



**PANJAB UNIVERSITY, CHANDIGARH-160014 (INDIA)**

**(Estd. under the Panjab University Act VII of 1947-enacted by the Govt. of  
India)**

**FACULTY OF MEDICAL SCIENCES**

**OUTLINES OF TESTS SYLLABI AND COURSES OF  
READING**

**FOR**

**BACHELOR OF SCIENCE( MEDICAL LAB TECHNOLOGY)**

**(B.Sc. M.L.T.)**

**For the Examinations of 2007 to 2016, 2017**

**Now new Nomenclature from examination 2018 is**

**B.Sc (Medical Laboratory Technology)**

## **Training and Syllabus:**

It is spread over 4 major laboratory disciplines and includes lectures and practicals. For practical training during the remaining time daily the students are posted in various labs and are engaged in day to day load together with the employed technicians under supervision by the technology teachers/faculty members/resident doctors. For this purpose the student spend 3 months every year in each of the 4 departments:

1. **BIOCHEMISTRY**
2. **MICROBIOLOGY:** including, bacteriology, Mycology, Parasitology and Virology.
3. **PATHOLOGY:** including Morbid Anatomy, Histotechnology, Cytology and Museum techniques.
4. **HAEMATOLOGY :- TRANSFUSION MEDCINE :** including Hematology Techniques, Blood Transfusion and Clinical Pathology.

## **CURRICULUM**

The details are provided in two parts:-

- i) Brief preamble for each subject including the period of study and posting.
- ii) Syllabus for each subject.

### 1. **BIOCHEMISTRY**

The candidate registering for B.Sc. Medical Lab Technology will be imparted basic training of theoretical and practical aspects in the field of Clinical Biochemistry. The students are made to learn the techniques of collections and preservation of samples, their estimation and recording of data. The student will also obtain the basic knowledge of Chemistry and metabolism of the relevant metabolites which are routinely estimated in relation to different diseases so as to obtain a clear understanding of the basic tests being performed by him/her. The principles of different techniques used for such estimations will also be imparted. The student will also be given basic training in laboratory management, safety measures, quality control aspects and automatic technology. The training in the subject is aimed at making the student work independently in advanced Clinical Biochemistry laboratory of any hospital or medical institution.

The student will be posted for training in the department of Biochemistry for a period of 13 weeks in each year. The distribution of time for theory and practical each year will be as under:

- |                              |          |
|------------------------------|----------|
| 1. Theory-Basic Biochemistry | 25 hours |
| 2. Practical                 | 50 hours |

During the remaining time daily, the student will under go practical training on skills of day diagnostic work pertaining to their lab of posting under supervision of faculty members/technology teachers/resident doctors.

2. **MICROBIOLOGY:**

The candidates registering for B.Sc Medical Lab. Technology course are given basic training in the field of Microbiology. The student is made to learn the techniques of collection of samples, their processing and the identifications of the various pathogens, like bacteria, parasites, viruses, using different techniques. In addition, the candidate is given vigorous training in the use of standard safety measures while handing highly infected material. The basic knowledge of the different diseases caused by various microorganisms is also imparted, so that he/she has a clear understanding on the assignment. The training is aimed at making the student competent to isolate and identify various micro- organisms independently. The student will be posted in the Baeterlogy, Parasitology, Virology and Mycology laboratories for a period of 13 weeks in each year as under:

1. Bacteriology, Immunology, Media room : 8 weeks
2. Parasitology Lab : 3 weeks
3. Virology and Mycology Lab : 2 weeks (1 week each) each

There will be 91 theory lectures and 39 practical as under:

SUBJECT	NO OF LECTURES			NO. OF PRACTICALS		
	I Year	II Year	III Year	I Year	II Year	III Year
Bacteriology, Immunology, Media and Sterilisation	18	14	14	6	6	6
Mycology	3	4	4	2	2	2
Parasitology	7	8	8	3	3	3
Virology	3	4	4	2	2	2

During the remaining time daily, the student will undergo practical training on skills of day to day diagnostic work pertaining to their lab posting under supervision of faculty members/technology teachers/resident doctors.

3. **HISTOTECHNOLOGY AND CYTOLOGY**

The training is aimed at preparing the student to prepare stained tissue sections of various types (paraffin, frozen). He/she would be able to provide special stains for procedures.

He/she should be able to collect exfoliative cytology smears, contact smears and perform Gene needle applications for cytological examination (under supervision) and carry out routine and special training procedure on cytology smears.

He/she should be able to organize the histopathology laboratory of the above services and provide basic equipment maintenance. He/she should learn systemic and basic museum display.

The student will be posted in the various laboratories as under:

**Period :**                    **13 weeks each year.**

SUBJECT	NO OF LECTURES			NO. OF PRACTICALS		
	I Year	II Year	III Year	I Year	II Year	III Year
HISTOPATHOLOGY	28 Gen. Anatomy Physiology	25 Techniques Human- Pathology	20 Techniques, Applied Histology	11	7	7
CYTOLOGY	2 Gen.	3 Stains	3 Hormonal cervical & FNAC	2	3	3
MUSEUM TECHNIQUES & OTHER DISPLAY TECHNIQUES	-	2	7	-	3	3

During the remaining time daily, the students will undergo practical training on skills of day to day diagnostic work pertaining to their lab posting under supervision of faculty members/technology teachers/resident doctors.

4. **HAEMATOLGY, CLINICAL PATHOLOGY & TRANSFUSION MEDICINE.**

The training imparted during the course will enable the student to carry out routine clinical lab. Investigations (blood, urine etc.) independently. He/she would also be able to plan routing hematology and operate equipment and its upkeep. He/ she would also be able to provide technical help for selected sophisticated hematologic techniques with adequate knowledge of principle involved. Training in lab. safety.

**HAEMATOLOGY:**

**LECTURES:**

1ST year	General Heamatology	20 lectures
2nd year	Fundamentals of Heamatology	20 lectures
3rd year	Applied heamatology	20 lectures

**PRACTICALS:**    13weeks each year.

The Student will be posted in the following laboratories for the period noted against each.

	I year	II year	III year
Clinical path & General hematology	13 weeks	-	-
Immuno- Hematology and blood transfusion	-	4 weeks	4 weeks
Coagulation lab.	-	5weeks	4 weeks
Specialised tests	-	4 weeks	5 weeks
	13 weeks	13 weeks	13 weeks

During the remaining time daily, the student will undergo practical training on skills of day to day diagnostic work pertaining to their lab of posting under supervision of faculty member/technology teachers/resident doctors.

## **BACHELOR OF SCIENCE, MEDICAL LAB TECHNOLOGY**

**(B.Sc. M.L.T.)**

### **DISRIBUTION OF MARKS**

	<b>First year (each subject)</b>	<b>Second year (each subject)</b>	<b>Third year (each subject)</b>
<b>Theory</b>	<b>90 Marks</b>	<b>90 Marks</b>	<b>90 Marks</b>
<b>Practical &amp; Viva Voce</b>	<b>90 Marks</b>	<b>90 Marks</b>	<b>90 Marks</b>
<b>Internal Assessment</b>	<b>10+10 Marks</b>	<b>10+10 Marks</b>	<b>10+10 Marks</b>
<b>Total</b>	<b>200 Marks</b>	<b>200 Marks</b>	<b>200 Marks</b>
<b>Grand Total</b>	<b>800 Marks</b>	<b>800 Marks</b>	<b>800 Marks</b>

# **SYLLABUS FOR FIRST YEAR**

## **I.A. BIOCHEMISTRY**

### **BASIC PRINCIPLES OF BIOCHEMISTRY:**

Introduction to medical technology, role of medical laboratory, technologists, ethics, responsibility, safety measure, first aid (accidents.)

Cleaning and care of general laboratory glassware and equipment, preparation and storage of distilled water, analytical balance, preparation of reagents and standard solutions, storage of chemicals.

Units of measurements. S.I. Units, measurement of volume, volumetric apparatus.(pipettes, flasks, Cylinders) Calibration of volumetric apparatus.

Radio isotopes and their use in Biochemistry, mole, molar and normal solutions pH, buffer solutions, pH-measurement, Osmosis, dialysis, surface tension.

Urine analysis (qualitative) for physical and chemical constituents i.e. sugar proteins, bile pigments, ketone bodies, porphobilinogen, faecal occult blood.

Collection and recording of biological specimens, separation of serum plasma preservation and disposal of biological samples material.

Basic statistics (mean, SD, CV, normal distribution, probability)

Normal or Reference range.

Definition, influencing factors, determination.

Volumetric analysis-Preparation of Standard acid and base solutions, chloride estimation.

## **SYLLABUS FOR FIRST YEAR**

### **I.B. HISTOTECHNOLOGY**

#### **(i) FUNDAMENTALS OF APPLIED HISTOLOGY:**

##### **INTRODUCTION:**

- i) Introduction to histopathology and laboratory organization.
- ii) Laboratory equipment, uses and maintenance.
- iii) Laboratory hazards and safety precautions.
- iv) Compound microscope-optical system, magnification and maintenance.

##### **ANATOMY AND PHYSIOLOGY:**

- i) The anatomic and physiological organization of human body and integrated physiology.
- ii) Cell organization and function.
- iii) Skeletal system, bones, joints and muscles.
- iv) Blood morphology chemistry and function.
- v) Respiratory system.
- vi) Cardiovascular system
- vii) Alimentary system, mechanism and physiology of digestion and absorption.
- viii) Liver structure and function.
- ix) Urinary system.
- x) Male genital system
- xi) Female genital system.
- xii) Nervous system.
- xiii) Spleen, lymph node and R.E. system.
- xiv) Endocrine glands and their functions.

##### **FUNDAMENTAL OF APPLIED HISTOLOGY:**

- i) Reception, recording and labeling of histology specimens.
- ii) Fixation and various fixatives.
- iii) Processing of histological tissues for paraffin-embedding.
- iv) Embedding and embedding media.
- v) Decalcification-various types-their mechanisms of action.
- vi) Microtome-various types, their working principle and maintenance.
- vii) Microtome knives and knife sharpening.
- viii) Practical section cutting, cutting faults and remedies.
- ix) Routine staining procedures, mounting and mounting media.
- x) Dye chemistry, theory and practice of staining.
- xi) Solvents mordents, accelerators and accentutators.
- xii) Uses of controls in various staining procedures.

(ii) **CYTOLOGY**

**LECTURES:**

Introduction of exfoliative cytology with special emphasis on female genital tract.

Collection processing and staining of Cytologic specimen.

**SYLLABUS FOR FIRST YEAR**

**I.C. HAEMATOLOGY**

**BASIC TECHNIQUES IN LABORATORY HAEMATOLOGY AND CLINICAL PATHOLOGY.**

1. Introduction to haematology and laboratory organization Lab safety and Instrumentation.
2. Formation of blood.
3. Composition and functions of blood.
4. Various anticoagulants, their uses, mode of action and their merits and demerits.
5. Collection & preservation of blood for various haematological investigations.
6. Physiological variations in HB, PCV, TLC and platelets.
7. Normal and absolute in haematology.
8. Quality assurance in hematology.
9. Haemoglobinometry, various methods of estimation of Hb, errors involved and standardization of instrument for adaptation for Hb estimation.
10. Haemocytometry, procedures for cell counts-visual as well as electronic. Red cell, leucocytes and platelet counts. Errors involved and means to minimize such errors.
11. Romanowsky dyes, preparation and staining procedures of blood smears.
12. Morphology of normal blood cells and their identifications.
13. Erythrocyte sedimentation rate, factors influencing ESR and various procedures for its estimation with their significance.
14. Haematocrit value by macro and micro methods their merits and demerits.
15. Routine examination of urine for microscopy.
16. Examination of biological fluids such as CSF, etc.
17. Examination of semen.



## **SYLLABUS FOR FIRST YEAR**

### **I.D. MICROBIOLOGY**

#### **A. MEDICAL MICROBIOLOGY PART-1 GENERAL MICROBIOLOGY:**

1. Introduction and brief history of microbiology.
2. Safety measures in microbiology.
3. General characteristics and classification of bacteria and fungi.
4. Growth and nutrition of microbes.
5. Care and maintenance of laboratory equipments.
6. Care and handling of various microscopes-Binocular, DGI, Phase-contrast, fluorescence and electron microscopes.
7. Principles and methods of sterilization.
8. Uses and mode of action antiseptics and disinfectants.
9. Handling and cleaning of glassware apparatus. Decontamination and disposal of contaminated material.
10. Preparation, uses and standardization of culture media.
11. Principles of staining methods and preparation of reagents.
12. Aerobic and anaerobic culture methods.
13. General characters and nature of antigens and antibodies.
14. Principles of Antigen-Antibody reactions.
15. Collection, transportation and processing of clinical samples for microbiology investigations.
16. Principles and mode of action of antibiotics and chemotherapeutic agents for bacteria and fungi.
17. Care and handling of laboratory animals.
18. Laboratory organization, management, recording of results and quality control in microbiology.

#### **B) VIROLOGY:-**

- Lectures:**
1. Introduction to Medical Virology.
  2. Nomenclature and classification of virology.
  3. General Characteristics of viruses physical, chemical and Biological properties.

#### **Practical:**

**Period of postings: 2 weeks**

1. Introduction to use of different laboratory instruments and their safety precautions.
2. Collections, handling, and storage of samples for viral diagnosis.
3. Washing, cleaning and sterilization of Media and glassware in Virology.

4. Principles of biosafety hoods, use of pipettes, syringes and other viruscontaminated instruments in the laboratory.
5. Demonstration of preservation of viruses, viral antigens, infects biological materials and viruses.

**C) PARASITOLOGY:**

**THEORY**

- Introduction to Medical and safety measures.
- General characters and classification of protozoa of medical importance.
- Morphology and life cycles of intestinal Protozon-Amoebac-Giardia.
- Laboratory diagnosis of intestinal protozoal infection:- Amoebae-Giardia.
- Morphology and diagnosis of oral and varinal flagellates -Trichomonas  
- E.gingvalia
- Morphology and life cycle of Haemoprotozoa - Malarial  
Parasite
- Laboratory diagnosis of Malarial infection.
- General characters and classification of medical Helminthology.
- Morphology and life cycles of Nematodes. -(Intestinal)  
-Ascaris  
-Enterobions  
- Ancylostoma  
-Strongyloides
- Laboratory diagnosis of intestinal Nematode infection.

**PRACTICALS:**

- Introduction to operation of laboratory instruments and safety precautions.
- Macroscopic examination of adult worms, cysts, tissues and processing of stool sample for routine examination.
- Saline and 12 preparation for protozoal cysts and trophozoites.
- Concentration procedures for helminthic ova and cyst.
- Examination and identification of ova and cyst of parasites of medical importance.

## **SYLLABUS FOR SECOND YEAR**

### **II.A. BIOCHEMISTRY**

#### **ANALYTICAL BIOCHEMISTRY AND METABOLISM**

Colorimetry Spectrophotometry, Flame photometry Atomic absorption spectroscopy, Electrometric determination of Na<sup>+</sup> and k<sup>+</sup>, chromatography, Electrophoresis.

Introduction, properties and simple metabolism of carbohydrates, proteins and fat Nucleic acids and Enzymes introduction, general properties.

Digestion and absorption.

Nutrition (Vitamins, Calories)

Radioimmunoassay (RIA) and ELISA.

## SYLLABUS FOR SECOND YEAR

### II.B. BASIC CELLULAR PATHOLOGY AND ALLIE TECHNIQUES:

#### HUMAN HISTOLOGY :

- I. Study of various body tissues:-
  - a) Epithelial tissue.
  - b) Connective tissue including bone and cartilage.
  - c) Muscular tissue.
  - d) Nervous tissue.
  - e) Glands-epithelial and endocrine.
  
- II HISTOLOGICAL STUDY OF VARIOUS SYSTEMS OF THE BODY:
  - a) The circulatory system.
  - b) The alimentary system.
  - c) The digestive system including liver, pancreas and gall bladder.
  - d) The respiratory system.
  - e) The urinary system.
  - f) The system of endocrine glands.
  - g) The reproductive system.
  - h) Nerve ending and organs of special senses.

#### FUNDAMENTALS OF APPLIED HISTOLOGY

1. Microscopy, working principle, maintenance and applications of various types of microscopes:-
  - Dark ground microscope.
  - Polarizing microscope.
  - Phase contrast microscope.
  - Interference microscope.
  - U.V. light microscope.
  - Micrometry.
2. Metachromasia and metachromatic dyes.
3. Haematoxylin stain. Its importance in histology.
4. Carbohydrates and amyloid ó special stains and procedures.
5. Connective tissues trichrome staining and other special stains for muscle fibres, elastic, reticulin fibres and collagen fibres.
6. Principles of metal impregnation techniques.
7. Demonstration and identification of minerals and pigments.

## **CYTOLOGY**

### **THREE LECTURES ON THE FOLLOWING SUBJECTS:**

1. Stains and cytologic preparation with special emphasis on MGG, and Papanicolou stains.
2. Special stains like PAS, Mucicarmine, Aleian blue, Schmorl and Acid phosphatase, Congo Red.
3. Cytologic screeing and quality control in cytology laboratory.

## **SYLLABUS FOR SECOND YEAR**

### **II.C. HAEMATOLOGY**

#### **FUNDAMENTALS OF HAEMATOLOGY**

1. History and discovery of blood group system.
2. ABO and Rhesus blood group system.
3. Compatibility tests in blood transfusion, complications and hazard of blood transfusion.
4. Laboratory investigations of transfusion reactions and mismatched transfusion.
5. Preparation of packed-cells and various fractions of blood for transfusion purposes.
6. Bone marrow aspiration composition and function.
7. Staining of bone marrow smears and preparation of histological section.
8. Hemoglobin, its synthesis, functions and degradation.
9. Hemoglobin, pigments and their measurement.
10. Abnormal hemoglobins and their means of identification and estimation.
11. LE cell phenomenon, and various methods of its demonstration.
12. Haemostatic mechanism and theories of blood coagulation.
13. Physicochemical properties of coagulation factors.
14. Screening coagulation procedures.
15. Quantitative assay of coagulation factors.

## **SYLLABUS FOR SECOND YEAR**

### **II.D. MICROBIOLOGY**

#### **I. IDENTIFICATION OF BACTERIA:**

Micrococci, Staphylococci, Streptococci, pneumococci, Corynebacteria, Escherichia, Klebsiella, Enterobacter, Proteus- providencia Salmonella, Shingella, Arizona, Citrobacter, Yersinia, Pseudomonas, Vibrio, Haemophilus, Mycoplasma, Rickettsia, Chalmydia, Tricragents.

#### **PATHOGENIC AND NEW-PATHOGENIC FUNGI:**

Candida, Cryptococci, Dermatophytes, Sporotrichoums, Histoplasma, Blastomyces, Coccidioides, Para-coccidioides, Dematiaceous fungi, Mycetoma, Actinomyces, Nocardia and common laboratory contaminants. Biochemical tests used for identification of bacteria and fungi. Antimicrobial sensitivity testing and assay methods for body fluids. Antimicrobial susceptibility testing for Mycobacteria. Preparation and standardization of antigens and antisera.

#### **VIROLOGY**

##### **Lectures:**

1. Different staining techniques used in virology.
2. Use of Embronated eggs in clinical Virology.
3. Principles of animal cell culture and their use in virology.
4. Use of common laboratory animals in viral diagnosis.

##### **Practicals:**

**Period of posting: 2 weeks**

1. Demonstration of staining procedures: Preparation of the following stains and demonstration of viral inclusion bodies:
  - a) Sellerø stain for Negri body demonstration.
  - b) Giemsa stain for CMV and Herpes viral inclusions.
2. Preparation of reagents for serological tests:  
Phosphate buffered saline, Veronal buffered saline, Alseverø solution, Dextrose gelatin, Veronal buffer and Tris buffer.
3. Principles and performance of viral haemagglutination and Haemagglutination inhibition test.
4. Demonstration of Haemadsorption test, IHA, and RPHA tests.
5. Collection titration and preservation of guinea pig serum for complement.
6. Demonstration of complement fixation test.
7. Demonstration of Immunofluorescence test and Immunoperoxidase test.
8. Demonstration of ELISA for HbsAg detection.

## PARASITOLOGY

Morphology and life cycle of haemoflagellates.

Laboratory diagnosis of leishmania, trypanosomes.

Morphology and life cycle of tissue and blood nematodes

Lab. Diagnosis of tissue & blood nematode infection. Morphology and life cycle of intestinal cestodes

Laboratory diagnosis of cestode infection

Culture techniques for protozoan amoeba, Giardia, Leishmania

Culture methods for Helminths Hookworm round worm.

Egg counting techniques.

Preparation of stains and staining procedures of malaria.

Identification of different plasmodium species.

Preparation of media and maintenance of cultures of E. histolytica.

Culture methods for helminthes

Putting up Casoni's test and its interpretation.

Examination hydatid cyst and processing for preparation of antigen for Casoni's Test.

Examination and processing of cysticercosis cyst.

Laboratory processing, staining and examination of samples.

-Leishmania  
-Trypanosomes

-Filaria  
-Trichinella  
-Dracunculus

-Taenia  
-Echinococcus  
-H.nana  
-D. latum  
-Hydatid  
-Cysticercosis

-Giardia  
-Leishmania



## **SYLLABUS FOR THIRD YEAR**

### **III.A. BIOCHEMISTRY**

#### **CLINICAL BIOCHEMISTRY METHODS:**

Principal of the assay procedures for biological materials, Total proteins, albumin, Glucose, Urea, Uric acid, Creatinine, Cholesterol and Bilirubin.

Sodium, Potassium, Chloride Calcium and Inorganic phosphate.

PBI, 17 Ketosteroids, Barbiturates.

Glucose tolerance test, insulin tolerance test, gastric analysis, xylose absorption test, clearance test for renal function. Enzymes-Acid Alkaline phosphatase, AST, AET, Amylase and Lactate dehydrogenase CPK.

Analysis of calculi and CSF.

Quality control of clinical investigations, Automation In clinical biochemistry laboratory, laboratory organization management and maintenance of records.

## **SYLLABUS FOR THIRD YEAR**

### **III.B. APPLIED HISTOLOGY:**

1. Handling of fresh histological specimens (tissues) cryo/frozen sections of fresh and fixed tissues, freeze drying.
2. Lipids identification and demonstration.
3. Micro-organisms in the tissues-various staining, techniques for their demonstration and identification.
4. Nucleic acids, DNA and RNA special stains and procedures.
5. Cytoplasmic constituents and their demonstration.
6. Tissues requiring special treatment i.e. eye ball E.M. biopsy, undercalcified bone.
7. Autopsy techniques
8. Immunohistochemistry demonstration.
9. Special microscopy-various types, EM.
10. Museum techniques, microphotography and other display material teaching material development.

### **CYTOLOGY**

#### **LECTURES:**

#### **THREE LECTURES ON THE FOLLOWING SUBJECTS**

1. Cervical cytology-basis of detection of malignant and premalignant lesions.
2. Hormonal assessment with cytologic techniques and sex chromatin and pregnancy tests.
3. Aspiration cytology-principles, indications and utility of the technique with special emphasis on role of cytotechnician in FNAC clinics.

### **IMMUNOPATHOLOGY**

#### **LECTURES:**

1. Cells and organs of the immune system.
2. Immunoglobulins, antibodies and humeral immune response.
3. Allergy.
4. Rheumatological diseases and investigations.
5. Infection and the immune system.
6. Cancer Immunology.

## **SYLLABUS FOR THIRD YEAR**

### **III.C. HAEMATOLOGY**

#### **APPLIES HAEMATOLOGY:**

1. Definition and classification of anaemias.
  2. Laboratory investigation for megaloblastic anaemia.
  3. Laboratory investigation for iron deficiency anaemia.
  4. Laboratory investigation for haemolytic anaemia including classification and causes.
  5. Leukemia: definition and classification.
  6. Cytochemical staining procedures in various haemopoietic disorders.
  7. Laboratory test for assessing bleeding disorders.
  8. Laboratory investigation for disseminated intravascular coagulation (DIC).
  9. Mechanism of fibrinolysis: tests for fibrinolysis.
  10. Platelet function tests and their interpretation.
  11. Techniques available for cytogenetic studies.
  12. Use of Radioisotopes in haematology.
  13. Safety measures for handling Radioisotopes.
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## SYLLABUS FOR THIRD YEAR

### III.D. MICROBIOLOGY

#### APPLIED MICROBIOLOGY:

1. Preservation of microbes and Lyophilisation methods.
2. Total and viable counts of bacteria.
3. Testing of disinfectants-Rideal-Walker, Chick-Martin and In-use tests.
4. Preparation and standardization of vaccines and immunization schedule.
5. Bacteriological examination of water, milk, food and air.
6. Nosocomial infections and sterility testing of I/V fluids and processing of various samples for hospital infections.
7. Toxin-Antitoxin assays and pathogenicity tests.
8. Epidemiological markers of microorganisms-Serotyping, Bacteriophage and Bacteriocine typing methods.
9. Lab, Diagnosis of common bacterial infection viz:  
Pyogenic infections, Respiratory tract infections, Meningitis, Diphtheria, whooping cough, Gas gangrene, Food-poisoning, Enteric fever, Acute diarrhoea diseases, Cholera Urinary tract infection, Tuberculosis, Leprosy, Plague, Anthrax, Typhus fever, Syphilis, Gonorrhoea and other STDs.
10. SEROLOGICAL TESTS:  
Widal, ASO, LFT, CRP, Rosewaller, Brucella agglutination, cold agglutination, VDRL, TPHA, FTA-ABS.
11. Lab diagnosis of fungal infections viz:Superficial Dermatophyle fungal infections Candidiasis, Cryptococosis, pulmonary infections, Mycetoma, other deep mycotic infections, subcutaneous fungal infections-Sporotrichosis, Chromoblastomycosis, Eye and Ear fungi infections.
12. Serological tests for fungal infections and skin tests.
13. Advanced techniques in microbiology-ELISA, RIA, CCIEP, Co-agglutination GLC, HPLC etc.
14. Rapid diagnostic methods and Automation. in Microbiology.

#### BASIC VIROLOGY METHODS:

Period of posting

2 weeks.

#### Lectures:

1. Principles of serological techniques used in Virology-Part 1:HA, HAI, Had, SRH, RPHA, IHA, CFT, CIEP.
2. Principles of Serological techniques used in Virology-Part-11 Nt, ELISA, RIA, IF, Immuno-peroxidase test.
3. Mode of transmission of viral agents.
4. Prevention of viral diseases.
5. Immunity in viral infection.

## Practical

## Period of Posting:

1. Demonstration of anatomical structure in fertile hen's egg.  
-Inoculation of fertile eggs.  
-Egg Inoculation techniques into a) Chorioallantoic, b) Membrane  
c) Allantoic cavity d) Yolk sac  
-Harvesting of the materials from eggs inoculated by these methods.
2. Inoculation of virus infected material mice by following routes:  
a) Intracerebral b) Intravenous c) Intraperitoneal d) Subcutaneous
3. Harvesting of infected mouse brain for rabies virus.
4. Preparation of tissue culture media:-  
a) Hank's Balanced salt solution b) Earle's Balanced salt solution  
c) Minimum Essential medium.
5. Collection of blood from:  
-Mice -retro orbital route  
-One day old chick -Cardiac bleeding
6. Preparation of Guinea pig kidney powder for Paul Bunnell Test.
7. Demonstration of Arboviral antigen-preparation from mouse brains for HAI and CFT test.
8. Demonstration of Herpes viral antigens in tissue culture system.

## PARASTOLOGY

### TOPIC

Morphology and life cycle of

Diagnosis of Morphology and life  
Cycle of trematodes

Serological and immunological  
Techniques used in diagnosis

### NO OF LECTURES: '8'

-Free living Amoebae  
-Balantidium  
-Toxoplasma

-Schistosomes  
-Intestinal Flukes  
-Blood Flukes

-Gel - diffusion  
- IHA, IFA, ELISA  
Indirect Fluorescent antibody

## **INTRODUCTION OF ENTOMOLOGY**

### **Identification of adult worms**

- Mosquitoes
- Flies
- Ticks and fleas

Animal care, Handling and uses in parasitology.

Preparation of parasitic antigens and antisera. Handling and operating of sophisticated equipments.

### **Practical:**

- Serological and immunological tests used in parasitology.
- Electrophoretic techniques
- Preparation of various parasitic antigens and standardization.
- Differentiation of various mosquitoes. Flies, worms and ticks.
- Usage of laboratory animals

Gel -diffusion

- Bleeding
- Routes of inoculation.

## BOOKS RECOMMENDED FOR READING

### BIOCHEMISTRY

Sr. No.	Name of the Book Edition, Year	Name (s) of Author (s)	PUBLISHERS
1	Varley's Practical Clinical Biochemistry	A.H Gowehlock	Heineman Medical Books Ltd., London
2.	Lab Manual in Biochemistry	E.A.Storey V.G.Makarova	MIR Publishers 2 Perby Rizky 1-110 GSP Moscow
3.	Harper's Biochemistry	A.K.Murray	Prentice Hall of India Ltd., New Delhi
4.	Introduction to Practical Biochemistry	Plummer D.T.	Tata McGraw Publishing co, New Delhi
5.	Biochemistry	J.H.Ottaway D.K.APPS	ELBS English Language Book Society London.
6.	Outline of Biochemistry	P.E.Conn P.K.Stumpf R.H.Dol	John Willey & Sons 605, 3rd Ave, New York
7.	An Introduction to Medical Statistics	Martine Bland	ELBS Oxford University Press, London
8.	Clinical Chemistry in Diagnosis and treatment	E.J.Zilvn P.R.Panval P.D.Maryne	Edward Arnold P.G.Publishers Ltd.
9.	Microanalysis in Medical Biochemistry	Wooten I.D.P. Freeman H.	Churchill Livingston, London
10.	Fundamental of Clinical Chemistry	N.W.Tietz (Ed)	W.B.Saunders Co. Philadelphia USA
11.	Clinical Chemistry (Principles and Techniques.)	R.J.Henry D.C.Cannon J.W.Winkelman	Harper & Row Publishers Hagerstown, MD, USA

## **PARASITOLOGY**

Sr. No	Name of the Book Edition, Year	Name (s) of Author (s)	PUBLISHERS
1.	Diagnositc techniques in medical parasitology	Fleck and Moody	John Wright
2.	Tropical Medicine and Parasitology by.	Gold Smith and Heynemann	Appleton and Lange
3.	Essential Immunology	I.M.Rohit	ELBS
4.	Parasites:A guide to Laboratory Procedures and identifications	L.R. Ash and T.C.Orihel	Am. Soc. Clinical
5.	Parasitic Diseases	M.Katz	Springer-Verlog
6.	Immunodiagnosis of Parasitic diseases	Walls and Sohantz	Academic Press
7.	Diagnostic Colour atles and Textbook of Parasitology	-	Igaku-Shoin Med. USA
8.	Parasitology	N.C.Day	Indian

## **MICROBIOLOGY**

Sr. No.	Name of the Book Edition, Year	Name (s) of Author (s)	PUBLISHERS
1.	Clinical Microbiology	J.Stokes and G.L.Ridgeway	William & Wilkins
2.	Manual of Practical Medical Microbiology and Parasitology	T.R.Oberhofer	Churchill and Livingston
3.	Introduction in Medical Microbology	Anant-Narainyan	Indian
4.	Practical Medical- Microbiology	Mackie and MC Cathey	-
5.	Laboratory Mannual and work book for Microbiology in Health and Disease	Robert Fuerst	W.B.Sunderu



## **VIROLOGY**

Sr. No.	Name of the Book Edition, Year	Name (s) of Author (s)	PUBLISHERS
1.	Notes on Medical Virology	Timbery	Churchil
2.	Manual for rapid Laboratory diagnosis	-	W.H.O.

## **MORBID ANATOMY & HISTOPATHOLOGY**

Sr. No.	Name of the Book Edition, Year	Name (s) of Author (s)	PUBLISHERS
1.	Theory and practice of Histological Techniques	Bancroft and Stevens	Butreworths London
2.	Cellular Pathology Techniques	C.F.A. Culling	Buttreworths London

## **HAMATOLOGY AND CLINICAL PATHOLOGY**

Sr. No.	Name of the Book Edition, Year	Name (s) of Author (s)	PUBLISHERS
1.	An Introduction to Medical Laboratory Technology	F.J.Baker et al	Butterworths & C London
2.	Practical Haematology	J.V.Dacia And	Churchill Living Edinburgh
3.	Hematology for Medical Technologists	Charles F.Seiverd	-
4.	Technical Hematology	Arthur Simmens	J.B.Lippinport
5.	Clinical Diagnosis and Management by Laboratory Methods	Todd & Sanford	W.B.Saunders
6.	Medical Laboratory Technology	Lynch	W.B.Saunders
7.	Blood Coagulation and Haemostatis	Thomson J.	Churchill Living

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