Unit-III

Lipids: Definition, Source, Classification, Function of major type of lipids. Saturated and Unsaturated type of fatty acids, Essential fatty acids and their importance.Phospholipids and their importance.Lipid metabolism – Fatty acid oxidation, Ketone bodies, Metabolism of cholesterol, Arteriosclerosis and Obesity.

Unit-IV

Enzymes: Definition, Classification of enzyme, Cofactor & Coenzymes, Concept of active sites and general mode of action of enzymes, units for measuring enzyme activity, factor affecting enzyme activity, factor responsible for abnormal enzyme secretion

Unit-V

Nucleic acids: Structure, Function and types of DNA and RNA, Nucleotides, Nucleosides, Nitrogen bases, purines and pyrimidines and role of Nucleic acid.

Unit-VI

Vitamins: classification, function and disease associated with vitamins.Minerals and ions: Requirement, function and biological importance of Calcium, Iron, Iodine, Zinc, Phosphorus, Copper, Sodium and Potassium

Course Outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: This paper aims at understanding the chemical properties of the bio-molecules.	3	1	2	-	1
CO2: It delivers concept on the functions and biomedical importance of bio molecules.	3	2	3	1	1
CO3: This subject imparts knowledge on the chemistry, function, and biological importance of carbohydrates, proteins, lipids, nucleic acids, enzymes, vitamins and minerals.	3	3	2	-	1

BML 194: BIOCHEMISTRY-I (Practical) 3

Hours/week Objective

- This explains identification and determination of protein and carbohydrates and examination of urine by different methods in the laboratory.

- It also helps to determine bile salt, bile pigments and urobilinogen in pathological conditions

Course Content

1. To determine protein by Biuret method.
2. To perform protein test by various methods.
3. Physical examination of urine
4. Urine sugar determination by Benedict's method.
5. Protein by heat and acetic method
6. Bile salt, Bile pigments and Urobilinogen determination
7. Determination of Ketone bodies
8. Determination of various parameters of urine by uristik method.
9. Preparation of hemolysate
10. To identify carbohydrates in given solution by various methods.

Course Outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This explains identification and determination of protein and carbohydrates and examination of urine by different methods in the laboratory.	2	3	2	1	-
CO2: It also helps to determine bile salt, bile pigments and urobilinogen in pathological conditions.	2	3	2	1	-

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Recommended Books (Latest Editions)

- Lehninger Principle of biochemistry by D.L. Nelson , M.L. Cox (seventh edition).
- Biochemistry by U. Satyanarayan & L. Chakrapani. (Fifth edition)

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML 195: COMMUNICATION FOR PROFESSIONALS (Theory) 45 Hours

Objective

- Understand the meaning of communication, its role in business, elements, level, models and media of communication.
- Communicate effectively (Verbal and Non-Verbal)
- Revision of grammar and Comprehension.
- Develop and improve writing skills.

Course content

1. Introduction: Meaning of Communication; Role of Communication in Business; Basic elements of the Communication process, level of Communication, forms, models and media of Communications, Verbal and non-verbal Communication-functions and types. Barriers to effective Communication.
2. Grammar: Subject verb agreement, tense, voice, improvement of sentences, rearrangement of sentences. Vocabulary: usage, synonyms,antonyms.
3. Comprehension
4. Forms of Writing: The Essay, The Précis, The Report, The Proposal, The C.V. andJob
5. Application letter. ThePresentation.
6. RolePlaying
7. GroupDiscussion

Course Outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: Understand the meaning of communication, its role in business, elements, level, models and media of communication.	3	2	1	-	1
CO2: Communicate effectively (Verbal and Non-Verbal)	3	2	-	-	1
CO3: Revision of grammar and Comprehension.	2	3	2	1	2
CO4: Develop and improve	3	1	1	2	1

	writing skills.					
	CO5: Develop skills of role playing and group discussion.	3	-	1	-	2

Recommended Books (Latest Editions)

- Professional communication, Editor Jana English (Fourth edition)
- Professional communication skill by S. Chand (second edition)

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

SEMESTER II

BML 201: HUMAN ANATOMY AND PHYSIOLOGY-II (THEORY) 45 Hours

Objective

- This syllabus ensures complete and comprehensive knowledge on all functionalities of the body.
- This curriculum can stimulate the students to understand the basic anatomy of included system and the resultant unified organization thereupon.
- This subject imparts profound knowledge on digestive system, endocrine system, neurophysiology, special senses, renal physiology, reproductive system and gastrointestinal physiology.
- It will help to understand functioning of various systems included in syllabus as well as diseases mentioned.

Course content

Unit-I

Digestive system: basic anatomy of esophagus, stomach, small intestine, large intestine liver, gall bladder, pancreas

Unit-II

Gastrointestinal physiology: Organs of GIT and their structure & function, secretion digestion, absorption and assimilation, gastrointestinal hormones, physiology of digestio of carbohydrates, proteins & lipids, Structure & function of liver, spleen,
gall bladder & pancreas, Jaundice, Cirrhosis & Pancreatitis

Unit-III

Endocrine system: Different hormones in endocrine system. Action of pituitary, thyroid parathyroid, adrenal and gonadal hormones. Body temperature regulatory process in human role of endocrine and nervous system.

Unit-IV

Neurophysiology: Reflex system, automatic nervous system, parts of brain and function of eac part. Nerve tract and their role.

Unit-V

Special senses: Structure of retina, rhodopsin and iodopsin cycle, visual tract, accommodation Auditory tract, mechanism of audition. Structure of taste bud, taste pathway, Olfaction and it physiology.

Unit-VI

Renal physiology: Structure and function of renal system. Urine formation, micturition, rena clearance test, renal buffer system.

Unit-VII

Reproductive system: Male and female reproductive organs, Gametogenesis, Ovulation Menstrual Cycle.

Course Outcome	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This syllabus ensures complete and comprehensive knowledge on all functionalities of the body.	3	2	1	-	1
CO2: This curriculum can stimulate the students to understand the basic anatomy of included system and the resultant unified organization thereupon.	3	2	-	-	1
CO3: This subject imparts profound knowledge on digestive system, endocrine system, neurophysiology, special senses, renal physiology, reproductive system and gastrointestinal physiology.	2	3	2	1	2
CO4: It will help to understand functioning of various systems included in syllabus as well as diseases mentioned.	3	1	1	2	1

JIS UNIVERSITY

[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML 291 HUMAN ANATOMY & PHYSIOLOGY-II (Practical) **3 Hours/week**

Objective

- This subject demonstrates digestive system, excretory system and nervous system with the help of models.
- It also explains and describes the structure of eye and ear, male and female reproductive system through models.

1. Demonstration of digestive system from models.
2. Demonstration of excretory system from models.
3. Demonstration of nervous system from models.
4. Structure of eye and ear
5. Demonstration of various parts of male & female reproductive system from models

Course Outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject demonstrates digestive system, excretory system and nervous system with the help of models.	2	3	2	1	-
CO2: It also explains and describes the structure of eye and ear, male and female reproductive system through models.	2	3	2	1	-

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML 202: PATHOLOGY-II (THEORY) **45 Hours**

Objective

The unique preposition of this paper is that it imparts knowledge on the basic techniques with clotting mechanism, blood banking techniques and automation.

It develops ability to perform the various types of tests involved in hematology, immunohematology, coagulation profile and handling of automated instruments.

Course content

Unit- I

Hemoglobin, structure, function and types, Hemoglobinometry, Haemoglobin estimation b various methods, advantages and disadvantages, physiological and pathological variations o blood parameters, Hemocytometry, visual and electronic method, neubauer count in chamber, RBC count, WBC count, Platelets count absolute eosinophil count, principle, procedure, calculation, significance, precautions involve during counting, absolute count of various WBCs. Physiological and pathological change in values, Erythrocyte sedimentation rate, manual and automated method, factor affect in ESR, packed cell volume, red cell indices (MCV, MCH, MCHC), Physiological a pathological variations in value

Unit-II

Complete blood count, determination by automated method and significance of eac parameter, Reticulocyte count, routine examination of CSF, semen, sputum and stool.

Unit –III

Mechanism of coagulation, coagulation factors, Bleeding time, clotting time, platelet count protamine sulphate test, clot retraction test

Unit-IV

Introduction to immuno hematology and blood banking technology, antigen, antibody complements, ABO & Rh blood group system, method of determination, other blood grou system, Donor selection, blood collection, anticoagulants, additive systems, blood bags, it labelling, storage and transportation

Unit- V

Uses, care & maintenance and calibration of Coulter counter, coagulometer, automatic ES analyzer, urine analyzer, point of care testing. Pre and Post analytical variables, automation in hematology

Course Outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: The unique preposition of this paper is that it imparts knowledge on the basic techniques with clotting mechanism, blood banking techniques and automation.	2	2	3	1	-
CO2: It develops ability to perform the various types of tests involved in hematology, immunohematology, coagulation profile and handling of automated instruments.	3	1	-	1	-

BML- 292 PATHOLOGY-II (LAB) **3Hours/Week**

Objective

- This practical subject enables the students to perform various tests in the laboratory, which are performed during various pathological conditions.
- It provides in hand knowledge on the pathological tests like ELISA, TB IgG, Dengue IgG, agglutination and WIDAL test.
- It also develops concept on contraceptive devices and demonstrates microscopic structure of bones and muscles with the help of permanent slides.

1. To perform ELISA test. To perform TB IgG& IgM test
2. To perform Dengue IgG &IgM test
3. To demonstrate agglutination reaction.
4. To perform RA test
5. To perform WIDAL test
6. To study about intrauterine contraceptive devices.
7. To demonstrate microscopic structure of bones with permanent slides.
8. To demonstrate microscopic structure of muscles with permanent slides.

Course Outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This practical subject enables the students to perform various tests in the laboratory, which are performed during various pathological conditions.	1	3	2	1	-
CO2: It provides in hand knowledge on the pathological tests like ELISA, TB IgG, Dengue IgG, agglutination and WIDAL test.	2	3	2	1	-
CO3: It also develops concept on contraceptive devices and demonstrates microscopic structure of bones and muscles with the help of permanent slides.	2	3	2	1	-

BML 203: GENERALMICROBIOLOGY-II (THEORY) 45Hours

Objective

Course content

Unit-I

Lab organization, management, recording of results and quality control in Medical Microbiology Lab. Safety measures in Microbiology Laboratory, Occurrence of labinfections, route of infections in laboratory, safety measures precaution in use of pathogens in teaching.

Unit-II

Host pathogen interaction: Definitions - Infection, Invasion, Pathogen, Pathogenicity, Virulence, Toxigenicity, Carriers and their types, Opportunistic infections,Nosocomialinfections.Transmission ofinfection

Unit-III

Principle, working, use, care & maintenance of Laminar air flow, Centrifuge, Autoclave, hot air Oven, Incubator, Colony Counter, Muffle Furnace, Mac-intos Field-jaretc.SterilitytestingofI/vfluids,Collection,transportationandprocessingofI/v fluids for bacterial contamination, Recording the result and interpretation

Unit-IV

Hospital acquired infection, Specimen collection from patients, clinics and hospitals, Specimen collection for epidemiological investigations, role of microbiology laboratory in control of nosocomial infection

Antimicrobial agents and Antibiotics: Introduction, mechanism of action, classification and uses, Antibiotic susceptibility testing in bacteriology, Culture medium used for Antibiotic susceptibility testing, Preparation and standardization of inoculums, Control bacterial strains, Description, morphology, cultural characteristics, pathogenecity, cultural characteristics, clinical features and lab diagnosis of Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Bordetella, Choice of antibiotics MIC and MBC: Concepts and methods for determination. Various methods of Antibiotic susceptibility testing with specialreference to Stokes and Kirby-Bauer method

Unit-V

Description, morphology, cultural characteristics, pathogenecity, cultural characteristics clinical features and lab diagnosis of Clostridia, Escherichia coli, Salmonella,Shigella Proteus, Vibrio, Pseudomonas, Spirocheates, Chlamydia, Actinomyces, Rickettsia,Yersenia Brucella,Description, morphology, cultural characteristics, pathogenecity, cultura characteristics, clinical features and lab diagnosis of Vibrio, Pseudomonas, Spirocheate Chlamydia, Actinomyces, Rickettsia,Yersenia, Brucella,Introduction of Mycology Definition, general properties and classification Cutaneous mycoses, Systemic mycoses Opportunisticmycoses Culture and laboratory test for fungus.

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This course imparts knowledge on management of a microbiology lab, and helps to gain idea about instrument handling in the laboratory.	2	-	3	2	1
CO2: It develops ability to identify and differentiate bacteria and fungusin biological samples.	3	1	-	2	1
CO3: It provides knowledge on host pathogen interaction, specimen collection, antimicrobial agents and antibiotics.	3	2	1	-	2

JIS UNIVERSITY

[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML 293: GENERAL MICROBIOLOGY-II (Practical) 3Hours/Week

Objective

- The objective of this practical based subject is to demonstrate different tests and techniques which are performed in the microbiology laboratory for the diagnosis of diseases.
- It enables the students to perform tests like HIV Tridott, radial immune-diffusion, immune precipitation, ASO test, Mantoux test, HBsAg rapid test etc.
- It also develops skills among students to perform PAS staining, AFB staining, tissue processing, hematoxylin and eosin staining.

Course Content

1. To perform HIV Tridot test.
2. To perform radial immune-diffusion test.
3. To perform immune-precipitation method.
4. To perform HBsAg rapid test.
5. To perform ASO test
6. Introduction of Allergy panel
7. Mantoux test
8. Grossing of tissue
9. To perform tissue processing by manual method.
10. To perform section cutting of paraffin embedded tissue.
11. To fix the smear on glass slide.
12. To perform hematoxylin and eosin staining.
13. To perform PAS staining.
14. To perform AFB staining.

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: The objective of this practical based subject is to demonstrate different tests and techniques which are performed in the microbiology laboratory for the diagnosis of diseases.	2	3	2	1	-

CO2: It enables the students to perform tests like HIV Tridott, radial immune-diffusion, immune precipitation, ASO test, Mantoux test, HBsAg rapid test etc.	2	3	2	1	-
CO3: It also develops skills among students to perform PAS staining, AFB staining, tissue processing, hematoxylin and eosinstaining.	2	3	2	1	-

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML- 204 BIOCHEMISTRY-I (THEORY) 45HOURS

Objective

- This syllabus has been formulated to impart basics knowledge of biochemistry, apparatus, units, equipment, and volumetric analysis in the Clinical Biochemistry.
- It imparts knowledge on the basics of reagent preparation, instrument handling and performing common analytical techniques in Clinical Biochemistry.

Course Content

Unit-I

Introduction to Clinical Biochemistry and role of Medical Lab Technologist, ethics, responsibility, safety measure and hazards in clinical biochemistry lab and first aid in laboratory accidents.
Glassware's & plasticware's used in lab, calibration of volumetric apparatus, cleaning& care and maintenance

Unit II

Principle, working, care & maintenance and calibration of Weighing balance, Hotplate, Magnetic stirrer, Centrifuges, Incubator, Hot air oven, Colorimeter,
Spectrophotometer, Water distillation plant, Deionizers Henderson Hassel balch equation, pH paper, pH meter, method of pH measurement

Unit-III

Preparation of solution and reagents, normal solution, molar solutions, percent solution, buffer solution, dilutions, w/v, v/v, standard solution, aqueous solutions, concepts of acid and base Units of measurement: SI unit, reference range, conversion factor, units for measurement of bio metabolite, enzymes, protein, drugs, hormones, vitamins

Unit-IV

Specimen collection and processing of blood, urine & CSF, separation of serum and plasma, deproteinization of sample, Handling of specimens for testing, preservation of specimen, transport of specimen, factors affecting the clinical results, effect of storage onsample

Unit- V

Physical, chemical and microscopic examination of urine, Bence Jones Proteinuria and its clinical significance, qualitative test of urine for reducing sugars, protein, ketone bodies, bile Salt, bile pigments, urobilinogen, occult blood, uric acid, urea and Creatinine, quantitative estimation of 24 hrs urine for protein and their clinical significance.

Course outcome	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This syllabus has been formulated to impart basics knowledge of biochemistry, apparatus, units, equipment, and volumetric analysis in the Clinical Biochemistry.	3	2	-	-	1
CO2: It imparts knowledge on the basics of reagent preparation, instrument handling and performing common analytical techniques in Clinical Biochemistry.	3	1	2	-	2

JIS UNIVERSITY

[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML- 294 BIOCHEMISTRY-II (LAB) **3Hours/Week**

Objective

- This subject explains the laboratory safety rules and demonstrates glasswares, apparatus and plasticwares used in the laboratory.
- It demonstrates methods of collecting blood sample, separation of serum and plasma and deproteinization of blood sample.
- It also provides detailed demonstration of photocolorimeter, spectrophotometer and pH meter.

Course Content

1. To study general laboratory safety rules.
2. To demonstrate glass-wares, apparatus and plasticwares used in laboratory.
3. Collection of blood sample
4. To separate serum and plasma.
5. Preparation of different percentage solutions
6. Preparation of normal and molar solutions. (0.1 N NaOH, 0.2N HCl,0.1 MH_2SO_4)
7. Demonstration of photo-colorimeter
8. Demonstration of spectrophotometer
9. Demonstration of pH meter
10. Deproteinization of blood sample

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject explains the laboratory safety rules and demonstrates glasswares, apparatus and plasticwares used in the laboratory.	2	3	2	1	-
CO2: It demonstrates methods of collecting blood sample, separation of serum and plasma and deproteinization of blood sample.	2	3	2	1	-

	CO3: It also provides detailed demonstration of photocolorimeter, spectrophotometer and pH meter.	2	3	2	1	-

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-205 FUNDAMENTALS OF COMPUTER SCIENCE (THEORY) 45HOURS

Objective

- This subject helps to develop idea on basics of computer science and MS Windows.
- It imparts knowledge on Windows explorer, Desktop and creation of folders and shortcuts. CO3: It enables the students to work with MS Office.

Course Content

1. Introduction
2. MS-Windows (Windows '98 Second Edition)
3. Desktop, creation of folders and shortcuts, features of Windows explorer
4. MS Office packages – Word, Excel, PowerPoint, basic skills in using these tools

Course outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: This subject helps to develop idea on basics of computer science and MS Windows.	1	2	3	1	1
CO2: It imparts knowledge on Windows explorer, Desktop and creation of folders and shortcuts. CO3: It enables the students to work with MS Office.	2	3	2	-	1

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

B.M.L.T. 2ND YEAR

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

SEMESTER III

BML-301 HEMATOLOGY AND BLOOD BANKING-I (THEORY) 45HOURS

Objective

- This subject helps to learn about haemoglobin and its laboratory investigations, leucocytes and their identification, hemostasis and coagulation.
- It develops knowledge on anaemia, its types, thalasemia and their investigations.
- It gives idea about geneal blood picture, estimation of iron, plasma haemoglobin, platelet count and thrombin time.

Course Content

Unit –I

RBCs, formation, morphology, cytoskeleton, anisocytosis, poikilocytosis, metabolism, role of 2, 3- BPG and oxygen dissociation curve.Anaemia and its classification, Morphological and etiological, pathogenesis, laboratory investigations and management,Iron deficiency anaemia, metabolism of iron, pathogenesis, laboratory investigations and management, principle and procedure of special test Megaloblasticanaemia, pernicious anaemia, pathogenesis, laboratory investigations

Unit-II

Haemoglobin, its synthesis and types, normal and abnormal hemoglobins, extravasccular and intravascular hemolysis.Haemolyticanaemia, pathogenesis and laboratory investigations, principle andprocedure of special test, G-6-PD

Unit –III

Leukopoiesis, Stages of Leukocyte Maturation, Features of Cell Identification, leucocytosis and leucocytopenia, neutrophilia, eosinophilia, basophilia, monocytosis, lymphocytosis, neutropenia, lymphopenia, causes and significance, toxic granulation, Morphological alterations in neutrophil, effect of HIV on blood cellparameter

Unit-IV

Overview of hemostasis and coagulation, Stages of platelets development, Primary and Secondary hemostasis, Role of platelets, Role of coagulation factors, Coagulation inhibitorysystem, Fibrinolysis

Unit-V

General blood picture, estimation of iron, TIBC, Transferrin, Ferritin, Plasma haemoglobin,Vit.B12, Folic acid, FIGLU test, Schiling test, Parietal cell antibodies,G-6- PD, Osmotic fragility test, Heinz bodies, Perls Prussian staining, Platelet count, Platelet aggregation test, PT, INR APTT, Mixing experiments in PT and APTT, Thrombin time.

Unit- VI

Aplastic anaemia, Anaemia of chronic disorders, Sideroblasticanaemia, HaemolyticAnaemia, etiology, pathogenesis, clinical features, laboratory investigations,Bone marrow examination, composition & functions, aspiration techniques, processing andstaining.

Unit-VII

Hemoglobinopathies, qualitative and quantitative, Sickle cell anaemia, sickle cell trait, etiology, pathogenesis, clinical features, and laboratory investigations, Disease management

and

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject helps to learn about haemoglobin and its laboratory investigations, leucocytes and their identification, hemostasis and coagulation.	2	1	2	3	2
CO2: It develops knowledge on anaemia, its types, thalasemia and their investigations.	2	1	1	3	2
CO3: It gives idea about geneal blood picture, estimation of iron, plasma haemoglobin, platelet count and thrombin time.	3	1	2	3	2

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-391 HEMATOLOGY AND BLOOD BANKING-I (LAB) 3HOURS/WEEK

Objective

- This subject develops practical skills among students regarding testing of different blood samples in the laboratory required during different pathological conditions.
- Its objective is to enable the students to perform different tests such as Differential Leukocyte Count, Absolute Leukocyte Count, sickling test and reticulocyte count.
- It also helps in the determination of red cell indices, G-6-PD, Plasma Hemoglobin and APTT.

Course content

1. General blood picture
2. Determination of red cell indices
3. Demonstration of hypochromic microcytic slide.
4. Determination of G-6-PD
5. Differential Leukocyte Count.
6. Absolute leucocyte count
7. Demonstration of toxic granulation of neutrophil
8. To perform PT and Calculate INR
9. To perform APTT
10. To perform sickling test
11. Determination of Plasma Hemoglobin
12. To perform reticulocyte count.

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject develops practical skills among students regarding testing of different blood samples in the laboratory required during different pathological	2	1	2	3	2

conditions.					
CO2: Its objective is to enable the students to perform different tests such as Differential Leukocyte Count, Absolute Leukocyte Count, sickling test and reticulocyte count.	3	2	3	3	1
CO3: It also helps in the determination of red cell indices, G-6-PD, Plasma Hemoglobin and APTT.	3	2	2	3	1

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-302 CLINICAL BIOCHEMISTRY-I (THEORY) 45HOURS

Objective

- The pathophysiological basis of the most relevant and prevalent diseases in our population.
- The main biological properties that are altered in these diseases and are examined in a clinical biochemistry laboratory
- The procedures for the biological properties measurement and test their semiological characteristics.
- It will also be familiar with the use of tools for the operation in a clinical biochemistry laboratory: instructions or work protocols, implementation of internal control quality program, participation in an external quality evaluation programs and use of automated measurement systems.

Course Content

Unit-I

Introduction to Clinical Biochemistry and role of Medical Lab Technologist, ethics, responsibility, safety measure and hazards in clinical biochemistry lab and first aid in laboratory accidents. Glassware's & plastic ware's used in lab, calibration of volumetric apparatus, cleaning& care and maintenance

Unit II

Principle, working, care & maintenance and calibration of Weighing balance, Hotplate, Magnetic stirrer, Centrifuges, Incubator, Hot air oven, Colorimeter, Spectrophotometer, Water distillation plant, Deionizers Henderson Hassel balch equation, pH paper, pH meter, method of pH measurement,

Unit-III

Preparation of solution and reagents, normal solution, molar solutions, percent solution, buffer solution, dilutions, w/v, v/v, standard solution, aqueous solutions, concepts of acid and base. Units of measurement: SI unit, reference range, conversion factor, units for measurement of bio metabolite, enzymes, protein, drugs, hormones, vitamins

Unit-IV

Specimen collection and processing of blood, urine & CSF, separation of serum and plasma, deproteinization of sample, Handling of specimens fortesting, preservation of specimen, transport of specimen, factors affecting the clinical results, effect of storage on sample

Unit- V

Physical, chemical and microscopic examination of urine, Bence Jones Proteinuria and its clinical significance, qualitative test of urine for reducing sugars, protein, ketone bodies, bile Salt, bile pigments, urobilinogen, occult blood, uric acid, urea and Creatinine, quantitative estimation of 24 hrs urine for protein and their clinical significance.

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1: The pathophysiological basis of the most relevant and prevalent diseases in our population.	3	2	3	1	2
CO 2: The main biological properties that are altered in these diseases and are examined in a clinical biochemistry laboratory	3	3	2	3	2
CO3: The procedures for the biological properties measurement and test their semiological characteristics.	3	2	2	2	2
CO 4: It will also be familiar with the use of tools for the operation in a clinical biochemistry laboratory: instructions or work protocols, implementation of internal control quality program, participation in an external quality evaluation programs and use of automated measurement	3	1	2	2	2

	systems.					

BML-392 CLINICAL BIOCHEMISTRY-I (LAB) 3HOURS/WEEK

Objective

- This explains identification and determination of protein and carbohydrates and examination of urine by different methods in the laboratory.
- It also helps to determine bile salt, bile pigments and urobilinogen in pathological conditions.
- It provides practical knowledge among students to determine ketone bodies and various parameters of urine by uristik method.

Course Content

1. To identify carbohydrates in given solution by various methods.
2. To determine protein by Biuret method.
3. To perform protein test by various methods.
4. Physical examination of urine
5. Urine sugar determination by Benedict's method.
6. Protein by heat and acetic method
7. Bile salt, Bile pigments and Urobilinogen determination
8. Determination of Ketone bodies
9. Determination of various parameters of urine by uristik method.

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This explains identification and determination of protein and carbohydrates and examination of urine by different methods in the laboratory.	3	2	2	2	2

	CO2: It also helps to determine bile salt, bile pigments and urobilinogen in pathological conditions.	3	2	2	1	2
	CO3: It provides practical knowledge among students to determine ketone bodies and various parameters of urine by uristik method.	3	2	2	3	1

JIS UNIVERSITY

[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML- 303 BASIC AND CLINICAL PHARMACOLOGY (THEORY) 45HOURS

Objective

- Explanation of the mechanism of drug action at organ system at basic levels.
- To understand the pharmacological actions of different categories of drugs i.e. working of drugs acting on various system of the body.
- Application of the basic pharmacological & clinical knowledge in the prevention and treatment of various diseases.
- Clinical aspect of various drugs including their application and usage.
- To understand the therapeutic applications and adverse effects of drugs including the molecular basis of the mechanisms of action, guiding principles of prescribing practices etc.

Course Outcome

Unit-1

General Pharmacology: Pharmacology; Different branches of Pharmacology; Routes of drug administration; Absorption, Distribution, Metabolism and excretion of drugs; General mechanism of drug action; Animal used in experiments; Animal handling and ethics; Bioassay procedures; Instruments used in Pharmacology; Basics of Clinical trials.

Unit- II

Drugs Acting on CNS: General anesthetics; Anxiolytic and hypnotic drugs; Psychotropic agents; Epilepsy and Anticonvulsant drugs; Narcotic analgesics and antagonists; Centrally acting muscle relaxation and anti-parkinsonism agents; Analgesics; antipyretics; anti-inflammatory agents and Central nervous system stimulant; Local anesthetics.

Unit III

Drugs Acting on ANS: Autonomic nervous system and neurohumoral transmission; Cholinergic or parasympathetic drugs; Anticholinergic or parasympathomimetic drugs; B.SC OF MEDICAL LAB. TECHNOLOGY-BMLT Adrenergic or sympathomimetic drugs; sympatholytic drugs; Drugs acting on autonomic ganglion; Neuromuscular blockers.

Unit IV

Drugs Acting on Respiratory System: Bronchodilators; analeptics; Nasal decongestants, expectorants; antitussive agents.

Unit V

Drugs acting on Cardiovascular System: Antiarrhythmic drugs; Cardiotonics; Antianginal drugs; Antihypertensive drugs; Drugs used in atherosclerosis.

Unit VI

Drugs Acting on Blood and Blood Forming Organs: Haematinics – Iron (Fe); Coagulants; Anticoagulants; Blood and plasma expanders.

Unit VII

Hormones and Hormone Antagonists: Antithyroid drugs; Hypoglycaemic agents; Sex hormones and oral contraceptives; Corticosteroids.

Unit VIII

Opioid Analgesics: Endogenous opioid peptides; Opioid receptors; Effects of clinically used opioids; Morphine and related opioid agonists; Acute opioid toxicity; Opioid agonist & antagonist; Therapeutic uses of opioid analgesics.

Unit IX

Drug Addiction and Drug Abuse: Drug dependence; Physical dependence on Drugs;

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1: Explanation of the mechanism of drug action at organ system at basic levels.	3	1	1	2	1
CO2: To understand the pharmacological actions of different categories of drugs i.e. working of drugs acting on various system of the body	3	2	2	3	-
CO3: Application of the basic pharmacological & clinical knowledge in the prevention and treatment of various diseases.	2	2	3	1	3
CO4: Clinical aspect of various drugs including their application and usage	3	1	3	2	1
CO5: To understand the therapeutic applications and adverse effects of drugs including the molecular basis of the mechanisms of action, guiding principles of prescribing practices etc.	3	2	2	2	1

JIS UNIVERSITY

[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML- 304 HEALTH EDUCATION & HEALTH COMMUNICATION(THEORY) 45HOURS

Objective

- Student will understand the health education system, health counselling processes and techniques, health reporting to different governing bodies.
- They will understand the concept, purpose, types of health communication, different processes of health communication as well as they will earn knowledge about different models of communication related to health.
- Identify the role and function of mass communication in health education.

Course content

- Health Education: Principles & Objectives, Levels of Health Education, Educational Methods, Evaluation & Practice of Health Education inIndia.
- Health Counseling: Introduction, Theories, Process &Techniques.
- Health Care Reporting, Role of NIC & Other Bodies, Research in Health Education

- Heath Communication: Basic Concept & Principles of Communication, Definition, Purpose, Types ofCommunication
- Communication Process, Directions of Communication: Upward, Downward, Lateral, Factors influencing Communication, Barriers of Effective Communication, How to overcome theBarriers
- Models of communication: Aristotle Model, Shannon and Weaver model, Schramm Model, Laegans Model, Fano Model, Literer's Model, Westly Maclean'sModel.

Mass communication & Role of Media in healtheducation

- Information Communication Technologies (ICT) in health care and awareness. (Telemedicine & e-health, communityradio)
- Future trends in information and communications systems.

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: Student will understand the health education system, health counselling processes and techniques, health reporting to different governing bodies	3	2	2	2	1
CO2: They will understand the concept, purpose, types of health communication, different processes of health communication as well as they will earn knowledge about different models of communication related to health	3	2	1	-	2
CO3: Identify the role and function of mass communication in health education	3	3	2	2	2

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-305 BIOMEDICAL WASTE MANAGEMENT (THEORY) 45HOURS

Objective

- This subject develops idea about the concepts of waste generation and disposal, planning and perspectives of BMW management.
- It imparts knowledge on record keeping, biomedical waste management and BMW treatment technologies.
- It helps to gain concept on occupational safety and health issues, legal aspects and environmental concern and approaches to common regional facilities.

Course Content

Unit 1: Present Scenario
Bio-medical waste – Concepts and Perceptions, Waste Generation, Segregation , Disposal

Unit 2:
Planning and Objectives of BMW Management, Survey, Policies and Perspectives of BMW Management

Unit 3:
Record Keeping, Management of Bio-medical Waste, Technologies for Treatment for BMW, Criteria for selecting appropriate Medical Waste Technologies

Unit 4:
Training, Occupational Safety and Health Issues

Unit 5:
Legal Aspects and Environment Concern, Implementation of Action Plan, Approaches to Common Regional facility

Course outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: This subject develops idea about the concepts of waste generation and disposal, planning and perspectives of BMW management.	2	2	3	2	2
CO2: It imparts knowledge on record keeping, biomedical waste management and BMW treatment technologies.	2	3	2	2	1
CO3: It helps to gain concept on occupational safety and health issues, legal aspects and environmental concern and approaches to common regional facilities.	3	2	3	1	2

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

SEMESTER IV

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-401 HEMATOLOGY AND BLOOD BANKING-II(THEORY) 45HOURS

Objective

- This subject will enable the students to understand about leukaemia, its classification and laboratory investigation, disorders of platelets, bleeding, coagulation, thrombosis and blood parasites.
- This subject will provide knowledge on principles of blood banking, blood group determination, anticoagulants, blood collection, preparation and storage of blood components.
- Students would understand the basics of transfusion medicine, laboratory testing, quality control and apheresis techniques.

Course content

Unit-I

Leukemia and its classification, WHO and FAB classification, AML, ALL, CML, CLL, its etiology, clinical features, laboratory investigations Cytochemistry involved in diagnosis of various types of leukemia.

Unit-II

Qualitative and quantitative disorders of platelets, hypercoaguable test, Disorders of secondary hemostasis, hemophilia and its lab diagnosis,Von- Willebrand disease, Disseminated intravascular coagulation, thrombosis, Disorder of fibrinogen, test for bleeding & coagulation disorders,correction, studies for factor deficiency, quantitative factor assay

Unit- III

LE cells, its demonstration and significance, lupus anticoagulants, Blood parasites, Malaria, Trypanosomes, Filariasis, Leishmania

Unit-IV

Basic Principles of Blood Banking, Antigen, Antibody, naturally occurring antibody, Complement, ABO & Rh blood group system, Methods of blood group determination, Forward and Reverse grouping, Slide & Tube method, Gel method.

Unit-V

Other blood group system such as Lewis, MNS, Kell Duffy etc. Anticoagulants and preservative used in blood bank, Donor selection criteria, Blood collection and processing

Unit-VI

Transfusion transmissible infectious disease screen, Coomb'test, Cross matching, Compatibility testing, Antibody Screening & Identification, Grading of Reaction/Agglutination

Unit-VII

Blood components and its preparation, preservation, storage and transportation. Indications for different blood component transfusion, Blood transfusion reaction and its type, HDN Introduction of stem cell banking and bone marrow transplantation.

Unit-VIII

Apheresis, indications of hemapheresis, plasmapheresis, plateletspheresis, plasmapheresis Quality control of reagents, equipment, blood components used in transfusion medicine. Role of NACO, Indian Red Cross Society, DGHS and blood transfusion services.

Course outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: This subject will enable the students to understand about leukaemia, its classification and laboratory investigation, disorders of platelets, bleeding, coagulation, thrombosis and blood parasites.	2	3	1	2	2
CO2: This subject will provide knowledge on principles of blood banking, blood group determination, anticoagulants, blood collection, preparation and storage of blood components.	3	2	3	2	2
CO3: Students would understand the basics of transfusion medicine, laboratory testing, quality control and apheresis techniques.	2	2	1	2	1

BML-491 HEMATOLOGY AND BLOOD BANKING-II (LAB) 3HOURS/WEEK

Objective

- This subject develops practical skills among students regarding testing of different blood samples in the laboratory required for the diagnosis of different pathological conditions.
- Its objective is to enable the students to perform different tests such as sickling test, fetal haemoglobin, LAP scoring, total platelet count, PT and APTT.
- It also helps to perform thrombin time, haemoglogin electrophoresis, D-dimer test and derermination of fibrinogen concentration.

Course content

1. Staining of bone marrow
2. To perform sickling test.
3. To determine fetal haemoglobin
4. To perform Heinzbodies
5. Demonstration of leukemicslides
6. To perform LAP scoring
7. To determine total platelet count
8. To perform PT
9. To perform APTT
10. To perform thrombintime.
11. To perform D-dimertest.
12. To determine fibrinogen conc.
13. General blood Picture
14. To demonstrate malarial slide
15. Haemoglobin electrophoresis
16. Demonstration of hemoparasites like trypanosomes, Filaria, Malaria

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject develops practical skills among students regarding testing of different blood samples in the laboratory required for the diagnosis of different pathological conditions.	3	2	2	1	1
CO2: Its objective is to enable the students to perform different tests such as sickling test, fetal haemoglobin, LAP scoring, total platelet count, PT and APTT.	3	3	2	2	-
CO3: It also helps to perform thrombin time, haemoglogin electrophoresis, D-dimer test and determination of fibrinogen concentration.	3	2	1	2	1

BML-402 CLINICAL BIOCHEMISTRY- II(THEORY) 45HOURS

Objective

- This subject will enable the students to know about the classification, structure functions and assay of enzymes, isoenzymes and coenzymes, enzyme kinetics and enzyme inhibition.
- It will impart knowledge on basic concepts of automation, principle, working and maintenance of various clinical chemistry analyzers, point of care testing and Hospital Laboratory Management.

Course content

Unit-I

Introduction to enzymes, Classification of Enzymes, Isoenzymes, Concept of lock and key and induced fit theory, concept of activation energy and binding energy. Factors affecting enzyme activity

Unit-II

Coenzyme: Classification, various types and function, structure of NAD+, NADP+, FAD and FMN, PPP. Units for measuring enzyme activity, factors affecting enzyme level in serum/plasma. Clinical assay &its type, kinetic assay and end point assay for the enzymes

Unit-III

Enzyme kinetics, the Michaelis-Menten equation and its physiological significances, Enzyme Inhibition, types of inhibitors of enzyme

Unit-IV Isoenzymes, their tissue distribution and clinical significance: ALT, AST, ALP, GGT, CPK, CK- MB, LDH, Troponin, Myoglobin, Amylase, Lipase, ACP

Unit-V

Basic Concepts of Automation, principle, working and maintenance of various clinical chemistry analyzers, point of care testing, Hospital Laboratory Management

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject will enable the students to know about the classification, structure functions and assay of enzymes, isoenzymes and coenzymes, enzyme kinetics and enzyme inhibition.	3	3	2	1	-
CO2: It will impart knowledge on basic concepts of automation, principle, working and maintenance of various clinical chemistry analyzers, point of care testing and Hospital Laboratory Management.	2	2	-	1	1

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BML-492 -CLINICAL BIOCHEMISTRY-II (LAB) 3HOURS/WEEK

Objective

- This helps determination of T3, T4, TSH, LH, FSH and Prolactin conc. in serum sample.
- It also helps to perform TRIPLE test, male and female fertility test and Beta HCG.

Course content

1. Preparation of hemolysate
2. To determine T_3conc. in serum sample.
3. To determine T_4conc. in serum sample.
4. To determine TSH conc. in serum sample.
5. To determine LH conc. in serum sample.
6. To determine FSH conc. in serum sample.
7. To determine Prolactin conc. in serum sample.
8. To determine TSH conc. in serum sample.
9. To perform TRIPLEtest.
10. Demonstration of male and female infertilitytest.
11. Beta HCG

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This helps determination of T3, T4, TSH, LH, FSH and Prolactin conc. in serum sample.	3	1	2	3	-
CO2: It also helps to perform TRIPLE test, male and female fertility test and BetaHCG.	3	2	2	3	1

BML-403 BACTERIOLOGY, IMMUNOLOGY AND PARASITOLOGY(THEORY) 45HOURS

Objectives

- This subject helps to develop knowledge on the concept of immunity, antigens.
- It provides information on laboratory testing of antigen and antibodies

using different techniques, rheumatological diseases and their laboratory

investigations.

- This paper aims to learn about introduction, general characteristics, life cycle

and laboratory diagnosis of various medically important parasites.

Course content

Unit-I

Historical background, general concepts of the immune system, innate and adaptive immunity; active and passive immunity; primary and secondary immune response. Cell and organs of immune system, Phagocytosis.

Unit-II

Antigens and haptens: Properties,foreignness, molecular size, heterogeneity, Band T cell epitopes; T-dependent and T-independent antigens. Antibodies: Historical perspective of antibody structure; structure, function and properties of the antibodies; different classes, subclasses and biological activities of antibodies; concepts of antibody diversity, isotype, allotype, Introduction of hybridoma technology, monoclonal antibodies, polyclonal antibody

Unit-III

Mechanism of humoral and cell mediated immune response. Introduction of Major Histocompatibility Complex, organization of MHC and inheritance in humans; Antigen presenting cells, antigen processing and presentation, Complement system and complement fixation test.

Unit-IV

Laboratory tests for demonstration of antigen – antibody reaction such as agglutination, precipitation, ELISA, RIA, Immunofluorescence,

Unit-V

Rheumatological diseases, etiology and pathogenesis and lab investigations

Unit-VI

Introduction of parasites, host, zoonosis, host parasites relationship, sources of infection, mode of infection, pathogenesis, immunity in parasitic infection

Lab diagnosis- Entamoebahistolytica, Malarial Parasites, Leishmania, Trypanosomes, their morphology, life cycle, pathogenesis, clinical features and lab diagnosis.

Helminthology: Introduction and classification, Taeniasolium, Taenia Saginata, Fasciola, Ascaris, Wuchereria bancrofti their morphology, life cycle, pathogenesis, clinical features and lab diagnosis. Hookworm, Trichuris. Dracunculus their morphology, life cycle, pathogenesis, clinical features and labdiagnosis

Unit-VII

Diagnostic methods in Parasitology: Introduction, Examination of stool, urine, blood, Culture methods, Immunological diagnosis andserology

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Course outcome	Programme Outcome				
	Content Knowledge	Critical Thinking and Discovery	Awareness and Understanding	Programming and Assessment	Leadership and Engagement
	PO 1	PO 2	PO 3	PO 4	PO 5
CO1: This subject helps to develop knowledge on the concept of immunity, antigens.	3	2	3	-	-
CO2: It provides information on laboratory testing of antigen and antibodies using different techniques, rheumatological diseases and their laboratory investigations.	3	1	3	-	-
CO3: This paper aims to learn about introduction, general characteristics, life cycle and laboratory diagnosis of various medically important parasites.	3	1	3	-	-

BML-493 BACTERIOLOGY, IMMUNOLOGY AND PARASITOLOGY (LAB)
3HOURS/WEEK

Objective

- This practical subject demonstrates microscope and its parts, autoclave, hot air oven and sterilization of glass-wares.

- It also demonstrates different staining techniques like Gram staining, Acid fast staining, Indian ink staining, and staining of bacterial spores.

- It also develops skill among students to perform RA test, WIDAL test, RPR test and CRP test.

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Course content

1. Demonstration of Microscope and its parts
2. Demonstration of glassware used in microbiology.
3. Demonstration of autoclave and sterilization of glass-wares.
4. Demonstration of Hot air oven and sterilization of glass-wares.
5. To perform Gram staining
6. To perform Acid fast staining (Zeihl-Neelsen staining)
7. To perform Indian ink staining
8. To perform Hanging drop method
9. Demonstration of capsule
10. Staining of bacterial spores
11. To demonstrate agglutination reaction.
12. To perform RA test
13. To perform WIDAL test
14. To perform RPR test.
15. To perform CRP test.

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This practical subject demonstrates microscope and its parts, autoclave, hot air oven and sterilization of glasswares.	3	1	2	-	-
CO2: It also demonstrates different staining techniques like Gram staining, Acid fast staining, Indian ink staining, and staining of bacterial spores.	3	1	2	-	-
CO3: It also develops skill among students to perform RA test, WIDAL test, RPR test and CRP test.	3	1	2	-	-

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-404 COMMUNITY MEDICINE(THEORY) 45HOURS

Objective

- This subject develops concept on history, environment relationship, levels of prevention with examples related to few diseases of national importance.
- It provides knowledge on mode of transmission and method of control of diseases, using of appropriate disinfection methods in the laboratory.
- It helps to understand Health services, health care and the role of laboratory technicians in primary health care.
- It provides information on National Programmes of Health and Disease Eradication /Control, Demography & Population Control and Biostatistics, Environmental Sanitation and Health Education.

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Content

Unit I

Natural History of Disease: Determinants of health, multi – factorial causation of disease host, agent, and environment relationship primary, secondary and tertiary levels of prevention with examples related to few diseases of national importance.

Unit II

Mode of Transmission of Disease: Air – borne, vector and vehicle transmission; Methods of control with examples for control of each mode.

Unit III

Disinfection: Disinfection of the infective materials received in the Laboratory by using the appropriate disinfection methods, at the health centre level.

Unit IV

Health Services: Brief description of organization of health services at the centre and state levels; Primary Health Care - Definition, components and principles of primary health care; Health for all indicators; Primary Health Centre - The functions, staffing pattern and the role of laboratory technicians in primary Health Centre.

Unit V

National Programmes of Health and Disease Eradication /Control: Health Programmes Family Welfare Programme, National Programme for water supply and sanitation, Nutritional Programmes, Immunization and universal immunization programme; Disease Eradication programme - Leprosy &Guniea worm; Disease control programmes - Tuberculosis, Malaria, Filaria, S.T.D, Goitre, Cholera and other diarrhaeal diseases and National Programme for prevention of blindness including trachoma.

Unit VI

Demography & Population Control: The factors influencing population growth, death rate, birth

rate and methods of contraception.

Unit VII

Biostatistics: Application of statistical principles in history; Presentation of data, calculation of mean, median and mode, range and standard deviation and their significance; Significance of 'T' test, Chi square values.

Unit VIII

Environmental Sanitation: Methods of water purification and disinfection, collection of water samples, their transport and bacteriological analysis; Methods of excreta disposal.

Unit VIII

Health Education: Definition, principles, objectives, purpose, types and AV aids; Communication - definition, process and types, Behavioral change communication; IEC (Information education and communication) - aims, scope, concept and approaches; Inter personal relationship - Co-ordination and co-operation in health education with other members of the health team; Teaching and learning process, concept, characteristics of leaner and educator; Role and skill of health professional in Health Education.

Course outcome	**Programme Outcome**				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject develops concept on history, environment relationship, levels of prevention with examples related to few diseases of national importance.	3	3	3	2	3
CO2: It provides knowledge on mode of transmission and method of control of diseases, using of appropriate disinfection methods in the laboratory.	3	3	3	2	3
CO3: It helps to understand Health services, health care and the role of laboratory technicians in primary health care.	3	3	3	2	3

CO4: It provides information on National Programmes of Health and Disease Eradication /Control, Demography & Population Control and Biostatistics, Environmental Sanitation and Health Education.	3	3	3	3	3

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B.M.L.

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

SEMESTER V

BML-501 VIROLOGY, MYCOLOGY AND APPLIED MICROBIOLOGY-I (THEORY) 45HOURS

Objective

- This subject emphasizes on Western blotting and other laboratory techniques, transplant immunology, autoimmune and immunological disorders and vaccination.
- This subject will enable to identify various viruses with latest biomedical techniques and demonstrate the diseases associated with them

Course Content

Unit- I

Western blotting, Immunodiffusion, Immuno-electrophoresis, Hypersensitivity and its types Introduction to Allergy and its laboratory test

Unit-II

Introduction of transplant immunology, graft rejection, tissue typing for kidney and bone marrow transplant, Laboratory test for transplant

Unit –III

Autoimmune disorders, pathogenesis, organ specific and systemic autoimmune disorders and its markers such parietal cell antibody, anti-sperm antibody, lupus anticoagulants, anti-mitochondrial antibody, ANA, ds DNA, HLA-B27, ASMA, anti
CCP

Unit-IV

Immunological disorders: primary and secondary immunodeficiency, SCID, AIDS, Tumour, types of tumours, Various Tumour Markers, their significance and method of estimation.

Unit-V

Vaccines, classification and applications, Active and passive immunization, Immuno prophylaxis schedule in neonates, children and in pregnancy

Unit VI

Nature and Properties of Viruses, Introduction: Discovery of viruses, nature and definition of viruses, general properties, concept of viroids, virusoids, satellite viruses and Prions. Structure of Viruses: Capsid symmetry, enveloped and non-enveloped viruses

Isolation, purification and cultivation of viruses, Viral taxonomy: Classification and nomenclature of different groups of viruses, Modes of viral transmission: Persistent, non-persistent, vertical and horizontal. Viral multiplication and replication strategies: Interaction of viruses with cellular receptors and entry of viruses. Assembly, maturation and release of virions

Unit- VII

Poxviruses, Herpesviruses, hepaptitis viruses, retroviruses-HIV, Picorna viruses, rhabdoviruses, orthomyxoviruses and paramyxo viruses, TORCH profile, Symptoms, mode of transmission, prophylaxis and control of Polio, Herpes, Hepatitis, Rabies, Dengue, HIV, Influenza with brief description of swine flu, Ebola, Chikungunya, Japanese Encephalitis

Unit VIII

Introduction to oncogenic viruses, Types of oncogenic DNA and RNA viruses, concepts of

oncogenes and proto-oncogenes, prevention & control of viral diseases, antiviral compounds and their mode of action, interferon and their mode of action, General principles of viral vaccination

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject emphasizes on Western blotting and other laboratory techniques, transplant immunology, autoimmune and immunological disorders and vaccination.	3	-	1	-	-
CO2: This subject will enable to identify various viruses with latest biomedical techniques and demonstrate the diseases associated with them	3	-	2	-	-

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-591 VIROLOGY, MYCOLOGY AND APPLIED MICROBIOLOGY-I (LAB) 3HOURS/WEEK

Objective

- This subject develops practical skill among students regarding microbiological diagnosis of diseases caused by virus and fungi.
- It helps to perform Leishman staining for malarial parasites, HBsAg by ELISA, HIV Tridot method, HIV by ELISA and TORCH profile.
- It also develops hands on skills on determination of PCRHBV, PCR HIV Viral load, Aldehyde Chopra test for Kala Azar, Zinc sulphate conc. for stool sample, and Serological diagnosis of Leishmania.

Course content

1. Leishman staining for malarial parasites
2. Demonstration of permanent slide of Trichuris, Ascaris and Hookworm
3. Saline wet mount for observing ova and eggs of parasites.
4. Iodine wet mount for observing ova and eggs of parasites.
5. Concentration of stool samples by floatation method
6. Zinc sulphate conc. Method for stool sample
7. Demonstration of various parasites by permanent slides.
8. Concentration of stool sample by sedimentation method
9. Serological diagnosis of Leishmania
10. Aldehyde Chopra test for Kala-Azar
11. To perform HBsAg/ Australia Ag by rapid method
12. To perform HBs Ag by ELISA
13. To perform HIV Tridot method.
14. To perform HIV by ELISA
15. To perform TORCH profile
16. Demonstration of PCRHBV
17. Demonstration of PCR HIV Viral load.

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course objective	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**

CO1: This subject develops practical skill among students regarding microbiological diagnosis of diseases caused by virus and fungi.	3	2	2	3	-
CO2: It helps to perform Leishman staining for malarial parasites, HBsAg by ELISA, HIV Tridot method, HIV by ELISA and TORCH profile.	3	2	2	3	-
CO3: It also develops hands on skills on determination of PCRHBV, PCR HIV Viral load, Aldehyde Chopra test for Kala Azar, Zinc sulphate conc. for stool sample, and Serological diagnosis of Leishmania.	3	2	2	3	-

BML-502 HISTOPATHOLOGY AND CYTOPATHOLOGY TECHNIQUE (THEORY) 45HOURS

Objective

- This paper aims to understand the principle, procedure & demonstration of various tissue constituents and advance tools.
- Students would be able to perform various staining techniques and understand principle and application of various techniques.
- It imparts concepts on immunohistochemistry, microtomes, sex chromatin, electron microscopy and fluorescence microscopy.

Course content Unit-I

Staining of carbohydrates: preparation of Schiff reagent, PAS staining, Alcian blue, staining of glycogen, Amyloid, other staining method. Connective tissue & its staining: Trichrome staining, verhoeff stain, Weigert Resorcin stain, Gordon's and Sweet stain, Gomori's method, von Geison stain, PTAH stain

Unit-II

Demonstration of minerals and pigments in tissue sample, Demonstration and identification of lipids, Demonstration of enzymes, diagnostic application and the demonstration of phosphatases, dehydrogenases, oxidases and peroxidases, Demonstration of microorganism on tissue specimens, Bacteria, AFB, Actinomyces, spirochetes, fungi

Unit-III

Demonstration of nucleic acids, Processing and staining of bone marrow sample. Fixation, Processing and section cutting of bones, eye ball, Techniques in neuropathology: Neurons staining, Myelin, Neuropathology lab specimen handling

Unit-IV

Demonstration of sex chromatin, Museum techniques, Electron microscopy: Principle and working, fixation, processing and staining of tissue Fluorescence Microscope: Principle and working

Unit- V

Immunohistochemistry: principle, types, applications, antigen retrieval, APAAP, PAP Staining, Quality control in histopathology

Unit-VI

Microtome, its type and working, various type of microtome, Microtome knives, its type and knife sharpening, Section cutting, fault and remedies, Section adhesive

Unit-VII

Cryostat, frozen sections of fresh, fixed and unfixed tissue, freeze drying, rapid frozen sections and staining for emergency diagnosis, Dye chemistry, Stains and dyes, natural dye, acidic dye, basic dye, neutral dyes, fluorescence dye, mordant, accelerators, accentuators, metachromasia, metachromatic dyes

Unit- VIII

Progressive, regressive, vital, supravital staining, types of hematoxylin, Haematoxylin and eosin staining, use of control sections in tissue staining, mounting and mounting media, advantages & disadvantages, refractive index

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This paper aims to understand the principle, procedure & demonstration of various tissue constituents and advance tools.	3	-	2	-	-
CO2: Students would be able to perform various staining techniques and understand principle and application of various techniques.	3	-	2	-	-
CO3: It imparts concepts on immunohistochemistry, microtomes, sex chromatin, electron microscopy and fluorescence microscopy.	3	-	-	-	-

BML-592 HISTOPATHOLOGY AND CYTOPATHOLOGY TECHNIQUES (LAB) 3HOURS/WEEK

Objective

- This practical based subject aims to demonstrate glasswares and equipments used in histopathology lab.
- It provides knowledge to prepare alcohol of different concentrations, formalin from stock solution and Grossing of tissue.
- This also helps to perform tissue processing by manual method, section cutting of paraffin embedded tissue, hematoxylin and eosin staining, PAP staining and also preparation of various cytological fixatives and stains used in cytology.

Course content

1. Demonstration of glass wares and equipment used in histopathology lab.
2. To prepare alcohol of different concentration.
3. To prepare formalin from stock solution.
4. To sharp knife by honing and stropping.

5. Grossing of tissue
6. To perform tissue processing by manual method.
7. To perform section cutting of paraffin embedded tissue.
8. To fix the smear on glass-slide.
9. To perform hematoxylin and eosin staining.
10. Preparation of various cytological fixatives
11. Preparation of various stains used in cytology
12. Preparation of smear
13. To perform PAP staining
14. To perform Giemsa staining on fluid sample
15. To prepare cell suspension
16. Processing of various fluid samples

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This practical based subject aims to demonstrate glass-wares and equipments used in histopathology lab.	3	-	-	-	-
CO2: It provides knowledge to prepare alcohol of different concentrations, formalin from stock solution and Grossing of tissue.	3	-	-	-	-
CO3: This also helps to perform tissue processing by manual method, section cutting of paraffin embedded tissue, hematoxylin and eosin staining, PAP staining and also preparation of various cytological fixatives and stains used in cytology.	3	2	1	3	-

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BML-503 HISTOTECHNOLOGY (THEORY) 45HOURS

Objective

- This paper aims to understand the principle, procedure & demonstration of various tissue constituents and advance tools.
- It helps to understand histopathology, types of tissues, instruments and equipments used in cytology, aspiration and exfoliative cytology, sex chromatin determination and automated screening devices.

Course content

Unit-I

Cell: basic structure and function, cell organelles, cell cycle, Benign and Malignant tumors, Instruments used in cytology, preparation of buffers, stains, Microscopy: Light, compound, phase contrast, fluorescence

Unit-II

Introduction of histopathology, cytology & histo techniques, laboratory organization, care & maintenance of equipments used in histotechnology lab, Safety measures in histotechnology lab Reception, Recording, Labelling and transportation of tissue specimens, Basic concepts of fixation and various types of fixative used in histopathology and cytopathology

Unit-III

Tissue and its types, Location and function, Grossing of tissues, whole mount, sections, smears, tissue processing and its steps, manual and automated method, components & principle of automatic tissue processor. Decalcification, decalcification methods, types of decalcifying fluid, Processing of bones and teeth, Embedding media, its type and properties

Unit- IV

Instruments and equipments used in cytology Fixation and Fixatives used in cytology, Adhesive and mounting media, Cell block and cytospin technique, Staining such as PAP, Diff-quick, MGG, H&E, Shorr staining, significance of PAP-HPV, Destaining and restaining of slides, Cover slipping

Unit-V

Aspiration and exfoliative cytology, Patient preparation, Sample collection, Fixation, Processing and Staining FNAC, collection, processing of sample and staining, on site quick staining procedure

Unit-VI

Pap staining, Progressive & Regressive, Hormonal cytology in different agegroups,Collection and processing of sputum, BAL, CSF, Pleural, peritoneal and pericardial fluid, Gynaecologic sample

Unit-VII

Sex chromatin demonstration, Introduction of Immunocytochemistry, different markers and its applications, Automation in cytology, Liquid based preparation & automated screening device

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	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This paper aims to understand the principle, procedure & demonstration of various tissue constituents and advance tools.	3	-	1	-	-
CO2: It helps to understand histopathology, types of tissues, instruments and equipments used in cytology, aspiration and exfoliative cytology, sex chromatin determination and automated screening devices.	3	-	1	-	-

BML-504 CLINICAL ENZYMOLOGY & AUTOMATION (THEORY) 45HOURS

Objective

- This course has been formulated to impart comprehensive knowledge of enzymes and automation in Clinical Laboratory.
- It helps to understand contemporary methods and practical approaches that are used in the clinical laboratories for the investigation of the diseased state as well as application of automation in laboratory.

Course content

Unit-I

Introduction to enzymes, Classification of Enzymes, Isoenzymes, Concept of lock and key and induced fit theory, concept of activation energy and binding energy. Factors affecting enzyme activity

Unit-II

Coenzyme: Classification, various types and function, structure of NAD+, NADP+, FAD and FMN, PPP. Units for measuring enzyme activity, factors affecting enzyme levelinserum/plasma. Clinicalassay&itstype, kineticassayand end point assayfor theenzymes

Unit-III

Enzyme kinetics, the Michaelis-Menten equation and its physiological significances, Enzyme Inhibition, types of inhibitors of enzyme

Unit-IV

Isoenzymes, their tissue distribution and clinical significance: ALT, AST, ALP, GGT, CPK, CK- MB, LDH, Troponin, Myoglobin, Amylase, Lipase, ACP

Unit-V

Basic Concepts of Automation, principle, working and maintenance of various clinical chemistry analyzers, point of care testing, Hospital Laboratory Management

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This course has been formulated to impart comprehensive knowledge of enzymes and automation in Clinical Laboratory.	3	-	1	-	-
CO2: It helps to understand contemporary methods and practical approaches that are used in the clinical laboratories for the investigation of the diseased state as well as application of automation in laboratory.	3	-	2	-	-

SEMESTER VI

BML-602: ESSENTIALS OF MEDICAL PHARMACOLOGY(THEORY) 45HOURS

Objective

- This subject provides knowledge about hormones, their mechanism of action, their disorders and testing procedures.
- It also develops knowledge on toxicology, alcohol poisoning, poisoning from metals, spot tests, hair and urine test and immunoassay for drugs.

Course content Unit-I

Hormones, Classification of hormones, organs of endocrine system their secretion and function, regulation of hormone secretion, Mechanism of action

Unit-II

Thyroid function test: Thyroid hormones, biological function, hypothyroidism, hyperthyroidism, Determination of T_3, T_4, TSH, FT_3, FT_4, TBG, Disorder associated with thyroid dysfunction.

Unit-III

Infertility profile: LH, FSH, TSH, Estrogen, Progesterone, Total Testosterone, Freetestosterone, DHEA-S,17-Ketosteroids, Prolactin, their estimation and clinical significance, reference range, hypo and hyper secretion, TripleTest

Unit-IV

Growth hormone, ACTH, Aldosterone, Cortisol their estimation and clinical significance, reference range, hypo and hyper secretion

Unit-V

Introduction of Toxicology, Alcohol poisoning, Lead poisoning, Zinc poisoning, Mercury poisoning drugs abuse, screening procedure for drug screening, Spot tests, hair and urine test, Immunoassay for drugs.

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject provides knowledge about hormones, their mechanism of action, their disorders and testing procedures.	3	-	2	-	-
CO2: It also develops knowledge on toxicology, alcohol poisoning, poisoning from metals, spot tests, hair and urine test and immunoassay for drugs.	3	-	2	-	-

JIS UNIVERSITY

[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-603: BIOMEDICAL TECHNIQUES, LAB MANAGEMENT AND ETHICS(THEORY)

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Objective

- This subject emphasizes on different modern analytical techniques such as chromatography, electrophoresis, centrifugation and immunoassay.
- It helps the students to understand the safety precautions in a clinical laboratory, methods of sample accountability and sample analysis.
- It also provides idea about quality management system, audit in a medical laboratory, frequency of audit and documentation.

Course content Unit-I

Chromatography, its principle, types and applications.Paper Chromatography, Thin layer chromatography, HPLC, Gas liquid chromatography, Ion exchange chromatography and their application in diagnosis.

Unit-II

Basic Principle of electrophoresis, Paper electrophoresis, Gel electrophoresis, PAGE, SDS-PAGE, Agarose gel electrophoresis, buffer systems in electrophoresis. Electrophoresis of proteins and nucleic acids, haemoglobin, immunoglobulin's, isoenzymes Applications of electrophoresis in clinical diagnosis.

Unit-III

Centrifugation, fixed angle and swinging bucket rotors, RCF and sedimentation coefficient, differential centrifugation, density gradient centrifugation and Ultra centrifugation.

Unit-IV

Radioisotopes, Radioactivity, instruments for radioactivity measurement, applications of radioisotopes in clinical biochemistry

Unit-V

Immunoassay: ELISA, RIA, FIA, FACS and their applications in clinical diagnosis.

Unit-VI

Ethical Principles and standards for a clinical laboratory professional duty to the patient, duty to colleagues and other professionals, Good Laboratory Practice (GLP) Introduction to Basics of GLP and Accreditation, Aims of GLP and Accreditation,
Advantages of Accreditation, Brief knowledge about National and International Agencies for clinical laboratory accreditation

Unit-VII

Awareness/Safety in a clinical laboratory, General safety precautions. HIV: pre- and post-exposure guidelines, Hepatitis B & C: pre- and post- exposure guidelines, Drug Resistant Tuberculosis. Patient management for clinical samples collection,
transportation and preservation, Sample accountability, Purpose of accountability, Methods of accountability

Unit-VIII

Sample analysis: Introduction, factors affecting sample analysis, reporting results, basic format of a test report, reported reference range, clinical alerts, abnormal results, results from referral laboratories, release of examination results, alteration in reports

Unit-IX

Quality Management system: Introduction, Quality assurance, Quality control system, Internal and External quality control, quality control chart, Biomedical Introduction and importance of calibration and Validation of Clinical Laboratory instrument, Ethics in Medical laboratory Practice, Ethics in relation to Pre-Examination procedures, Examination procedures, reporting of results, preserving medical records, Procurement of equipment and Inventory Control,

Unit-X

Audit in a Medical Laboratory, Introduction and Importance, NABL & CAP, Responsibility, Planning, Horizontal, Vertical and Test audit, Frequency of audit, Documentation

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject emphasizes on different modern analytical techniques such as chromatography, electrophoresis, centrifugation and immunoassay.	3	-	1	-	-
CO2: It helps the students to understand the safety precautions in a clinical laboratory, methods of sample accountability and sample analysis.	3	-	-	1	-
CO3: It also provides idea about quality management system, audit in a medical laboratory, frequency of audit and documentation.	3	-	-	1	2

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML- 601 DIAGNOSTIC MOLECULAR BIOLOGY(THEORY) 45HOURS

Objective

- The students will understand the basics of transcription apparatus and different transcription factor used
- They will understand the principle, types and application of different PCR techniques.
- They will gather knowledge about blotting techniques, chromosomes, their structures and related disorders, nucleic acids & their synthesis, effect of different enzymes in DNA replications.
- They will understand the concept of radioisotopes and their applications in the field of diagnosis.

Course content

Unit I

Basic transcription apparatus, Initiation, elongation and termination of transcription, Eukaryotic Transcription of mRNA, tRNA and rRNA, types of RNA polymerases, transcription factors Introduction of translation

Unit-II Nucleic acid amplification testing, PCR, Principle, Types, applications, Thermal cycler, RT-PCR, reverse transcriptase PCR, Nested PCR

Unit-III

Blotting techniques, southern blotting and Western blotting Introduction to chromosomes, its structure and disorder, Karyotyping,
Chromosomal studies in hematological disorders (PBLC and Bone marrow), FISH

Unit-IV

Radioisotopes and its application in measurement of blood volume, determination of red cell volume and plasma volume, red cell life span, platelet lifespan, radiation hazards and its prevention disposal of radioactive material
Introduction and applications of Flow cytometry, Stem cell banking, Prenatal Diagnosis

Unit-V

Nucleic Acids, DNA, RNA, composition, structure, types, denaturation and renaturation of DNA, chemistry of DNA synthesis, general principles of replication, enzyme involved in DNA replication DNA polymerases, DNA ligase, primase, telomerase and other accessory proteins.

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: The students will understand the basics of transcription apparatus and different transcription factor used	3	-	1	1	-
CO2: They will understand the principle, types and application of different PCR techniques.	3	1	1	1	-
CO3: They will gather knowledge about blotting techniques, chromosomes, their structures and related disorders, nucleic acids & their synthesis, effect of different enzymes in DNA replications.	3	1	1	1	-
CO4: They will understand the concept of radioisotopes and their applications in the field of diagnosis.	3	1	1	1	-

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML691 -DIAGNOSTIC MOLECULAR BIOLOGY(LAB) 3HOURS/WEEK

Objective

- This subject develops skills among students regarding Isolation of DNA, separation of DNA by Agarose gel electrophoresis and karyotyping.

- It also demonstrates methods to perform PCR HLAB-27, PCRHIV and PCRMTB.

Course content

1. Isolation of DNA
2. Separation of DNA by Agarose gel electrophoresis
3. Demonstration of thermal cycler and PCR.
4. HIV test by Western Blotting
5. To perform karyotyping
6. Demonstration of PCR HLAB-27
7. Demonstration of PCR HIV
8. Demonstration of PCR MTB

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: This subject develops skills among students regarding Isolation of DNA, separation of DNA by Agarose gel electrophoresis and karyotyping.	3	1	1	2	-
CO2: It also demonstrates methods to perform PCR HLAB-27, PCRHIV and PCRMTB.	3	1	1	2	-

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[Syllabus for Bachelor of Medical Laboratory Technology (BMLT)

BML-692: HOSPITAL INTERNSHIP AND PROJECT

Objective

- The aim of this training program is to depute students to various labs of Pathology department wherein they shall perform practical training of handling patients, collection and processing of blood, urine, sputum, stool and body fluid samples.
- This will help students learn to identify patient's particulars based on CR number, Lab Number and transfer of samples from collection centres to different labs, and also to learn process of performing various tests in different labs.

Students shall be deputed to various labs of Pathology department wherein they shall undergo practical training of handling patients, collection and processing of blood, urine, sputum stool and body fluids samples.

Identification of patient's particulars based on CR number, Lab Number and transfer of samples from collection centres to different labs. Process of performing various tests in different labs. Each student is required to maintain a logbook of the various posting.

Student's performance shall be evaluated on continuous basis by the faculty posted in various sections. The faculty shall submit the assessment records of each student posted in his/her section on monthly basis to the HOD. Marks will be awarded out of 100.

	Programme Outcome				
	Content Knowledge	**Critical Thinking and Discovery**	**Awareness and Understanding**	**Programming and Assessment**	**Leadership and Engagement**
Course outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO1: The aim of this training program is to depute students to various labs of Pathology department wherein they shall perform practical training of handling patients, collection and processing of blood, urine, sputum, stool and body fluid samples.	3	-	3	3	2
CO2: This will help students learn to identify patient's particulars based on CR number, Lab Number and transfer of	3	-	2	2	3

samples from collection centres to different labs, and also to learn process of performing various tests in different labs.					