



MOTHERHOOD UNIVERSITY, Roorkee

ENLIGHTENING WORLD

Syllabus For Bachelor of Medical Lab. Technology (BMLT)

[Academic Session 2016-17 Onwards]



**Roorkee-Dehradun Road, Village Karoundi,
Post- Bhagwanpur, Tehsil-Roorkee
Pin -247661
Distt-Haridwar
(Uttarakhaand)**

CREDIT BASE GRADING SYSTEM/WEEK

code	1 st year	Duration	tutorial	Credit
MUBMLT 101	Human Anatomy And Physiology	3	1	4
MUBMLT 102	Basic Pathology	3	1	4
MUBMLT 103	Clinical Biochemistry	3	1	4
MUBMLT 104	Preventive Medicine & Health Care	3	1	4
MUBMLT 105	Microbial Biology	3	1	4
MUBMLT 106	Technical Method in Microbial Biology	3	1	4
MUBMLT 107	Communication Skills & Personality Development	3	1	4
MUBMLT 108	Fundamentals of computer sciences	3	1	4
MUBMLT 109	Basic Pathology practical's	4	0	2
MUBMLT 110	Preventive Medicine & Health Care practical's	4	0	2
MUBMLT111	Microbial Biology practical's	4	0	2
MUBMLT112	Communication Skills & Personality Development	4	0	2
MUBMLT113	Fundamentals of computer sciences	4	0	2
TOTAL		44	8	44

code	2 nd year	Duration	tutorial	Credit
MUBMLT 201	Clinical Biochemistry I (Separative & Instru. Techniques)	3	1	4
MUBMLT 202	Clinical Biochemistry II (Metabolic & A blood chemistry)	3	1	4
MUBMLT 203	Medical Microbiology I (Bacterial Pathogens & Asso. Diseases)	3	1	4
MUBMLT 204	Medical Microbiology II (Technical Methods in Medical Microbiology)	3	1	4
MUBMLT 205	Pathology & Allied Sub-I (Haematology & Clinical Pathology)	3	1	4
MUBMLT 206	Pathology & Allied Sub-II (Histopathology & Cytology Techniques)	3	1	4
MUBMLT 207	Clinical Biochemistry II (Metabolic & A blood chemistry) practical's	4	0	2
MUBMLT 208	Medical Microbiology II (Technical Methods in Medical Microbiology) practical's	4	0	2
MUBMLT 209	Pathology & Allide Sub-II (Histopathology & Cytology Techniques) practical's	4	0	2
		30		30

code	3 rd year	Duration	tutorial	Credit
MUBMLT301	Clinical Biochemistry- I (Biostatic Automation and endocrinology)	3	1	4
MUBMLT302	Clinical Biochemistry- II (Diagnostic Ezymology)	3	1	4
MUBMLT303	Medical microbiology –I (Pathogenic viruses & misc. microbes)	3	1	4
MUBMLT304	Medical microbiology– II (Applied microbiology& advance techniques)	3	1	4
MUBMLT305	Pathology & Allied sub-I (immuno pathology & transfusion Medicine)	3	1	4
MUBMLT306	Pathology & Allied Sub-II (Histopathology & Cytology)	3	1	4
MUBMLT307	Clinical Biochemistry- II (Diagnostic Ezymology) practical's	4	0	2
MUBMLT308	Medical microbiology –II (Applied microbiology& advancetechniques) practical's	4	0	2
MUBMLT309	Pathology & Allied Sub-II (Histopathology & Cytology) practical's	4	0	2
	TOTAL	30	6	30

DISTRIBUTION OF MARKS BMLT 1st year

S.N.	Subject Name	Paper Code	Duration	Maximum Marks		Total
				Sessional	Annual	
1	Human Anatomy & Physiology	MUBMLT 101	180	30	70	100
2	Basic Pathology	MUBMLT 102	180	30	70	100
3	Clinical Biochemistry	MUBMLT 103	180	30	70	100
4	Preventive Medicine & health Care	MUBMLT 104	180	30	70	100
5	Microbial Biology	MUBMLT 105	180	30	70	100
6	Technical Methods in Microbial Biology	MUBMLT 106	180	30	70	100
7	Communication Skills and Personality Development	MUBMLT 107	120	10	15	25
8	Fundamentals of Computer Sciences	MUBMLT 108	120	10	15	25
9	Basic Pathology	MUBMLT 109 P		30	70	100
10	Preventive Medicine & health Care (P)	MUBMLT 110 P		30	70	100
11	Technical Methods in Microbial Biology (P)	MUBMLT 111 P		30	70	100
12	Communication Skills and Personality Development (P)	MUBMLT 112 P		10	15	25
13	Fundamentals of Computer Sciences (P)	MUBMLT 113 P		10	15	25
Total Marks				310	690	1000

DISTRIBUTION OF MARKS B M L T 2nd year

S N	Subject Name	Paper Code	Duration	Maximum Marks		Total
				Sessional	Annual	
1	Clinical Biochemistry (Separative&Istru. Techniques)	MUBMLT201	180	30	70	100
2	Clinical Biochemistry-II (Metabolic& a blood Chemistry)	MUBMLT202	180	30	70	1000
3	Medical Microbiology- I(Bacterial Pathogens &Asso. Diseases)	MUBMLT203	180	30	70	100
4	Medical Microbiology -II (Technical Methods in Medical Microbiology)	MUBMLT204	180	30	70	1000
5	Pathology & Allied Sub-1 (Hematology & Clinical Pathology)	MUBMLT205	180	30	70	100
6	Pathology & Allied Sub-II (Histopathology & Cytology Techniques)	MUBMLT206	180	30	70	100
7	Clinical Biochemistry-II P	MUBMLT207		30	70	100
8	Medical Microbiology –II P	MUBMLT208		30	70	100
9	Pathology & Allied Sub-II P	MUBMLT209		30	70	100
Total Marks				270	630	900

DISTRIBUTION OF MARKS BMLT 3rd year

S · N ·	Subject Name	Paper Code	Duration	Maximum Marks		Total
				Sessional	Annual	
1	Clinical Biochemistry-I (Biostatistics Automation & Endocrinology)	BMLT301	180	30	70	100
2	Clinical Biochemistry-II (Diagnostic Enzymology)	BMLT302	180	30	70	100
3	Medical Microbiology-I (Pathogenic Viruses & Misc. Microbes)	BMLT303	180	30	70	100
4	Medical Microbiology-II (Applied Microbiology & Advanced Tech.)	BMLT304	180	30	70	100
5	Pathology & Allied Sub-I (Immunopathology & Transfusion Medicine)	BMLT305	180	30	70	100
6	Pathology & Allied Sub-II (Histopathology & Cytology)	BMLT306	180	30	70	100
7	Clinical Biochemistry (Biostatistics Automation & Endocrinology) P	BMLT307		30	70	100
8	Medical Microbiology-II (Applied Microbiology & Advanced Tech.) P	BMLT308		30	70	100
9	Pathology & Allied Sub-II (Histopathology & Cytology) P	BMLT309		30	70	100
Total Marks				270	630	900

EXAMINATION REGULATIONS

Theory Examination: All the paper in each year carrying 100 marks out of which 30 marks will be internal assessment and 70 marks for external assessment based on the question paper sent by the university, the paper will be of 3 hrs. The Practical Examination will be held with the final examination. The practical and Viva voice in each subject will carry 30% marks as internal & 70% marks as external assessment (according to examination scheme) prescribed for the year.

The Essentialities for qualifying to appear in professional examination based on the performance.

ATTENDANCE: 75% of attendance by the examination is compulsory provided. He/she has 80% attendance in non lecture teaching i.e. seminars, group discussions tutorials, demonstration, practical, hospitals (Tertiary, Secondary and Primary) posting and bed side clinics etc.

INTERNAL ASSESSMENT:

- i. It shall be based on day assessment (see note), evaluation of student assignment, preparation for seminar, clinical case presentation etc.
- ii. Seasonal examination shall be conducted throughout the course.
- iii. Day to day records should be given importance during internal assessment.
- iv. Weight age for the internal assessment shall be 30% of the total marks in each subject.

Note: Internal assessment shall relate to different ways in which student's participation in learning process during semesters is evaluated. Some examples are as follows:

- i. Preparation of subject for student's seminar.
- ii. Preparation of a clinical case for discussion.
- iii. Clinical case study problem solving exercise.
- iv. Participation in projects for health care in the community (planning stage to evaluation).
- v. Proficiency in carrying out a practical or a skill in small research project.
- vi. Some of the items can be assigned as home work/vacation work.

UNIVERSITY EXAMINATIONS:

Theory papers will be prepared by the examiners as prescribed. Nature of questions will be short answer type/objective type and marks for each part indicated separately.

Practical/clinical will be conducted in the laboratories or hospital wards objective will be to assess proficiency in skills. Conduct of experiments, interpretation of data and logical conclusion clinical cases should preferably include common diseases not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation. Viva/ oral include evaluation of management approach and handling of emergencies candidate's skills in interpretation of common investigation data also is to be evaluated. The examinations are to be designed with a view to ascertain whether the candidate has acquired necessary for knowledge, minimum skills along with clear concepts of the fundamentals, which are necessary for him to carry out his professional day to day work competently.

INTERNSHIP

General

Internship is a phase of training wherein a graduate is expected to conduct actual practice of Medical Laboratory Technology and acquire skills under supervision so that he/she may become capable of functioning independently.

SPECIFIC OBJECTIVES

At the end of internship training the graduate shall be able to:

- i. Perform all the diagnostic techniques.
- ii. Use discretely the essential laboratory services.
- iii. Manage all type of clinical diagnostic methods.
- iv. Demonstrate skills in handling the modern equipment in medical microbiology.
- v. Develop leadership qualities to function effectively as a leader of the laboratory environment.
- vi. Render services to the laboratory set up and to communicate effectively with doctors and the hospital management.

INTERNSHIP TIME DISTRIBUTION

Main Objective

The Development of skill and competency in data processing, reporting and maintenance of records, laboratory investigation.

The Duration of Internship shall be 6 Month.

Histopathology & Cytology Lab -

1 $\frac{1}{2}$ Month

Clinical Pathology & Hematology Lab

1 $\frac{1}{2}$ Months

Clinical Biochemistry Lab -	1 $\frac{1}{2}$ Month
Medical Microbiology Lab-	1 Month
Transfusion Medicine I Blood Bank	15 Days

OTHER DETAILS

- i. All parts of internship shall be done in the Multi specialty Hospital or medical college.
- ii. Every candidate will be required after passing the final BMLT (Medical Lab. Tech.) examination to undergo compulsory rotatory internship.
- iii. The intern shall be entrusted with laboratory responsibilities under direct supervision Senior Medical Officer/Technician. They shall not be working independently.
- iv. Interns will not issue certified laboratory reports or other related documents under their signature.

ASSESSMENT OF INTERNSHIP

1. The interns maintain the record of work, which is to be verified and certified by the Senior Medical Officer or Technician under whom he/she works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and the end of training. Base on the record of work and date of evaluation. The Medical Superintendent / Principal shall issue Certificate of Satisfactory Completion' of training following which the university shall award the BMLT degree of declare the candidate eligible for the same.
2. Satisfactory completion shall be determined on the basis of the following:
 - Proficiency of knowledge required for each laboratory techniques.
 - The competency in skills expected to manage each laboratory technique.
 - Competency for performance of self performance of having assistant in procedures. Of having observed.
 - Responsibility, punctuality, works up of laboratory techniques, Involvement in procedure, follow of report.
 - Capacity to work in a team (behavior with colleagues, nursing staff and relationship with medical and paramedical staff).
 - Initiating, participation in discussions, research aptitude.

MEDIUM OF INSTRUCTION

English shall be the medium of instructions for all the subjects of study and for examinations of the Bachelor of Medical Laboratory Technology course.

SUBMISSION OF RECORD NOTE BOOKS Practical

At the time of practical examination, each candidate shall submit his/her practical file to the examiner.

The record book duly certified by the head of the Department (HOD), as a bonafide record of work done for the candidate.

Course of study.

1st Year
HUMAN ANATOMY & PHYSIOLOGY (HAP)

Paper code –MUBMLT 101

Max Marks -70

Unit I

Introduction of Medical Science.

Organization of human body and integrated physiology, Cell organization, fundamentals issues of body and organ systems, Primary defense mechanism of human body against pathogenic microbes, Gross anatomy and histology of organs or respiratory system, organs of respiration, mechanism of respiration and factors controlling it.

Gross anatomy and histology of organs of alimentary system, organs of digestive system, and various glands associated with the digestive system, mechanism and physiology of digestion and absorption.

Unit II

Cells and organs of immune system: Morphology and their distribution.

Gross anatomy and physiology of reticulo- endothelial system, Secondary immune response of human body to external stimuli.

Physiology of various body fluids: CSF, Peritoneal, Pericardial, Pleural and synovial fluids.

Gross anatomy & physiology of excretory System.

Gross anatomy and history of organs of cardiovascular system, organs of the system, mechanism and physiology of blood flow through the cardiovascular System.

Unit III

Gross anatomy and histology of musculo- skeletal system, classification & functions of bones and muscles, Physiology of muscular contraction and factor controlling them, various types of joints and their physiology, Gross anatomy and histology of organs of nervous system, division of nervous system and mechanism of nerve impulse transmission & reflex arc, sensory and motor system, sensory& motor systems special sense organs, Gross anatomy and histology of organs of reproductive system, mechanism of reproduction and factors controlling it, Gross anatomy and histology of organs of endocrine system, different glands of the system and their distribution, Mechanism of hormone production, factors controlling it and their mechanism of action.

1st Year
BASIC PATHOLOGY

Paper code: MUBMLT 102

Max Marks -70

UNIT I

Introduction: Hematology, Laboratory organization & Safety measures.

Formation, composition and functions of blood, Anticoagulants, mode of action of anticoagulants and their merits and demerits Collection, preservation, transport and handling and disposal of blood smears.

Basic hematology and estimation of haematocrit values, physiological variations, normal and absolute values and quality assurance in hematology.

UNIT II

Romano sky dyes, preparation and staining procedures of blood smears. Morphology of blood cells and their identifications.

Haemo-globinometry: Various methods, errors involved and standardization of instruments.

Haemo- cytometry : Procedure of cell count, visual as well as electronic, red cell, leukocyte and platelet count. Errors involved and mean to minimize such errors.

Determinations of innate immunity and its mechanism, phagocytosis the compliment: system, gross structure and development of cells concerned with antibody production cellular process involved in antibody formation.

UNIT III

Pathology of inflammation in response to microbial invasion. Pathology of localized and systemic infections. Various routes of transport of Microbes to human body and methods of defense. Invasive techniques for diagnosis of acute and chronic microbial infections.

Pathology of specific chronic infective disorders: Tuberculosis, Leprosy, Syphilis, SASE (sub acute bacterial endocarditis) and rheumatologic disorders.

Study of microbes responsible for pathogenesis of tumors and their on cogenesis.

Immune- histopathology & immuno - histochemistry (Basic Principles Procedures and applications)

Introduction to blood banking technology.

1st Year
BASIC PATHOLOGY (practical)

Paper code: MUBMLT 109

Max Marks -70

The syllabus of practical will be relevant portion of Theory.

1st Year
CLINICAL BIOCHEMISTRY

Paper code: MUBMLT-103

Max Marks -70

UNIT I

Introduction to Clinical Biochemistry and role of Medical Lab Technologist, ethics, responsibility, safely measure and hazards in clinical biochemistry lab and first aid in laboratory accidents.

Basic awareness of laboratory in respect to equipments & glassware. Unit of measurements and calibration of volumetric apparatus. Colorimetry, spectro-photometry, flame-photometry, analytical balance etc. (principles instrumentations & applications).

Preparation and storage of reagents, standard solutions, buffer solutions and pH determination, Biophysics, techniques osmosis, dialysis, surface tension, sedimentation and viscosity- principles & applications.

Sterilization and Disinfection: Study of various's methods of sterilization- dry and moist heat, radiation, filtration, autoclaving and chemical disinfection.

Henderson-Hassalbach equation and it's clinical applications. Acid base disturbances and their clinical significance. Acid- base- buffer and pH-simple calculations. Concept of clinical sensitivity and specificity and factors affecting the clinical results. Collection of blood specimens avoiding Haemolysis, de-proteinization & separation of serum/plasma. Biochemical composition of body fluids and their physiological variations.

Physical and Biochemical Examination of urine Samples: Qualitative tests of inorganic urinary ingredients: Chlorides, phosphate, sulphur compounds, sodium, potassium, calcium and magnesium and their clinical significance. Qualitative tests for glycosuria, pentosuria, galactosuria, proteinuria, microalbuminuria and Bence Jones Proteinuria and their clinical significance. Qualitative test of urine for uric acid, urea and creatinine.

Quantitative estimation of 24 hours urine for albumin and 17- keto-steroids and their clinical significance.

Physiological variation of biometabolites in various body fluids and their clinical significance. Pathological changes in composition of body fluids and their clinical correlation.

Qualitative test of urine for ketone bodies, bile salts, bile - pigments and urobilinogen and their clinical significance.

UNIT II

1. Carbohydrates: Structure, Classification and their function in biological system.

2. Lipids: General structure of fatty acids and classification of Lipids.

3. Proteins: Classification, structural organization and function of protein.

4. Enzymes: Definition, classification of Enzyme, Concept of active sites and general mode of action of Enzymes.

5. Nucleic Acids: Structure function and types of DNA and RNA. Nucleotides, Nucleosides, Nitrogen bases and role of Nucleic Acid

1st Year
PREVENTIVE MEDICINE AND HEALTH CARE

Paper code: MUBMLT 104

Max Marks -70

Unit I

Water, Air and Noise Pollution: Removal of water hardness, purification of water and standards of water quality. Air and noise pollution and their prevention. Housing and air-conditioning.

Hygiene and Sanitation: Sanitation barriers, excreta disposal and disposal of hospital waste. Incineration and disinfection.

Infections and Control: Microbial pathogen city, source and spread of infections in community, pathogenesis, toxigenicity, invasiveness, variations and virulence. Host factors controlling infections to men, mode of spread and their control by physical & chemical agents.

Unit II

Epidemiology: Epidemiology, surveillance and control of community infections. Role of laboratory in community and hospital infection . Emergence of drug resistance . Methods of prevention & control isolation of patients, quarantine & incubation periods of various infectious diseases. Management of patients infectious diseases hospital (IDH).

Prophylactic Immunization: Rationale of immunization, immune response and duration of immunity controlled studies of prophylactic vaccines and hazards immunization, Reproductive, Family Planning & Child Health Care Programs.

Unit III

Bacteriology of Water, Milk, Food and Air: Bacteriological examination of water. Collection of specimens, presumptive coli form count, cloakroom test, colony count and interpretation of results. Bacterial examination of sewage and sewage effluents Bacteriological examination and control of swimming bath, membrane filter technique and isolation of pathogens.

Bacteriological examination milk, bacterial standards and various tests for pasteurized mm Bacterial examination of ice- cream, shellfish and canned foods, milk bottles ,crockery arc cutlery. Examination of food stuff in cases of outbreak of food poisoning Bacteriological examination of air and environment dust.

Health Care by Balance Diet and Yoga: Normal constituents of diet, various die programs, balance a diet and factors responsible for etiology of various nutritional disorders Carcinogens in food. Role of regular exercise & yoga in prevention & management c various diseases .

Health planning & Management: Health planning, Planning cycle, Malaria eradication various other national health policy and programs.

1st Year
PREVENTIVE MEDICINE AND HEALTH CARE

Paper code: MUBMLT 110

Max Marks -70

The syllabus of practical will be relevant portion of Theory.

1st Year
PAPER V: MICROBIAL BIOLOGY

Paper code: MUBMLT 105

Max Marks -70

Unit I

Microbiology & Medicine: Introduction to medical microbiology, discovery of micro-organism. Contribution of Robert Koch, Antony Van Leuwen Hoak, Louis Pasteur, Bordet, Paul Ehrlich, Alexander Fleming, Match nikoff, Needham, Tyndall Jensson, Joseph Lister, Karl Landsteiner etc.. Scope & relevance and safety measures of medical microbiology. Role of medical microbiology in identification and management of various infectious diseases.

Morphology & Nature of Bacteria: Anatomy of bacterial cell, intracellular components and their functions bacterial reproduction, morphological study of bacteria and its appendages- flagella, fimbriae ,pili, capsule, spore and cysts. Classification and Identification of Bacteria :Biological group, morphological and biological classification, DNA composition as a basis of classification system of identification-morphology, staining reactions, cultural characters, biochemical reactions & antigenic characters etc.

Sterilization and Disinfections: Various physical methods of sterilization heat UV radiation, ionizing radiation, characters affecting sterilization, auto cave control sterilization indicators.

Chemical disinfectants: phenol and its compounds, alcohol, halogen heavy metals and quaternary ammonium compounds, aldehyde, gaseous compound. Use and abuse of disinfectants.

Unit II

Cultural Media: Liquid and solid media, container for medias distribution of media in tubes, bottles and Petridishes. Common ingredients of cultural medias. Synthetic media, peptone water, nutrient agar and broth, chocolate and blood agar, meat extract broth, milk agar etc. Special Medias for Neisseria,

Corrynebacterium, Mycobacterium & Entero bacteriaceae group etc.

Cultivation of Bacteria: Instruments used, inoculation hood, laminar flow, culture procedure, incubation (Aerobic and Anaerobic). Isolation of pure culture and its preservation. Suspending media for freeze drying of bacteria. Blood culture, Pure Cultures: Maintenance & Preservation of pure cultures. Collection, transport processing & storage of clinical samples for microbiological analysis, Growth and Nutrition of Bacteria: Typical growth curve, various phases of growth, physiology of bacteria - catabolism and anabolism. Nutrition of microbes and physical conditions required of growth. Effect of carbon, nitrogen, growth factors, vitamins, temperature ,pH, Osmotic pressure, oxygen and carbon dioxide on microbial grow

Unit III

Lab organization, Management, Recording of results and quality control in medical microbiology. Principles of staining techniques, preparation of stains and their storage, Introduction to Virology, Mycology & Parasitological: (Characteristic, morphology, classification, nomenclature, pathogenesis)

Antimicrobial Agents and Antibiotic: Disinfectants, antiseptics, chemotherapeutic agents chemotherapeutic index, development of chemotherapy, antibiotic and effect of antibiotic on protein & nucleic acid synthesis and cytoplasmic membrane, Future development of chemotherapy.

1st Year
MICROBIAL BIOLOGY

Paper code: MUBMLT 111

Max Marks -70

The syllabus of practical will be relevant portion of Theory.

1st Year
TECHNICAL METHODS IN MICROBIAL BIOLOGY

Paper code: MUBMLT 106

Max Marks -70

Unit I

1. Microscopy: Study of compound microscope - magnification, numerical aperture, resolution and components of microscope. Dark ground illumination care of microscope and common difficulties. Micrometry study of phase contrast, interference, fluorescent and electron microscope, Preparation of smear for electron microscope.
2. Study of pH in Microbiology: Methods for measurements pH meter, Preparation, dilution and chemistry of suspension fluids. Oxidation - reduction (redox) potential.
3. Preparation of Stains: Making of films, staining methods, mounting media. Gram's stain - preparation of stain and staining methods. Special stains for AFB, Diphtheria, Spores, Capsule, Intra cytoplasm lipids, Polysaccharides, nuclear material, Field's stain, stain for amoebae, Fungi and Rickettsiae.

Unit II-

Study of instruments used in Medical Microbiology-

1. General Instruments: Distillation plant, Centrifuge Machine, Analytical Balance, Hotplate, Magnetic Stirrer, Water Bath, Automatic Dispensers and Diluters, Deionizer etc.
2. Microbiological Instruments: Autoclave, Incubator, Hot air oven, Laminar Air flow, Colony counter, Muffle furnace, Refrigerator, Inoculator, Mac-Intosh jars etc.
3. Instruments used in immunology: Electrophoresis, Immuno diffusion, Star plate, Chromatography, ELISA reader, Automatic washer and RIA equipments etc.
4. Care and Management of Experimental Animals: General directions for the care of animals, material inoculated, necropsy, Common diseases and experimental procedures. Various experimental animals- rabbits, guinea pigs, mice, rats, hamsters, fowls and monkeys - their data, cages, feeding and handling.
5. Safety Measures in Microbiology Laboratory: Occurrence of lab infections, route of infection in laboratory, safety measure precautions in use of pathogens in teaching. Lab organization, management, recording of results and quality control in Medical Microbiology Lab.
6. Culture and Drug Sensitivity Tests: Culture, isolation and identification of pathogens from urine, pus and sputum and recording of their results.

1st Year

COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

Paper Code: MUBMLT 107

Max Marks 15

Unit I

- Introduction
- Types of communication
- Barriers in communication
- Communication, Importance & principles of communication

Unit II

- Review of grammar, Parts of speech in brief, Verb and tense forms
- Direct & indirect speech, Types of sentence
- Transformation and synthesis of sentences
- Voice, phonetics

Unit III

- Vocabulary, idioms and phrases
- use of dictionary for learning to pronounce, word formation by adding prefixes & suffixes
-

Unit IV

- spoken English, using non-verbal communication
- discussion, telephonic conversation
- audience psychology & presentation skills
- interview techniques, debate

Unit V

- précis writing
- curriculum vitae writing
- listening, reading, comprehension
- preparation of report
- Letter writing, note taking and note making.

1st Year

COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

Paper Code: MUBMLT 112

Max Marks 15

The syllabus of practical will be relevant portion of Theory.

1st Year

BASICS OF COMPUTER

Paper Code: MUBMLT 108

Max Marks 15

1. Input and Output units: Their functional characteristics, main memory, cache memory read only memory, overview of storage devices – floppy disk, hard disk, compact disk, tape. Computer Networks and Communication: Network types, network topologies.
2. Internet - Evolution , Protocols, Interface Concepts, Internet Vs Intranet, Growth of Internet, ISP.SSS Connectivity – Dial-up, Leased line, VSAT etc. URLs, Domain names, Portals.
E-MAIL- Concepts, POP and WEB based E-mail, merits, address, Basics of Sending & Receiving, Email Protocols, Mailing List, Free E-mail services.
3. Electronic Payment Systems: Introduction, Types of Electronic Payment Systems, Digital Token- Based, Electronic Payment Systems, Smart Card and Electronic Payment Systems, Credit Card-Based Electronic Payment Systems, Risk and Electronic Payment Systems.
4. Html – Concepts of Hypertext, Versions of HTML, Elements of HTML syntax, Head & Body Sections, Building HTML documents, Inserting texts, Images, Hyperlinks, Backgrounds and Color Controls, Different HTML tags, Table layout and presentation, Use of font size & Attributes, List types and its tags, Use of Frames and Forms in web pages. Overview of MS Front Page, Macromedia Dream weaver, and other popular HTML editors, designing web sites using MS Front Page (using at least Front Page 2000)

Reference Books:

1. Sanders, D.H., *Computers Today*, McGraw Hill.
2. Trainer, T.N., *Computers*, McGraw Hill.
3. Joseph, P.T., S.J., *E- Commerce an Indian Perspective*, Prentice Hall of India.

* Latest editions of all the suggested books are recommend

1st Year

BASICS OF COMPUTER (Practical)

Paper Code: MUBMLT 113

Max Marks 15

The syllabus of practical will be relevant portion of Theory.

2nd Year
CLINICAL BIOCHEMISTRY - I
(SEPARATIVE AND INSTRUMENTAL TECHNIQUES)

Paper code MUBMLT 201

Max Marks -70

Unit I

Chromatography: Thin layer Chromatography

Gas liquid Chromatography.

Electrophoresis -paper and gel electrophoresis for hemoglobin,
urinary proteins, serum SCF &LDH.

Colorimetry, flame photometry.

Atomic absorption spectroscopy.

Unit II

Immune Test

Immunochemical, Immunoprecipitation, Immunofixation and radial Immunidiffusion tests.

Principle, procedures and applications: Osmometry, Semi auto-analyzer, auto-analyzer, diluters &
dry chemistry analyzer.

Unit III

Principal Procedure and Application of
Coulter counters.

Enzyme Linked Immunoborvent Assay (ELISA) Reader.

Radi -immunoassay (RIA).

Polymerase Chain Reaction (PCR).

2nd Year
CLINICAL BIOCHEMISTRY - II
(METABOLIC AND BLOOD CHEMISTRY)

Paper code: MUBMLT 202

Max Marks -70

Unit I

Carbohydrate metabolism, glycolysis , TCA and their clinical importance, Glucose Tolerance Test (GTT).

Protein metabolism - urea cycle and its biomedical significance.

Lipid metabolism-Beta-oxidation of fatty acids, ketonebodies, metabolic changes in liver and adipose tissues during starvation, lipid profile.

Unit II

Principle, assay procedures and clinical significance of following: Glucose, Proteins, AIG, Urea, BUN, Uric Acid, Creatinine, Cholesterol, Bilirubin (Direct & Indirect).

Electrolytes: Quantitative estimation of sodium, potassium, calcium, chloride, lithium, phosphorus, magnesium and their clinical significance.

Unit III

Acid base balance test, Xylose Absorption test and insulin tolerance test, Urea and creatinin clearance tests and their significance. Renal function tests and their clinical interpretation.

Principle techniques and clinical significance : Glycosylated Hb (HbA1C), Liver function tests.

2nd Year
CLINICAL BIOCHEMISTRY – II
(METABOLIC AND BLOOD CHEMISTRY)
(Practical)

Paper code: MUBMLT 207

Max Marks -70

The syllabus of practical will be relevant portion of Theory.

2nd Year
MEDICAL MICROBIOLOGY-I
(BACTERIAL PATHOGENS & ASSOCIATED DISEASES)

Paper code -203

Max Marks -70

Unit I

Normal Micro flora of Human Body: Skin, respiratory system and genitourinary tracts. Source of infection, mode of spread and portals of entry.

Description, pathogenicity, mode of infection, incubation period and toxigenicity of:-

Staphylococcus.

Streptococcus.

Pneumococcus.

Neisseria.

Bordetella.

Haemophilus.

Unit II

Host parasite interaction in bacterial infections. Pathogenic properties of bacteria (colonization of surfaces, invasion of tissue, production of exo and endo toxins). Anti bacterial defense of the host.

Description, pathogenicity, mode of infection, incubation period and toxigenicity of:-

1. Corynebacteria, Erysipelothrix, Listeria .

2. Mycobacteria

3 Atypical Mycobacteria

4. Anthrax Bacillus

5. Yersenia, Pasteurella & Francisella

Unit III

Physiology & Biochemistry of Bacteria: Protein, carbohydrate, lipids and nucleic acid as antigens.

Description, pathogenicity, mode of infection, incubation period and toxigenicity of:

1. Salmonella

2. Shigella

3. Proteus

4. Pseudomonas, Loefflerella

5. Vibrio

6. Escherichia coli

7. Clostridia

2nd Year
MEDICAL MICROBIOLOGI II
(TECHNICAL METHODS IN MEDICAL MICROBIOLOGY)

Paper code 204

Max marks-70

Unit I

The role of laboratory in the diagnosis and control of infections: Management and quality control of medical microbiology laboratory.

- a) Specimen collection from patients, clinics and hospitals.
- b) Specimen collection for epidemiological investigations.
- c) Training of medical microbiologist to handle epidemics.

Morphology, Staining, Cultural Character of Bacteria, Selective cultural media, Identification by special tests, Biochemical reactions and sero-typing of:

- a) Grams positive cocci :- Cluster forming, chain forming and diplo- cocci.
- b) Neisseria, Bordetella and Haemo philus.

Pathogenesis and Pathology of infections caused by 2 (a) and 2 (b).

Unit II

Isolation of pure culture and its preservation.

Morphology, Staining, Cultural character, Selective cultural media ,Identification by special tests ,Biochemical reactions and Sero-typing of:-

1. Corynebacterium
2. Mycobacterium
3. AtypicalMycobacterium
4. Anthrax bacillus
5. Brucella
6. Yersenia and Pasteurella

Pathogenesis and Pathology of infections caused by (1 to 6).

Unit III

Microbial drug sensitivity test and its clinical interpretation

Morphology, Staining, Cultural character, Selective cultural media, Identification by special tests, Biochemical reactions and Serotyping of:-

1. Salmonella
2. Shigella
3. Proteus
4. Pseudomonas
5. Vibrio
6. Escherichia coli
7. Clostridia

Pathogenesis and Pathology of infections caused by Salmonella, Shigella, Proteus, Pseudomonas, Vibrio, Escherichia coli,Clostridia.

2nd Year
MEDICAL MICROBIOLOGI II
TECHNICAL METHODS IN MEDICAL MICROBIOLOGY (Practical)

Paper code 208

Max marks-70

The syllabus of practical will be relevant portion of Theory.

2nd Year
PATHOLOGY AND ALLIED SUBJECTS-I
(HAEMATOLOGY & CLINICAL PATHOLOGY)

Paper code: MUBMLT 205

Max Marks-70

Unit I

Coagulation: Mechanism of coagulation, coagulation regulation, hyper coagulable states, coagulation disorders.

Bleeding Disorders: Various types, vascular abnormalities, role of platelet in haemostasis, platelet disorders, and thrombosis and thrombohaemorrhagic disorders.

Anemia's : Definition, various types of anaemia, causes of anaemia, changes in the blood morphology due to anaemia.

Unit II

Leucocytosis, neutropenia & pancytopenia their causes & significance infectious mononucleosis.

Hematological Malignancies: Various types of malignancies such as Leukemia Lymphomas including multiple myeloma. Their identification & clinical features.

Lab investigation in Haematological malignancies.

Unit III

Haematological changes in systemic disorders. Their microscopic picture with identification and clinical features. Hematological aspects of pediatric and geriatric age groups. Hematological disorders in pregnancy and their blood picture. Hematological changes in AIDS.

Various parasites in blood and their clinical significance. Lab investigations and methods of identification.

Organization, planning and management of blood bank. Donor selection and its various aspects. Selection of blood and the guidelines for transfusion practice quality control and safety and basic management of blood bank.

2nd Year
PATHOLOGY AND ALLIED SUBJECTS-II
(HISTOPATHOLOGY & CYTOLOGY TECHNIQUES)

Paper code: MUBMLT 206

Max Marks-70

Unit I

Reception recording and labeling of histology specimen. Fixation and various fixatives.
Processing of histological tissues for paraffin embedding.
Processing of histological tissues for paraffin embedding.
Embedding- various methods.
Microtomes- various types of their working principle and maintenance.

Unit II

Section cutting- faults and remedies. Microtome knives and knife sharpening.
Dye chemistry theory and practice-of staining.
Routine staining procedures H and E mounting and mounting media.
Solvents mordents accelerators and accentuators.

Unit III

Uses of controls in various staining procedures.
Special staining procedures for connective tissues carbohydrates amyloids and pigments.
Meta chromasia and meta chromatic dyes.
Museum techniques.

2nd Year
PATHOLOGY AND ALLIED SUBJECTS-II
HISTOPATHOLOGY & CYTOLOGY TECHNIQUES (Practical)

Paper code: MUBMLT 209

Max Marks-70

The syllabus of practical will be relevant portion of Theory.

3rd Year
CLINICAL BIOCHEMISTRY- I
(BIOSTATICS, AUTOMATION & ENDOCRINOLOGY)

Paper code: MUBMLT 301

Max Marks-70

Unit I

Basic bio-statics for clinical quality control. Standard deviation, standard error, coefficient of variation, normal distribution, t-test and chi-square test.

Establishment and maintenance of quality control for laboratory tests based upon medical usefulness.

Terminology of quality control and quality control charts.

Unit II

Normal ranges of various bio-metabolites and their confidence limits.

Automation: Handling of automatic analyzers, organization and management of hospital laboratory.

Unit III

Toxicology: Alcohol, heavy metals (Zinc, Hg etc.) salicylate, drug abuse, screening and drug interference with laboratory findings.

Endocrinology: Estimation of growth hormone, ACTH, sex hormone binding globulin, aldosterone, parathormon, cortisol and 17-hydroxylprogesteron and their clinical significance.

3rd Year
CLINICAL BIOCHEMISTRY -II
(DIAGNOSTIC ENZYMOLOGY)

Paper code: MUBMLT302

Max Marks-70

Principle of assay, procedures and clinical significance

Unit I

1. Principles of enzyme activity determination. Units for expressing enzyme activity. Factors affecting enzyme activity. Mechanism responsible for abnormal enzyme levels.
2. Isoenzymes- Serum CPK, CK- MB,LDH, SGOT (AST), SGPT (ALT), Cholinesterase HBDH, amylase, alpha amylase, lipase, aldolase and myoglobin.

Unit II

1. Serum leucine, amino peptidase, alkaline and acid phosphatases.
2. Fructosamine test in semen.
3. Analysis of renal biliary and prostatic stones. Tests for foetal well being by amniotic fluids. Analysis for alpha- foetoprotein and lactogen and their clinical significance.

Unit III

1. Gastric analysis, free and total acidity, pentagastrin test, histamine and caffeine stimulation tests.
2. Thyroid function test: T3, T4, TSH, Free T3, Free T4, protein bound iodine (PBI) thyroglobulin and LATES.
3. Infertility profile: TSH, FSH, LH, Testosterone, Estrogen, Prolactin and DHEAA sulphate.

3rd Year
CLINICAL BIOCHEMISTRY -II
DIAGNOSTIC ENZYMOLOGY (Practical)

Paper code: MUBMLT307

Max Marks-70

The syllabus of practical will be relevant portion of Theory.

3rd Year
MEDICAL MICROBIOLOGY- I
(PATHOGENIC VIRUSES AND MISC. MICROBES)

Paper code: MUBMLT303

Max Marks-70

Unit I

1. Misc. microbes: Actinomyces, Nocardia, Donovanias, Treponema, Chlamydia, Rickettsiae, Mycoplasma and Pathogenic fungi. Pathogenesis, pathology and lab diagnosis.
2. Pox -viruses: Smallpox, Vaccinia, Molluscum Contagiosum.
3. Herpes Virus: H Simplex, Chickenpox- Zoster, CMV, IMN and Burkitt's Lymphomas.
4. Adenoviruses: Pharyngeal infections, Respiratory infections and Conjunctival infections.

Unit II

1. Orthomixoviruses (Influenza types A, B, C, etc.): Influenza.
2. Paramyxovirus: Respiratory infections, mumps and measles.
3. Miscellaneous Viruses: Rubella, Corona arena viruses: Rubella common cold lymphocytic choriomeningitis.
4. Picorna Viruses: Enteroviruses, Poliomyelitis aseptic meningitis and Epidemic myalgia. Rhinoviruses - Common cold.

Unit III

1. Hepatitis Viruses: Infectious and serum hepatitis.
2. Arbo Viruses: Encephalitis yellow fever, Dengue fever.
3. Rhabdo Viruses: Rabies.
4. SLOW and Oncogenic Viruses: Scrapie kuru and animal virus tumors.
5. Cell culture and observation of effect of viruses on cell: Technique, procedure and interpretation of results.

3rd Year
MEDICAL MICROBIOLOGY - II
(APPLIED MICROBIOLOGY & ADVANCE TECHNIQUES)

Paper code: MUBMLT 304

Max Marks-70

Unit I

1. Preparation of container and swabs for collections of specimens for microbial examinations.
2. Portal regulation and transport of specimen.
3. Flowchart of lab diagnostic procedures.
4. Documentation of specimen in laboratory.
5. Preservation of Micro-organism: Periodic subculture method, cold storage, freezing, deep freezing, lyophilization methods. Total and viable counts of bacteria.

Unit II

1. Human Parasitology: Protozoa, Rhizopoda and Helminth.
2. Immunology and sero-diagnosis.
3. Prophylactic mass immunization.
4. Nosocomial infection and sterility testing of I.V. fluids and processing of various samples for various hospital infections.

Unit III

1. Pathology, lab-diagnosis and control of common infections and infestations.
2. Cell, tissue and organ culture.
3. Specific serological methods of diagnosis.
4. Test for bacterial sensitivity to antimicrobial and their interpretation.
5. Specific culture and drug sensitivity in methods.
6. Advance diagnostic techniques in Medical Microbiology: Torch profile, myco, dot, IgG, IgA, IgM and IgE testing. Australia Ag (HBsAg) etc.

3rd Year
MEDICAL MICROBIOLOGY - II
(APPLIED MICROBIOLOGY & ADVANCE TECHNIQUES (Practical))

Paper code: MUBMLT 308

Max Marks-70

The syllabus of practical will be relevant portion of Theory.

3rd Year
PAHTOLOGY & ALLIED SUBJECTS - I
(IMMUNOPATHOLOGY & TRANSFUSION MEDICINE)

Paper code: MUBMLT 305

Max Marks-70

Unit I

1. Introduction and antigens.
2. Cells and organs of the immune system.
3. Immunoglobulin antibodies.
4. Humoral& Cellular immune response.
5. Detection of various allergic agents and immune-pathology of allergy.
6. Rheumatological diseases: Pathogenesis and Lab diagnosis.

Unit II

1. Infections, Inflammation and the immune system.
2. Cancer immunology & tumor markers.
3. Tissue typing for kidney transplant & bone marrow transplant.
4. Laboratory tests for demonstration of antigen, antigen - antibody reaction and cell mediated immunity.
5. Laboratory investigations in megaloblastic anaemias (Iron deficiency, megaloblastic hemolytic)

Unit III

1. Pathogenesis and laboratory investigations in Leukemia's.
2. Laboratory investigation in coagulation disorder, bleeding disorder, disseminated intra vascular coagulation (DIC),Platelet functions tests.
3. Cytogenetic in hematology.
4. Radioisotopes and their applications.

3rd Year
PATHOLOGY AND ALLIED SUBJECTS -II
(HISTOPATHOLOGY & CYTOLOGY)

Paper code: MUBMLT 306

Max Marks-70

Unit I

1. Types of tissue seen in histopathology i.e. Connective tissue, epithelial tissue, glandular, benign malignant tumor tissue, bone tissue etc.
2. Handling of fresh histological specimen (tissues) cryo /frozen sections of fresh and fixed tissues, freeze drying.
3. Lipids, identifications and demonstration.
4. Micro-organism in the tissue-various staining, techniques for their demonstration and identifications.
5. Nucleic acids, DNA and RNA special stains and procedures.

Unit II

1. Cytoplasm constituents and their demonstration.
2. Tissues requiring special treatment i.e. eye ball B.M. biopsy, under calcified bones.
3. Neuro pathological techniques.
4. Enzyme histo -chemistry demonstration of phosphatases, dehydrogenases, oxidase and peroxidases etc.
5. Electron microscope, working principles, components and allied techniques for electron microscopy, ultra- microtomy.

Unit III

1. Immunohistochemistry.
2. Cervical cytology-basis of detection of malignant and pre-malignant lesions.
3. Hormonal assessment with cytological techniques.
4. Demonstration of sex chromatin.
5. Aspiration cytology principles indication and utility of the techniques with special emphasis on role of cyto-technician in FNAC clinics.

3rd Year
PATHOLOGY AND ALLIED SUBJECTS -II
HISTOPATHOLOGY & CYTOLOGY (Practical)

Paper code: MUBMLT 309

Max Marks-70

The syllabus of practical will be relevant portion of Theory.