

# DISTRIBUTION OF MARKS TO VARIOUS DISCIPLINES

## I<sup>st</sup> Year

Paper No.	Theory/Paper	Paper code	Duration	Theory (M.M)		Total	Practical (Max. Marks)		Total
				Sessional	Annual		Sessional	Annual	
I	Human Anatomy & Physiology		3 hrs	30	70	100	30	70	100
II	Basic Pathology		3 hrs	30	70	100			
III	Clinical Biochemistry		3 hrs	30	70	100	30	70	100
IV	Preventive Medicine & Health Care		3 hrs	30	70	100			
V	Microbial Biology		3 hrs	30	70	100	30	70	100
VI	Technical Methods in Microbial Biology		3hrs	30	70	100			
<b>Total Marks</b>				180	420	600	90	210	300

## 2<sup>nd</sup> Year

Paper No.	Theory/Paper	Paper code	Duration	Theory (M.M)		Total	Practical (Max. Marks)		Total
				Sessional	Annual		Sessional	Annual	
I	Clinical Biochemistry-I (Separative & Istru. Techniques)		3 hrs	30	70	100	30	70	100
II	Clinical Biochemistry-II (Metabolic & Blood Chemistry)		3 hrs	30	70	100			
III	Medical Microbiology-I (Bacterial Pathogens & Asso. Diseases)		3 hrs	30	70	100	30	70	100
IV	Medical Microbiology-II (Technical Methods in Medical Microbiology)		3 hrs	30	70	100			
V	Pathology & Allied Subject-I (Haematology & Clinical Pathology)		3 hrs	30	70	100	30	70	100
VI	Pathology & Allied Subject-II (Histopathology & Cytology Techniques)		3hrs	30	70	100			
<b>Total Marks 2<sup>nd</sup> year</b>				180	420	600	90	210	300

## 3<sup>rd</sup> Year

Paper No.	Theory/Paper	Paper code	Duration	Theory (M.M)		Total	Practical (Max. Marks)		Total
				Sessional	Annual		Sessional	Annual	
I	Clinical Biochemistry-I (Biostatistics Automation & Endocrinology)		3 hrs	30	70	100	30	70	100
II	Clinical Biochemistry-II (Diagnostic Enzymology)		3 hrs	30	70	100			
III	Medical Microbiology-I (Pathogenic Viruses & Misc. Microbes)		3 hrs	30	70	100	30	70	100
IV	Medical Microbiology-II (Applied Microbiology & Advanced Tech.)		3 hrs	30	70	100			
V	Pathology & Allied Subject-I (Immunopathology & Transfusion Medicine)		3 hrs	30	70	100	30	70	100
VI	Pathology & Allied Subject-II (Histopathology & Cytology)		3hrs	30	70	100			
<b>Total Marks 3<sup>rd</sup> year</b>				180	420	600	90	210	300

**Note:** Course Structure (Teaching duration) will be of 2 hrs / week for Theory & 3 hrs /week for Practicals for each paper.

The minimum pass marks will be 40 % in individual subjects in theory and Practical and 50% in Aggregate.

# **CURRICULUM (SUBJECT WISE) SYLLABUS FOR MEDICAL LAB. TECHNOLOGY**

## **PAPER II: BASIC PATHOLOGY**

### **Unit I**

Introduction to 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 samples.

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

### **Unit II**

Romanowsky dyes, preparation and staining procedure 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 complement system, gross structure and development of cells concerned with antibody production, cellular processes involved in antibody formation.

### **Unit III**

Pathology of inflammation in response to microbial invasion. Pathology of localized and systematic 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, SABC (subacute bacterial endocarditis) and rheumatological disorders.

Study of microbes responsible for pathogenesis of tumors and their oncogenesis.

Immuno- histopathology & Immuno – histochemistry (Basic Principles of Procedures and applications)  
Introduction to blood banking technology

## **B.Sc Medical Lab Technology I<sup>st</sup> year**

### **PAPER III: CLINICAL BIOCHEMISTRY**

#### **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's. (Unit of measurements and calibration of volumetric apparatus. Colorimetry, spectrophotometer, 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 methods of sterilization – dry and moist heat. Radiation, filtration, autoclaving and chemical disinfection.

Henderson – Hassalbach equation and its 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-ketosteroids and their clinical significance.

Physiological variation of biometabolytes 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, bilesalts, 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 proteins.

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.

## **B.Sc Medical Lab Technology I<sup>st</sup> year**

### **PAPER IV: PREVENTIVE MEDICINE AND HEALTH CARE**

#### **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.

**Infection and control:** Microbial Pathogenicity, 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 infections. 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 coliform 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 milk. Bacterial examination of ice-cream, shellfish and canned foods, milk bottles, crockery and cutlery. Examination of food stuff in cases of out break of food poisoning. Bacteriological examination of air and environment dust.

**Health care by balance diet and yoga:** Normal constituents of diet, various diet programs, balance diet and factors responsible for etiology of various nutritional disorders. Carcinogens in food. Role of regular exercise & yoga in prevention & management of various diseases.

**Health Planning & Management:** Health planning, Planning Cycle, Malaria eradication & various other National Health policy & Programs.

## **B.Sc Medical Lab Technology I<sup>st</sup> year** **PAPER V: MICROBIAL BIOLOGY**

### **Unit I**

**Microbiology & Medicine:** Introduction to Medical Microbiology, Discovery of micro-organisms, Contribution of Robert Koch, Antony Van Leeuwen hook, Louis Pasteur, Bordet, Paul Ehrlich, Alexander Fleming, Matchnikoff, Needham, Tyndall Jenson, Joseph lister, Karls 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 groups, 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 disinfection:** Various physical methods of sterilization – heat UV radiation, ionizing radiation, character affecting sterilization, auto clave control and sterilization indicators. Chemical disinfectants – phenol and its 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 Petri dishes. 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 & Enterobacteriaceae 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 condition required for growth. Effect of Carbon, Nitrogen, Growth factors, Vitamins, Temperature, pH, Osmotic pressure, Oxygen and Carbon Di oxide on microbial growth.

### **Unit III**

Lab. Organization, Management, Recording of Results and Quality Control in Medical Microbiology.

Principles of Staining Techniques, Preparation Stains and their storage.

**Introduction to Virology, Mycology & Parasitology:** (Characteristic, morphology, classification, nomenclature, pathogenesis).

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



# **B.Sc Medical Lab Technology I<sup>st</sup> year**

## **PAPER VI: TECHNICAL METHODS IN MICROBIAL**

### **BIOLOGY**

#### **UNIT I**

- 1. Microscopy:** Study of compound microscope-magnifying, numerical aperture, resolution and components of microscope. Dark ground illumination care of microscope and common difficulties. Micrometry Study of phase contrast, interference, fluorescent an 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 fluid. 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, intracytoplasmic lipids, polysaccharides, nuclear material, field's stain, stain for amoeba, 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, De-iodizer etc.
- 2. Microbiological Instruments:** Autoclave, Incubator, Hot air oven, Laminar Air flow, Colony Counter, Muffle furnace, Refrigerator, Incubator, Mac-Intos, intos field- jar etc.
- 3. Instruments used in immunology:** Electrophoresis, Immunodiffusion, starplate, 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, rat, 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 precaution in use of pathogens in teaching lab organization, management, recording of results and quality control n 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.

**B .Sc Medical Lab Technology 2<sup>nd</sup> year**  
**PAPER I: CLINICAL BIOCHEMISTRY-I**

***(SEPARATIVE AND INSTRUMENTAL TECHNIQUES)***

**Unit I**

Chromatography: Thin layer chromatography, gas liquid chromatography.

Electrophoresis-Paper and gel electrophoresis for hemoglobin, urinary proteins, serum CSF & LDH.

Colorimetry, flame photometry, atomic absorption spectroscopy.

**Unit II**

Immunochemical, Immunoprecipitation, Immunofixation and radial immunidiffusion test

Osmometry: Principle, procedure and applications.

Semi auto-analyzer, diluters & dry chemistry analyzer: Principal Procedure and applications.

**Unit III**

Principal Procedure And Application Of:

Coulter counters.

Enzyme Linked Immunosorbent Assay (ELISA) Reader.

Radio-Immunoassay. (RIA)

Polymerase chain reaction (PCR).

**B .Sc Medical Lab Technology 2<sup>nd</sup> year**  
**PAPER II: CLINICAL BIOCHEMISTRY-II**  
**(METABOLIC AND BLOOD CHEMISTRY)**

**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, A.G, urea, BUN, uric acid, creatinin 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.

Glycosylated Hb & Liver function tests. Principle technique and clinical significance.

**B .Sc Medical Lab Technology 2<sup>nd</sup> year**  
**PAPER III: MEDICAL MICROBIOLOGY-I**

**(BACTERIAL PATHOGENS & ASSOCIATED DISEASES)**

**Unit I**

Normal microflora 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*

*Neisseria*

*Streptococcus*

*Bordetella*

*Pneumococcus*

*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 defence 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. *Brucella*
6. *Yersenia, pasteurilla & 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. <i>Salmonella</i> | 4. <i>Pseudomonas, Loefflerella</i> |
| 2. <i>Shigella</i>   | 5. <i>vibrio</i>                    |
| 3. <i>Proteus</i>    | 6. <i>Clostridia</i>                |

**B .Sc Medical Lab Technology 2<sup>nd</sup> year**  
**PAPER IV: MEDICAL MICROBIOLOGY-II**

**(TECHNICAL METHODS IN MEDICAL MICROBIOLOGY)**

**Unit I**

The role of laboratory in the diagnosis and control of infection: 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 haemophilus.

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 serotyping of:-

- |                           |                             |
|---------------------------|-----------------------------|
| 1. Corynebacterium        | 4. Anthrax bacillus         |
| 2. Mycobacterium          | 5. Brucella                 |
| 3. Atypical Mycobacterium | 6. Yersenia and Pasteurella |

Pathogenesis and Pathology of infections caused by 2 (1 to 6)

**Unit III**

Microbial drug sensitivity test's and its clinical interpretation:

Morphology, Staining, Cultural Character, Selective cultural media, identification by special tests, biochemical reactions and serotyping of:-

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

Pathogenesis and Pathology of infections caused by 2 (1 to 7).

**B .Sc Medical Lab Technology 2<sup>nd</sup> year**  
**PAPER V: PATHOLOGY AND ALLIED SUBJECTS-I**

**(HAEMATOLOGY & CLINICAL PATHOLOGY)**

**Unit I**

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

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

Anaemias: 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 investigations in haematological malignancies.

**Unit III**

Haematological Changes in systematic 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.

**B .Sc Medical Lab Technology 2<sup>nd</sup> year**  
**PAPER VI: PATHOLOGY AND ALLIED SUBJECTS-II**  
**(HISTOPATHOLOGY & CYTOLOGY TECHNIQUES)**

**Unit I**

Reception recording and labeling of histology specimens.

Fixation and various fixatives.

Processing of histological tissues for Paraffin embedding.

Embedding and embedding media.

Decalcification – various methods.

Microtomes – various types 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.

**B .Sc Medical Lab Technology 3<sup>rd</sup> year**  
**PAPER I: CLINICAL BIOCHEMISTRY-I**

**(BIOSTATICS, AUTOMATION & ENDOCRINOLOGY)**

**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.) salicylates, drug abuse, screening and drug interference with laboratory findings.

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



**B .Sc Medical Lab Technology 3<sup>rd</sup> year**  
**PAPER I: CLINICAL BIOCHEMISTRY-II**

**(Diagnostic Enzymology)**

**(Principle of assay, procedure and clinical significance)**

**Unit I**

1. Principles of enzyme activity determination. Units for expressing enzyme activity.

Factors affecting enzyme activity. Mechanisms 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 fluid. 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 DHEA sulphate.

**B .Sc Medical Lab Technology 3<sup>rd</sup> year**  
**PAPER III: Medical Microbiology-I**

**(PATHOGENIC VIRUSES AND MISC. MICROBES)**

**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: Herpes Simplex, Chickenpox-Zoster, CMV, EBV and Burkitt's Lymphomas.
4. Adenoviruses: Pharyngeal infections Respiratory infections and conjunctival infections.

**Unit II**

1. Orthomyxoviruses (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.

**B .Sc Medical Lab Technology 3<sup>rd</sup> year**  
**PAPER IV: Medical Microbiology-II**

**(APPLIED MICROBIOLOGY & ADVANCE TECH.)**

**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-organisms: Periods subculture method, cold storage, freezing, deep freezing, lyophilization methods. Total and viable counts of bacteria.

**Unit II**

1. Human parasitology: Protozoa, rhizopoda and helminths.
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 agents and their interpretation.
5. Specific culture and drug sensitivity methods.
6. Advanced diagnostic techniques in Medical Microbiology: Torch profile, mycodot, IgG, IgA, IgM and IgE testing, Australia Ag (HBsAg) etc.

**B .Sc Medical Lab Technology 3<sup>rd</sup> year**  
**PAPER V: PATHOLOGY & ALLIED SUBJECT-I**  
**(IMMUNOPATHOLOGY & TRANSFUSION MEDICINE)**

**Unit I**

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

**Unit II**

1. Infection, 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-antibody reaction and cell mediated immunity.
5. Laboratory investigations in megaloblastic anaemias (Iron deficiency, megaloblastic, haemolytic).

**Unit III**

1. Pathogenesis and laboratory investigation in Leukemia's.
2. Laboratory investigation in coagulation disorder, bleeding disorder, disseminated intravascular coagulation (DIC), Platelet functions etc.
3. Cytogenetics in hematology.
4. Radioisotopes and their applications.

**B .Sc Medical Lab Technology 3<sup>rd</sup> year**  
**PAPER V: PATHOLOGY & ALLIED SUBJECT-II**  
**(HISTOPATHOLOGY & CYTOLOGY)**

**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, freezing 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. Cytoplasmic constituents and their demonstration.
2. Tissues requiring special treatment i.e. eyeball B.M. biopsy, undercalcified bones.
3. Neuropathological techniques.
4. Enzyme histochemistry demonstration of phosphates, 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 cytotechnician in FNAC clinics