SUMANDEEP VIDYAPEETH

(Declared as Deemed to be University under Section 3 of the UGC Act 1956)

Accredited by NAAC with a CGPA of 3.53 out of four-point scale at 'A' Grade

Category – I deemed to be university under UGC Act - 2018

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CURRICULUM
Bachelor of Science
(B.Sc)
MEDICAL LABORATORY TECHNOLOGY

Attested CTC

15/2/2021

Vice-Chancellor
Sumandeep Vidyapeeth
An Institution Deemed to be University
Vill. Piparia, Taluka: Waghodia.
Dist. Vadodara-391 760. (Gujarat)

Dean
Dr. K. Shah Med. Instt. & Rose. Centre

AMENDED UP TO DECEMBER -2020

INTRODUCTION

Scope

The quality of paramedical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses. Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that paramedical and healthcare professionals are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care.

Learning goals and objectives for paramedical healthcare professionals

The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres: 1. Clinical care

Program outcomes

- Perform routine clinical laboratory testing.
- Make specimen-oriented decisions on predetermined criteria including working knowledge of critical values.
- Communicate with other members of healthcare team, customers and patients in an effective manner.
- Process information and ensure quality control as appropriate to routine laboratory procedures.
- Train students in routine laboratory procedure.
- Upgrade knowledge and skills in a changing healthcare scenario.
- Should know the logical interpretation of clinical lab investigations.

Ethics and accountability

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as healthcare service providers. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice
- Employ professional accountability for the initiation, maintenance and termination of patient-provider relationships
- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality

Commitment to professional excellence

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare.

Eligibility for admission:
He/she has passed the Higher Secondary (10+2) Science or a duly constituted Board with pass marks in Physics, Chemistry, Biology

Duration of the course:
Duration of the course is 4 years including 1-Year internship after successful completion of three years

Attendance:
A candidate has to secure minimum 80% attendance in overall with at least-
1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Medium of instruction:
English shall be the medium of instructions for all the subjects of study and for examination of the course.

Assessment:
Assessments should be completed by the academic staff, based on the compilation of the student's theoretical & clinical performance throughout the training program me. To achieve this, all assessment forms and feedback should be included and evaluated. Student must attain at least 50% marks in each Theory, Internal assessment, and Practical independently / separately for each individual subject.

Course of Instruction:

Course Name	Course Code	Theory (In hrs.) (Class and lab)	Practical (In hrs.) (Clinical)
First Year - Total Hours 410			
Anatomy	BMLT101	60	40
Physiology	BMLT102	60	40
Biochemistry	BMLT103	60	40
Pathology & Microbiology	BMLT104	80	30
Total		**260**	**150**
Second Year - Total Hours 360			
Biochemistry	BMLT201	80	40
Pathology	BMLT202	80	40
Microbiology	BMLT203	80	40
Total		**240**	**120**
Third Year - Total Hours 360			
Biochemistry	BMLT301	80	40
Pathology	BMLT302	80	40
Microbiology	BMLT303	80	40
Total		**240**	**120**
Fourth Year			
Internship (Integrated Practice) - Total Hours 2184			

Scheme of Examination:

Course	Course Code	Assessment			
		Hours	Internal	External	Total
First Year					
Anatomy	BMLT101	3	20	80	100
Physiology	BMLT102	3	20	80	100
Biochemistry	BMLT103	3	20	80	100
Pathology & Microbiology	BMLT104	3	20	80	100
Total			**80**	**320**	**400**
Second Year					
Biochemistry	BMLT201	3	20	80	100
Pathology	BMLT202	3	20	80	100
Microbiology	BMLT203	3	20	80	100
Total			**60**	**240**	**300**
Third Year					
Biochemistry	BMLT301	3	20	80	100
Pathology	BMLT302	3	20	80	100
Microbiology	BMLT303	3	20	80	100
Total			**60**	**240**	**300**
Internship - Practical		2	20	80	100

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FIRST YEAR B.SC. MEDICAL LABORATORY TECHNOLOGY

BMLT101 ANATOMY (60 HOURS)

Unit 1- Organization

- Terms, terminology, planes
- Tissues of the body (General) Epithelial tissue
- Glands, mucous membrane.

Unit 2- Skeletal system

- Cartilage
- Bones
- Ossification, blood supply
- Joints
- Synovial joint

Unit 3 - Muscular tissue

- Muscle classification – I
- Muscle – II

Unit 4 - Nervous system

- Neuron, Neuroglia
- Spinal cord & Spinal nerves
- Parts of brain & major functions
- Cranial nerves
- Autonomic nervous system

Unit 5 - Sensory organs

- Nose & Olfaction
- Tongue

Unit 6 - Circulation & Lymphatic

- Systemic, Pulmonary, Portal
- Heart, chambers, valves
- Coronary circulation, Venous drainage, applied
- Major branches of aorta, major veins, pulse
- Femoral and Axillary artery
- Diaphragm
- Lymphoid tissue classification, structure I
- Lymphoid tissue classification, structure II
- Lymphatic drainage, lymphatic trunks

Unit 7- Respiratory system

- Larynx, Trachea

- Pleura & lung & structure
- Bronchopulmonary segments, Para nasal sinuses

Unit 8 - Digestive system

- Pharynx, Esophagus
- Stomach, Duodenum
- Liver, Gall bladder, Pancreas
- Jejunum, Ileum, Appendix
- Colon, Rectum, Anal canal

Unit 9 - Urinary system)

- Kidney
- Ureter, Urinary bladder
- Prostate, Urethra

Unit 10- Endocrine system

- Thyroid, Parathyroid
- Suprarenal
- Pituitary Pancreas**,**

Unit 11 - Reproductive system

- Female reproductive system
- Male reproductive

PRACTICALS: (40 HOURS)

- Human skeleton
- Organ systems
- Organs – 1
- Organs – 2
- Organs – 3
- Organs – 4
- Organs – 5
- Types of Cartilages
- Bones -1
- Bones -2
- Bones -3
- Histology of compact bones
- Muscles of body as functional groups
- Histology of types of muscles

BMLT102 PHYSIOLOGY (60 HOURS)

Unit 1 - General Physiology

- Introduction to cell physiology,

- transport across cell membrane
- Homeostasis, Body Fluid compartment & measurement

Unit 2 - Blood

- Introduction - composition and function of blood
- Plasma proteins
- Red blood cells.
- Hemoglobin
- WBC
- Platelets
- Homeostasis
- Blood Group

Unit 3 - Nerve - Muscle Physiology

- Resting membrane potential &Action potential
- Types of muscle& Mechanism of Muscle Contraction
- Neuromuscular Junction
- Neuron and neuroglia
- Properties of nerve fibre
- Secretion & Composition & function of CSF

Unit 4 - GIT

- Movement of GIT
- Deglutition & Mechanism of Vomiting
- Digestive Juices in upper digestive tract
- Digestive juices in lower digestive tract

Unit 5 - Excretory system

- Kidneys-structure, function
- Glomerular filtration rate
- Counter current mechanism of concentration of urine,
- micturition, Diuretics
- Artificial kidney, renal function tests
- Skin
- Regulation of body Temperature

Unit 6 - Respiratory system

- Mechanism of Breathing
- Hypoxia
- O2 and CO2 transport
- Pulmonary volume & Capacities

Unit 7 - Cardio Vascular System

- Introduction to CVS & general principles of circulation
- Properties of Cardiac muscle
- Cardiac cycle, heart sounds, Pulse
- Cardiac output, Heart rate ,BP ,ECG
- Coronary circulation, Cutaneous circulation-Triple response ,Shock
- Effects of exercise on CVS and Respiratory system

Unit 8 - Lymphatic System

Unit 9 - Endocrine System

- Hormones of pituitary, Thyroid
- Parathyroid Gland
- Hormones of Adrenal Gland & Pancreas

Unit 10 - Reproductive System

- Introduction to reproductive system, Puberty
- Male reproductive system,
- Female reproductive system,
- Physiological changes during pregnancy, pregnancy tests, parturition & lactation
- Male & Female contraceptive methods
- Special senses
- Vision
- Audition
- Olfaction
- Gustation

PRACTICALS: , (40 HOURS)

- Introduction and Laboratory guidelines
- Demonstration of estimation of Hemoglobin
- Practical of estimation of Hemoglobin
- Practical of BT & CT
- Practical of Blood Grouping
- ESR & PCV
- Blood Pressure
- Pulse
- Revision
- Heart rate & heart sound
- Breathing rate & breathing sound
- Identification of blood cells by peripheral smear. RBC, WBC, Platelets.
- Revisions

BMLT103 BIOCHEMISTRY (60 HOURS)

Paper I:Fundamentals of Clinical Biochemistry

- Introduction and scope of Clinical Biochemistry

- Functioning Clinical Laboratory: - Role of Medical Laboratory technologist, Code of Ethics.
- Laboratory Safety including Biomedical waste disposal
- Reagents: - Preparation, Formulation, storage, safety and uses.
- Collection and Preservation of Sample/specimen & anti-coagulants
- Chemistry of Body fluids: - Blood, CSF, Urine, Milk, Bile, Gastric Juice and Saliva.
- Buffers of Body system and pH regulation.
- Glassware's & plastic ware's used in laboratory and its calibration, cleaning, care and maintenance.
- Biophysics: -Osmosis, Dialysis, Viscosity, Surface tension, Colloids and Sedimentation, Osmotic Pressure and osmolality.
- Blood buffers and pH regulation.
- Cell biology:- Prokaryotic and Eukaryotic, cell organelles, subcellular fraction and its function
- Chemistry and Biomedical Importance of :
- Carbohydrate
- Proteins
- Lipids
- Nucleic acid.
- Enzymes:
- Vitamins
- Minerals
- Chemistry of Body fluids: - Blood, CSF, Urine, Milk, Bile, Gastric Juice and Saliva.

PRACTICALS: (40 HOURS)

- To demonstrate glassware's, apparatus and plastic wares used in laboratory.
- Preparation of different percentage solutions
- Preparation of normal and molar solutions. (0.1 N NaOH, 0.2N HCl, 0.1 M H_2SO_4).
- Reactions of Carbohydrate
- Reactions of Protein: - Precipitation and Color reaction.
- Analysis of Normal Urine:- Physical, Chemical and Microscopic
- Analysis of abnormal Urine:- Physical, Chemical and Microscopic
- Qualitative analysis of Saliva.
- Qualitative analysis of Milk
- Qualitative analysis of Bile.
- Qualitative analysis of CSF.
- Qualitative analysis of Gastric juice.

BMLT104 PATHOLOGY & MICROBIOLOGY (80 HOURS)

PATHOLOGY (40 HOURS)

Unit 1 - Histo Pathology

- Introduction to Histo Pathology
- Receiving of Specimen in the laboratory
- Grossing Techniques
- Mounting Techniques – various Mountants
- Maintenance of records and filing of the slides
- Use & care of Microscope

- Various Fixatives, Mode of action, Preparation and Indication. Section Cutting
- Tissue processing for routine paraffin sections
- Decalcification of Tissues.
- Staining of tissues - H& E Staining
- Bio-Medical waste management

Unit 2 - Clinical Pathology

- Introduction to Clinical Pathology
- Collection, Transport, Preservation, and Processing of various clinical Specimens
- Urine Examination – Collection and Preservation of urine. Physical, chemical, Microscopic
- Examination
- Examination of CSF and other body fluids.
- Sputum Examination.
- Examination of feces

Unit 3 – Hematology

- Introduction to Hematology
- Normal constituents of Blood, their structure and function.
- Collection of Blood samples
- Various Anticoagulants used in Hematology
- Various instruments and glassware used in Hematology, Preparation and use of glassware
- Laboratory safety guidelines
- SI units and conventional units in Hospital Laboratory
- Hb, PCV
- ESR
- Normal Hemostasis
- Bleeding Time, Clotting Time, Prothrombin Time, Activated Partial Thromboplastin Time.

Unit 4 - Blood Bank

- Introduction
- Blood grouping and Rh Types
- Cross matching

PRACTICALS: (15 HOURS)

- Urine Examination.
- Physical
- Chemical
- Microscopic
- Blood Grouping Rh typing.
- Hb Estimation, Packed Cell Volume[PCV], Erythrocyte Sedimentation rate{ESR]
- Bleeding Time, Clotting Time.
- Histopathology – Section cutting and H &E Staining.

MICROBIOLOGY (40 HOURS)

Unit 1- General Microbiology

History: Louis Pasteur, Robert Koch

- Microscope: Parts, function and its types
- Morphology of bacteria: classification of microorganisms, bacteria cell, staining of bacteria-Gram and ZN stain
- Physiology of bacteria: Growth and nutrition of bacteria, Growth curve
- Sterilization and disinfection: Dry heat, moist heat sterilization, filtration, Radiation, disinfectants use in hospital
- Culture media: simple and complex media, preparation and its use
- Culture methods: aerobic and anaerobic
- Identification of bacteria: catalase test, coagulase test, oxidase test, Urease test, IMViC TESTS

Unit 2 - Immunology

- Infection
- Immunity
- Antigen
- Antibody

Unit 3 - Collection, transport and processing of clinical specimens:

- Throat swab
- Sputum
- Urine
- Pus
- Blood
- CSF

Unit 4 - Health care associated Infections: Sources, Method of transmission and Prevention

Unit 5 - Principle and Practices of Biomedical waste management:

PRACTICALS: (15 HOURS)

- Microscope: parts function, focus, care and handling
- Hanging drop preparation
- Performance of Gram's stain
- Performance of ZN stain
- Culture media preparation: Nutrient agar, Blood agar, Chocolate agar, NA slant, MacConkey agar
- Functioning of Autoclave and Hot air oven
- Visit to hospital for the demonstration of Biomedical Waste Management
- Aseptic practices in laboratory and safety precautions

Each student shall undergo training in Skill Simulation Laboratory for learning certain basic clinical skills like IV/IM injection, setting IV-line, Cardio-pulmonary resuscitation (CPR), and Life support at the beginning of second year, for duration of continuous four days. (Board of Studies letter No.: FPMS/SV/BOS-MIN/0006/2016-17, dated 19/04/2017, and vide notification of Board of Management resolution Ref.: No. SVDU/R/2017-18/5056, dated 09/01/2018).

SECOND YEAR B.SC. MEDICAL LABORATORY TECHNOLOGY

BMLT-201 BIOCHEMISTRY (80 HOURS)

Paper II: Instrumentation and Blood chemistry

- Principle, Working and application of:
- Colorimetry,
- Spectrophotometer,
- Flame Photometer, Fluorimeter.
- Principle, Working and application of
- Chromatography:- TLC,GLC & HPLC
- Electrophoresis: - Paper and Gel electrophoresis
- Principle, Working and application of:
- Immunoprecipitation
- Immunodiffusion, RIA
- ELISA
- Metabolic aspects of Biomolecules with respect of laboratory analysis:
- Carbohydrate Metabolism:-
- Digestion and absorption of carbohydrates,
- Glycolysis
- TCA
- Gluconeogenesis
- Blood glucose regulation and
- Diabetes mellitus
- Biomedical & Clinical Importance (OGTT & Lactose intolerance)
- Proteins Metabolism: -
- Digestion and absorption of protein,
- Transamination, Deamination,
- Decarboxylation of amino acid and Urea cycle.
- Biomedical clinical importance.
- Lipid Metabolism:-
- Digestion and absorption of lipids.
- Beta Oxidation of palmitic acid and ketone bodies.
- Metabolic changes in Liver & Adipose tissues during starvation,
- Lipoprotein & its clinical uses and Lipid Profile.

PRACTICALS: (40 HOURS)

- To separate serum and plasma.
- Demonstration of pH meter
- Demonstration of colorimeter.
- Establishment of Beers and Lamberts law
- Estimation of blood sugar
- Estimation of blood urea, urea clearance
- Estimation of cholesterol in serum
- Estimation of total protein, albumin & A:G ratio
- Estimation of creatinine
- Lipid profile
- Estimation of bilirubin (direct & indirect)

- Estimation of Uric acid.

BMLT 202- PATHOLOGY (80 HOURS)

Unit 1 - Hematology

- Hemopoiesis, Stem cells, formed elements and their functions
- Anticoagulants used in various hematological studies
- Routine hematological tests and normal values
- Determination of Hemoglobin and Hematocrit
- Enumeration of RBC, WBC & Platelets
- Absolute Eosinophil count
- Reticulocyte count
- Calculation of Red cell Indices
- Preparation of staining of blood film for morphology of red cells and differential count.
- Automated Hematology cell counter
- Special Hematological tests:
- Sickling tests
- Osmotic fragility test
- Determination HbF and HbA2
- Hemoglobin Electrophoresis
- Investigation of G6PD deficiency
- Plasma haptoglobin and demonstration of hemosiderin in urine
- Tests for Autoimmune hemolytic anemia
- Measurement of abnormal Hb pigments
- Hemostasis and Coagulation
- Normal hemostasis, mechanism of blood coagulation and normal fibrinolytic system
- Collection of blood and anticoagulants used in coagulation studies
- Investigation of hemostatic mechanism-BT, CT, whole blood coagulation time test,
- PT, PTT.
- Thrombin Time, Plasma Fibrinogen, FDP, D-Dimer
- Demonstration of LE cells.

Unit 2 - Immunohematology

- ABO Blood group and Rh system
- Subgroups of A and B , Other blood groups and Bombay group
- HLA antigens and their significance

Unit 3 - Histopathology

- Instrumentation :
- (a) Automated Tissue Processor
- (b) Microtome, Microtome-knives, Knife sharpener
- (c) Freezing microtome and Cryostat
- Techniques :
- Routine paraffin section cutting
- Frozen section and Cryostat section studies
- Mounting techniques: Various mountants and mounting techniques

Unit 4 - Cytology

- Normal cell structure, functions, cytologic criteria of malignancy

- Instruments in Cytology
- Types of specimens, methods of collection & preparation of cell block
- Different fixatives and methods of fixation
- Staining : (a) Papanicolaou's stain- principle , preparation and staining techniques
- May Grunwald Giemsa stain
- H & E stain
- Normal cytology
- Techniques of collection of specimens for cervical cytology study
- Hormonal cytology and cytological indices
- Respiratory tract, Gastrointestinal tract and Urinary tract
- Normal cytology
- Collection of samples, preparation of smears and staining

PRACTICALS: (40 HOURS)

- Determination of Hemoglobin and Hematocrit
- Red blood cell count
- Total white blood cell count
- Platelet count
- Differential count of white blood cells
- Absolute Eosinophil count
- Reticulocyte count
- Paraffin section cutting
- Staining by Hematoxylin& Eosin and other special stains

BMLT 203- MICROBIOLOGY (80 HOURS)

Unit 1- Revision of General microbiology

- History: Louis Pasteur, Robert Koch
- Microscope: Parts, function and its types
- Morphology of bacteria: classification of microorganisms, bacteria cell, capsule, flagella, fimbriae and spore, staining of bacteria-gram and ZN stain
- Physiology of bacteria: Growth and nutrition of bacteria, Growth curve
- Sterilization and disinfection: Dry heat, moist heat sterilization, filtration, Radiation, disinfectants use in hospital
- Culture media: simple and complex media, preparation and its use
- Culture methods: aerobic and anaerobic
- Identification of bacteria: catalase test, coagulase test, oxidase test, Urease test, IMViC TESTS
- Antimicrobial susceptibility tests

Unit 2 - Immunology

- Antigen
- Antibody: structure and function, types
- Antigen-antibody reactions: Agglutination tests, Precipitation tests, Immunofluorescent tests, ELISA, Immunochromatographic test, Complement fixation tests.
- Immunoprophylaxis

Unit 3 - Systemic bacteriology

- Staphylococcus aureus-REVISION
- Streptococcus pyogenes-REVISION
- Neisseria species
- Salmonella typhii
- Shigella species
- Vibrio cholera
- Clostridium species
- Corynebacterium diphtheria
- Mycobacterium Tuberculosis
- Mycobacterium leprae
- Spirochetes-treponema pallidum

Unit 4 - Parasitology

- Entamoeba Histolytica
- Giardia Lamblia
- Trichomonas vaginalis
- Plasmodium species
- Leishmania donovani
- Cestodes: Taenia solium, Taenia saginata, Echinococcus granulosus
- Trematodes: Schistosomes
- Nematodes: Ascaris lumbricoides, Ancylostoma duodenale, Enterobius vermicularis, Trichuris, Strongyloides, Filarial worm

PRACTICALS: (40 HOURS)

- Preparation of stains viz. Gram, Ziehl Nielsen (ZN)
- Performance of Gram's staining and focus
- Performance of ZN staining and focus
- Preparation and pouring of media – Nutrient agar, Blood agar, chocolate agar, Mac Conkeys agar, NA slants, Triple sugar iron agar, Sabouraud dextrose agar
- Operation of autoclave, hot air oven, filters like Sietz and membrane and sterility tests.
- Washing and sterilization of glassware (Plugging and packing)
- Disposal of contaminated materials like cultures.
- Quality control of media, reagents etc.
- Care and maintenance of common laboratory equipments like water bath, centrifuge, refrigerators, incubators, etc.
- Parasitology: Stool examination for egg and cyst (saline and iodine mount), stool concentration techniques.
- Serology: WIDAL, RPR, ASO, MALARIAL ANTIGEN, DENGUE
- Aseptic practices in laboratory and safety precautions

THIRD YEAR B.SC. MEDICAL LABORATORY TECHNOLOGY

BMLT301-BIOCHEMISTRY (80 HOURS)

PAPER III: Diagnostic enzymology, Endocrinology and Clinical Applied

- Basic Biostatics for clinical quality control: - Mean, Mode, Median, standard deviation, coefficient of Variation, Normal distribution, standard error and clinical quality control chart.
- Automation: - Principle, Working and application of Semi and Fully Auto analyzer.
- Laboratory management: - Sample rejection criteria and SOP writing.
- Quality control- IQC & EQC, Quality indicators
- Clinical Enzymology
- Coenzymes and cofactor
- Isoenzymes
- Cancer:- Carcinogens, Oncogenes, Tumor Markers
- Classification, secretion, function, regulation and Mechanism of action for the Growth hormone, ACTH, Aldosterone, Cortisol their estimation and clinical significance, reference range, hypo and hyper secretion
- Organ function Test: - LFT, RFT, TFT, Gastric function test, Cardiac function test.
- Infertility Profile: - TSH, FSH, LH, Testosterone, estrogen and prolactin.
- Normal Ranges of various metabolites and their confidence limits.
- Advance technique: - Blotting technique, karyotyping, DNA fingerprinting and Radioisotopes.

PRACTICALS: (40 HOURS)

- Estimation of SGOT & SGPT
- Estimation of serum alkaline phosphatase
- Estimation of various isoenzymes
- Estimation of Serum TSH
- Estimation of Thyroid hormones: T3 & T4
- Hormonal Analysis: FSH,LH and Prolactin
- Demonstration of male and female infertility test
- To perform separation of amino acids by paper chromatography
- Separation of protein by gel electrophoresis

BMLT 302-PATHOLOGY (80 HOURS)

Unit 1- Hematology

- Hematology
- Anemias
- Classification, Clinical Features, Cause, and Investigation of Iron deficiency anemia,
- Megaloblastic anemia, Hemolytic Anemia.
- Leukemias
- Classification, Clinical Features, Cause, and Investigation of all leukemia
- Hematology and Quality Control.
- Hemostasis and Coagulation
- Assay of clotting factors
- (b)Tests for fibrinolytic activity- Euglobulin , clot lysis test and FDP
- Bone marrow Examination
- Needle aspiration and surgical biopsy technique
- Preparation of smears and staining

Unit 2 - Immunohematology

- Principles of Blood transfusion:
- Blood donor selection

- Methods of bleeding donors
- Blood containers, anticoagulants and storage of blood
- Coomb's test and its significance
- Screening of blood for infective material
- Blood components, preparation & component therapy
- Autologous Blood transfusion
- Transfusion reactions
- hemolytic Disease of Newborn
- Blood Bank organization, Standards, Procedures, Techniques and Quality control
- Laboratory organizations and Management:
- Professional court of ethics for Medical laboratory personnel.
- Laboratory facilities,
- Total quality management system
- Continuing education and evaluation
- Budget development and monitoring
- Information management system in laboratory

Unit 3 - Clinical Pathology, Histopathology, Cytology and Cytogenetics

- Clinical Pathology
- Complete examination of Urine, all body fluids, C.S.F and Stool.
- Histopathology
- Staining techniques: Special stains for Carbohydrates, Connective tissue, Nervous
- tissue, Bone tissue, Collage fibers, Elastic Fibers, Lipids, Organisms, fungi, parasites,
- pigments and deposits in tissues.
- Maintenance of records and filing of slides
- Application of computers in Pathology
- IHC, Quality Control, Automation in Histopathology
- Cytology
- Female Genital tract
- Cervical cytology screening for malignant and nonmalignant conditions, raditation
- changes follow up.
- Cytology of endometrium- normal, nonmalignant and in malignant conditions
- C S F and Effusions
- Cytology of CSF in inflammatory, nonmalignant & malignant Conditions
- 2.Cytology of effusions in nonmalignant and malignant conditions
- Glands – Breast, Thyroid and Lymph nodes
- Anatomy , Histology and Physiology
- Fine needle aspiration cytology of glands and other soft tissue mass
- Cytologic features in nonmalignant and malignant conditions of different
- glands and nipple discharges.
- Cytogenetics
- Introduction to cytogenetics, terminology , classification and nomenclature of
- human chromosomes
- Sex chromatin identification

PRACTICALS: (40 HOURS)

Hematology

- RBC count
- WBC count
- Platelet Count

- P.C.V and Blood Indices
- ESR
- Differential WBC count
- PS Examination – I
- PS Examination – II
- Sickling Tests
- Hb. Electrophoresis
- BLOOD BANKING
- Cross Match Test
- Coomb's Control Cell preparation
- Du Test
- Direct Coomb's Test
- Indirect Coomb's Test
- Anti D Titer
- Screening of Donor's blood for infective agents(HIV, Hepatitis B, Syphilis, Malaria)
- Transfusion reaction work up
- Preparation of blood components

Clinical Pathology

- Urine examination R & M
- CSF Examination R & M
- Pleural Fluid Examination R & M
- Ascitic Fluid R & M
- Synovial Fluid R & M
- Stool for R & M

Histopathology & Cytology

- Hematoxylin & Eosin Stain
- PAS & Other special Stain
- Papanicolaou's stain
- May Grunwald Geimsa staining
- Tissue Processing
- Block Making
- Section Cutting

BMLT303 - MICROBIOLOGY (80 HOURS)

Unit 1 - Immunology

- Immune system: structure and function
- Immune response: Humoral and cell mediated immune response, immunological tolerance
- Complement system
- Hypersensitivity
- Autoimmunity
- Immunodeficiency disease

Unit 2 - Mycology

- Introduction, classification of fungus

- Superficial mycosis: Dermatophytes
- Subcutaneous mycosis: Mycetoma
- Dimorphic fungus
- Systemic mycosis: histoplasma capsulatum
- Opportunistic mycosis: Candida, aspergillus, cryptococcus

Unit 3 - Virology

- General properties of Virus: morphology, replication, viral hemagglutination, virus cultivation , virus classification.
- Herpes virus
- Rhabdovirus
- Hepatitis Virus
- HIV
- Polio Virus
- Rota virus, dengue, chickengunia.

Unit 4 - Applied Microbiology

- Hospital-acquired infections & Laboratory Hazards
- Biomedical waste management.
- Quality control in Diagnostic Microbiology.
- Recent advances in Diagnostic Microbiology
- The ethical issues of microbiological characterization techniques in controlling the infectious diseases and avoiding the spreading include both individuals and public at large. Professional ethics is the moral bond that links a profession, the people it serves, and society

PRACTICALS: (40 HOURS)

- Collection of specimens for Microbiological investigations such as Blood, Urine, sputum, Pus (Swabs),
- Identification of Bacteria of Medical Importance up to species level: S.aureus, E.coli, Klebsiella, Pseudomonas, Proteus, Salmonella typhi.
- Performance of AST.
- Methods for the preservation of bacteria, Maintenance of stock cultures for both bacteria and fungus.
- Mycology: KOH mount, LPCB mount, Slide culture techniques, Colony identification of fungus,- Aspergillus species, candida albicans, Mucor, Dermatophyte.
- Candida: gram stain, germ tube test, colony characteristics.
- Revision of parasitology: stool examination for round worm, hook worm
- Serology: Widal tests, RPR test, ASO test
- ELISA

Internship (Integrated Practice) - Total Hours 1440

The internship will span1 Year. This will include 6 hours of practice a day, totaling to 1440 hours during internship year. As a part of this, the students will maintain a work logbook which will be duly endorsed by the supervisor or trainer. At the end of internship, the candidate shall submit the work log book along with certificate from the training institute.

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in clinical delivery of services. Students will demonstrate competence in beginning and intermediate procedures. Students will observe the advanced and specialized procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The students are expected to work for minimum 6 hours per day and this may be more depending on the need and the healthcare setting.

CODE OF PROFESSIONAL CONDUCT
INTRODUCTION

The Code of Professional Conduct is designed and set out as guidance for the clinical practitioner within the relationship that exists with every patient receiving health care.

Essential to that relationship is the patient's trust in the practitioner. This trust hangs upon the patient's assurance of being the practitioner's first concern during their clinical encounter, and upon the patient's confidence that the care received will be competent, whether in diagnosis, therapy or counseling.

STANDARD OF PRACTICE AND CARE

Patients are entitled to the highest standard of practice and care. The essential elements of this are professional competence, good relationships with patients and colleagues and observance of professional ethical obligations.

In providing care you must therefore:

- Recognize the limits of your professional competence.
- Be willing to consult colleagues.
- Keep clear, accurate and contemporaneous patient records which report the relevant findings.
- Keep colleagues informed.
- Pay due regard to the efficacy and the prudent use of resources.
- Be competent, truthful, and accurate, when reporting on investigations.
- Be competent when giving or arranging treatment.

Patient's rights

- Listen to patients and respect their views.
- Treat patients politely and considerately.
- Respect patients' privacy and dignity.

- Give information to patients in a way they can understand.
- Respect the right of patients to be fully involved in decisions about their care.
- Respect the right of patients to refuse treatment or to take part in teaching or research, reporting the refusal to the person requesting the procedure.
- Respond to complaints promptly and constructively.
- Ensure that your views about a patient's life style, culture, beliefs, race, color, sex, sexuality, age, social status, or perceived economic worth, do not prejudice the service you give.

CONFIDENTIALITY

Patients have a right to expect that you will not pass on any personal information which you learn in the course of your professional duties, unless they agree

Attested CTC

15/2/2021

Vice-Chancellor
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