

SYLLABUS

First year

Paper : 1 SYLLABUS for Principles of Epidemiology, Research Methodology, Biostatistics and Medical Ethics :-

UNIT I: EPIDEMIOLOGY

Introduction: Historical aspects and evolution of epidemiology, definitions and concepts in Epidemiology.

Natural history of disease. Approaches in Epidemiology. Descriptive and Analytical Epidemiology, Disease burden and Measures of risk and death. Epidemiological Investigations.

UNIT-II – RESEARCH METHODOLOGY

Principles of Research study designs, Sampling Methods, Sample size Estimation, Protocol writing and Measures of Association.

Introduction to Operations Research.

UNIT III: BIOSTATISTICS

Fundamentals of Biostatistics: Introduction, Types of data, Tabular and graphical presentation of data. Measures of location, dispersion and correlation: Measures of central tendency. Mean, mode, median, GM, HM, quartiles Measures of dispersion—Range, Standard Deviation, Variance, Coefficient of Variation.

Probability and statistical inference: Concept and probability distribution. Normal distribution—density curves, applications and statistical tables. Concept of significance tests, parametric and nonparametric tests, standard error and confidence intervals.

Inferential statistics: Probability and distributions – Poisson, Binomial and Normal distribution – Chi-square test – Hypothesis test - Student's t-test – Correlation and Regression – ANOVA.

UNIT IV: MEDICAL ETHICS

Bioethics and Medical ethics: Historical perspectives & Introduction to Bioethics, Nuremberg Code, Declaration of Helsinki, Principle of essentiality, informed consent, confidentiality, minimisation of risk, accountability and responsibility. Ethics of clinical trials: Drug trials, vaccine trials, Clinical Trials with medical devices/surgical procedures/radioactive materials, Research in transplantation and stem cell therapy. Regulatory framework and guidelines for conduction of human research: Review processes, Institutional ethical committees, composition of committees, review procedures, WHO, UNESCO and ICMR guidelines.

References :

1. Epidemiology: An Introduction. Kenneth J. J. Rothman. Latest edition / Pub. Date: May 2002. Publisher: Oxford University Press.
2. Epidemiology. Leon Gordis. Latest edition / Pub. Date: November 2004. Publisher: Elsevier Health Sciences.
3. Diseases and Human Evolution. Ethne Barnes. Latest edition / Latest edition / Pub. Date: March 2005. Publisher: University of New Mexico Press.
4. Epidemiology: Beyond the Basics. F. Javier Nieto, Moyses Szklo. Latest edition / Pub. Date: November 2003. Publisher: Jones & Bartlett Publishers, Inc.
5. Basic and Clinical Biostatistics. Beth Dawson, Robert G. Trapp, Robert Trapp. Latest edition / Pub. Date: March 2004.
6. Discovering Statistics Using SPSS. Andy Field. Latest edition / Pub. Date: April 2005. Publisher: SAGE Publications.
7. Arora PN & Malhon PK (1996). Biostatistics Imalaya Publishing House, Mumbai.
8. Sokal & Rohlf (1973). Introduction to Biostatistics, Toppan Co. Japan.
9. Stanton A & Clantz, Primer of Biostatistics — The McGraw Hill Inc., New York.
10. Government of India. Good Clinical Practices for Clinical Research in India. New Delhi: 2001
11. Indian Council of Medical Research. Ethical Guidelines for Biomedical Research on Human Subjects. New Delhi: 2000
12. United Nations Educational, Scientific and Cultural Organisation (UNESCO). Universal Declaration on Bioethics and Human Rights. Paris; 2005

PAPER – II GENERAL BIOCHEMISTRY, MEDICAL LABORATORY TECHNOLOGY

General Biochemistry

Unit – 1

Structure of Cell and intracellular organelles

Carbohydrates, lipids, proteins and nucleic acids – structure, classification, properties, functions and Separation techniques

Membrane structure, glycoproteins

Unit – 2

Enzymes: Classification, factors that alter enzymes catalyzed reaction, Michaelis – Menton

Equation, Competitive and noncompetitive inhibition of enzyme reactions, regulation enzyme activity, Isoenzymes – separation and identification, plasma enzymes in clinical diagnosis. Coenzymes.

Unit – 3

Bioenergetics and Oxidative phosphorylation; free energy -exergonic and endergonic reaction, high energy phosphates, components of electron transport chain-mechanism of ATP production, Chemiosmotic theory, inhibitor of respiratory chain.

Unit –4

Carbohydrate Metabolism; Glycolysis, TCA cycle, glycogen, gluconeogenesis, blood glucose regulation, diabetes mellitus

Lipid Metabolism: Synthesis and breakdown of fatty acids, ketone bodies, DKA, Cholesterol, bile acids, lipoproteins, atherosclerosis.

Unit – 5

Protein Metabolism: Synthesis and breakdown of amino acids, urea cycle, specialized products from amino acids.

Unit – 6

Molecular Biology: Structure and functions DNA, organization and replication, transcription, protein synthesis.

Recombinant DNA technology, PCR, FISH

Unit – 7

Vitamins, Water and mineral Metabolism: Functions and deficiency manifestations of Vitamin A, D, E, K, C, B Complex. Water and electrolytes, calcium, phosphorus, magnesium, iron, lead, copper, trace elements (iodine, selenium, zinc).

Practicals:

General Experiments:

1. Preparation of buffers and determination of pH
2. Absorption spectra of aromatic amino acids
3. Colour reactions of aminoacids
4. Normal and abnormal constituents of urine
5. Body fluid examination
6. Qualitative analysis and identification of sugars
7. Separation of sugars by paper chromatography
8. Qualitative analysis and identification of amino acids
9. Separation of aminoacids by paper chromatography, TLC
10. Separation of Lipids by TLC
11. Agarose gel electrophoresis
12. SDS_PAGE and quantitation using densitometers
13. Separation of proteins, hemoglobin, lipoproteins b electrophoresis using agarose gel
14. Studies on enzyme kinetics using enzyme sources such as acid phosphatase from potatoes, alkaline phosphatase from liver – effect of pH, Temperature and substrate concentrations
15. Assessment of antioxidant status: Vitamin C and E, glutathione, MDA, Paraoxonose in serum
16. PCR
17. ELISA
18. Western blot
19. Chemiluminascence
20. Blood gas analysis
21. Karyotyping
22. Molecular weight determination by PAGE

23. Cell fractionation
24. Protein purification by
 - a) NH_4SO_4 Precipitation

Recommended books

1. Harper's textbook of Biochemistry
2. Principles of Biochemistry by Lehninger
3. Dr. Vasudevan

References:

1. Biochemistry by Voet and Voet
2. Molecular Biology by Griffith

Recommended books for practicals

1. Practical Biochemistry – Plummer
2. Practical Biochemistry – Harold Varley
3. Tools in Biochemistry – Cooper
4. Lynch's Medical Lab Technology – Stanley S. Raphael

Medical Laboratory Technology

Unit -1

General Laboratory Techniques and procedures: Chemicals and related substance, general laboratory supplies, volumetric equipments and its calibration, centrifuges, balances and weighing, concept of solute and solvent, buffer solutions and their actions, physical and chemical units, units of measurements, safety measures.

Unit – 2

Specimen collection and processing: Collection and preservation of blood and urine, sources of biological variations, pre-analytical variables.

Analytical Techniques:

- A. Spectrophotometry, flame emission spectrophotometry, atomic absorption spectrophotometry, fluorimetry, nephelometry, turbidimetry, flow cytometry
- B. Electrochemistry – potentiometry, biosensors
- C. Chromatography – Theory, description of techniques of various types of chromatography, paper chromatography, HPLC
- D. Electrophoresis – Theory, description of techniques of various types of electrophoresis, technical considerations
- E. immunochemical techniques – basic concepts, antigen-antibody binding qualitative methods, quantitative methods.

F. Centrifugation techniques

G. Protein purification

H. Recombinant DNA technology – PCR, western blotting, northern blotting and southern blotting.

Automation: Concepts, automation of analytical processes, integrated automation for clinical laboratory, automation of point of care analyzers.

Unit -3

Laboratory Operation:

- a. Selection and evaluation of methods: Basic concepts, accuracy - reference methodology, systematic error, analytical range, sensitivity and speciality, detection limit, interferences within run-precision, recovery

Assessing method acceptability:

- b. Establishment and use of reference value
- c. Clinical laboratory information-computer system, micro-computer applications laboratory information systems, future use of computers.

Unit-4

Laboratory Management and Safety: Health care delivery and financial strategies for managed care, financial management, human resource management and space and facility management. Lab safety- safety program, safety equipments, chemical hygiene plan. Hazards in the laboratory- identification of hazards, chemical hazards, clinical hazards, electrical hazards, biological hazards. Prevention of hazards.

Quality management: Fundamentals, total quality management, total testing process, control of preanalytical and analytical variables, control of analytical quality using stable control materials, external quality assessment, documentation of reports, proficiency testing new quality initiatives.

PAPER – III GENERAL BACTERIOLOGY, IMMUNOLOGY AND PARASITOLOGY

General Bacteriology

Unit – 1

Brief history of microbiology with special reference to the contributions of Louis Pasteur, Robert Koch and others.

Morphology and physiology of Bacteria Classification and growth requirement of Bacteria
Principles and uses of different kinds of Microscopes

Unit- 2

Sterilization and disinfection procedures Basic principles of Bacterial genetics Cultivation methods

Antibiotic –antibiotic susceptibility testing.

Unit – 3

Sources and modes of transmission of infection with prevention of hospital acquired infection

Definition of Epidemic, Endemic, Pandemic and sporadic outbreak of diseases Virulence factors of Bacteria

Practicals

Handling of microscope, staining methods Preparation of media, inoculation methods Preservation of cultures, anaerobic cultivation methods

Washing and sterilization of glassware, handling of equipment Techniques of filtration, maintenance of quality control antibiotic susceptibility testing

Molecular techniques

Immunology

Unit – 1

Antigen, antibody definition, examples

Antigen-antibody reaction – principles and their application in the diagnosis of infectious diseases.

Unit- 2

Immunity- classification, active immunity, passive immunity, innate immunity, humoral and cell mediated immunity, immunization schedule

Unit- 3

Hypersensitivity-classification, mechanism and example autoimmunity – mechanism and example tumour and transplantation immunology.

Practicals

Demonstration of agglutination precipitation, neutralization, fluorescent Antibody technique, immune blot technique, ELISA etc

Test to demonstrate CMI

Test to demonstrate hypersensitivity Detection of ANA, Ds DNA etc

Parasitology

Unit – 1

Classification – protozoa-amoeba, flagellates, sporozoa, ciliates Opportunistic parasitic infections

Unit – 2

Helminthes – cestodes, trematodes.

Unit -3

Helminthes- nematodes and diagnostic methods in parasitology.

Practicals

Stool examination for ova and cysts Concentration methods

Peripheral blood smear examination Special staining methods

PAPER – IV HAEMATOLOGY AND CLINICAL PATHOLOGY:

Basic Principles of laboratory organization and safety

Sample Collection – principles of analytical, pre and post analytical errors Reception, labelling and recording of laboratory investigations

Cleaning of glassware, pipettes, E.S.R tubes and counting chambers Preparation of capillary pipette, distilled water, reagents, buffers

Collection of blood, preparation of blood smear, staining of blood and bone marrow smears.

Genetics

Continuity of life - heredity, variation; mendl's laws of inheritance, chromosomal basis of inheritance; other patterns of inheritance , mutation and chromosomal aberrations;

Human genetics - methods of study, genetic disorders.

DNA as a genetic material - its structure and replication; structure of RNA and its role in protein synthesis; Gene expression - transcription and translation

Basic techniques in Molecular Biology and cytogenetics

Equipment relevant to lab haematology and transfusion medicine including Mirroscope: Light, phase contrast, interference, fluorescence, polarization and electron microscopy (principle, parts and its application)

Photometry: Basic principal UV-Vis spectrometry and colorimetry instrumentation and its application

Fluorimetry: Principal, Instrumentation and application

Electrophoresis: Principal, types and application (agrose gel electrophoreses, starch gel and polyacrylamide electrophoresis)

Centrifuge: Basic principle, type analytical and preparative centrifuges, different density gradient centrifuge and analytical with its application

Blood analyzer: Principal, instrument and its application Incubator, hot air oven and autoclave: Principal, instrument and its application.

Radioactivity: Radioisotopes, half life units, Geeger Mueller counter, gamma counter and scintillation PH meter (principle types, types of electrodes and application)

Freezers, coolers platelet agitators, cryo thawing baths Automated immunohaematology analysers

Automated coagulation analysers, platelet aggregometers and hromboelastogram

Haemopiesis

Red Blood Cells :

Normal erythropoiesis, morphology

Red cell disorders – inherited and acquired

Anemias – classification, pathophysiology and diagnosis Haemolytic disorders

Malignant disorders

White Cells:

Normal myelopoiesis,

White cell disorders - inherited and acquired

Malignant disorders – classification, pathophysiology and diagnosis

Platelet disorders – classification, diagnosis and pathophysiology

PAPER – V GENERAL PATHOLOGY

Unit-1

- General introduction to pathology
- Causes of cell injury, cell injury and necrosis Apoptosis and sub cellular responses to cell injury
- Cellular responses to growth and differentiation, pathologic calcification
- Acute and chronic inflammation, morphologic patterns of acute and chronic inflammation, systemic effects of inflammation
- Complements and their functions Cytokines and their functions
- Intracellular accumulation, gangrene – pathology and classification, pathogenesis and classification of edema, reticulocyte structure
- Pathogenesis of thrombosis, embolism, infarction and shock

Unit-2

Control of normal growth, cell cycle illustration and the regulation of cell division, labile cells, stable cells, permanent cells, molecular events in cell growth (autocrine signalling, paracrine signaling, endocrine signaling), cell surface receptors, signal transduction systems and transcription factors.

Growth inhibition, growth factors, extra cellular matrix and cell matrix interactions, collagen, elastin, fibrillin and elastic fibres, adhesive glycoproteins and integrins, matricellular proteins, proteoglycans and hyaluronidase.

Repair by connective tissue- angiogenesis, growth factors and receptors for angiogenesis, extra cellular matrix proteins as regulators of angiogenesis.

Fibrosis, tissue modeling, wound healing, healing by first and second intention Haemo dynamic disorders – hemostasis and thrombosis.

Unit-3

Genetics (molecular basis of human diseases, production of human biologically active agents, gene therapy, disease diagnosis, mutations, mendelian disorders, autosomal dominant disorders, autosomal recessive disorders and X linked disorders)

Biochemical and molecular basis of single gene disorders.

Disorders with multifactorial inheritance, normal karyotype, fluorescence in situ hybridization, cytogenetic disorders involving sex chromosomes.

Diagnosis of genetic diseases. Direct gene diagnosis, indirect gene diagnosis, linkage analysis.

Unit – 4

Neoplasia, Nomenclature, characteristics of benign and malignant neoplasms Molecular basis of cancer, oncogenes and cancer, protein products of oncogenes

Activation of oncogenes, point mutations, chromosomal rearrangements, gene amplification, cancer suppressor genes, protein products of tumor suppressor genes.

Molecules that regulate nuclear transcription and cell cycle, Rb gene, P53 gene, BRCA-1 and BRCA-2 gene, molecules that regulate signal transduction, cell surface receptors, other tumor suppressor genes. Genes that regulate apoptosis and DNA repair, Telomeres and cancer, molecular growth, Kinetics of tumor cell growth, tumor, tumor angiogenesis

Lab diagnosis of cancer.

Practicals

Polymerase chain reaction

In situ hybridization

Cytogenetics

Unit - 5

Infectious diseases, new and emerging infectious diseases, categories of infectious diseases in brief, special techniques for diagnosing infections

Tuberculosis-etiology, pathogenesis and lab diagnosis Leprosy – etiology, pathogenesis and lab diagnosis

HIV- epidemiology, pathogenesis and lab diagnosis

Practicals

Western blot, Northern blot, Southern blot, CD4 CD8 counts

Systemic pathology

PAS (Periodic Acid-Schiff) stain

Romanowsky stain Stain for micro-organisms

Argentaffin and argyrophil stains Amyloid stains Reticulin stains

Trichrome stains

Phosphotungstic acid hematoxylin stain (PTAH)

Stains for hemodierin (Perls), melanin (Fontana) and calcium (von Kossa) Stains for neutral lipids Mucin stains Glemsa stain Elastica fibers Myelin stains

Enzyme histochemistry and immunoenzyme technique

Immunohistochemistry and the various immunohistochemical stains in the diagnosis of various disorders

Tissue of special interest – nervous system Hard tissue

Miscellaneous cells Endocrine cells Cytology technique Quantitative methods

Autoradiography (specimen radiography) Microincineration

Museum technique Specimen photography and microphotography Microscopy

- General microscopy
- Dark ground microscopy
- Immunofluorescence and fibers and formaldehyde induced fluorescence
- Fluorescence microscopy
- Polarizing microscopy
- Phase contrast microscopy
- Electron microscopy

Flow cytometry

Other methods for analysis of cell proliferation and Nucleolar Organiser region evaluation
polymerase chain reaction and application of PCR technology in Pathology cytogenetics interphase cytogenetics

SECOND YEAR

PAPER – I CLINICAL BIOCHEMISTRY, ENDOCRINOLOGY AND NUTRITIONAL BIO-CHEMISTRY

Clinical Biochemistry

Unit -1

Clinical Enzymology: Enzymes in plasma and their origin, general principles of assay, clinical significance of enzymes and isoenzymes, Measurement of serum enzymes in diagnosis – cardiac and skeletal muscle enzymes, liver and biliary tract enzymes digestive, **bone and gi disorders**.

Unit-2

Disorders of carbohydrate metabolism: diabetes mellitus – diagnosis, gestational diabetes mellitus, role of laboratory in diagnosis and prognosis in diagnosis and prognosis, hypoglycemia. Determination of glucose in body fluids, ketone bodies, lactate and pyruvate. Glycated proteins, urinary albumin excretion –specimen collection, storage and quantitative assay. Qualitative tests for individual sugars in urine. **Inborn errors of metabolism**

Disorders of Lipid Metabolism: Atherosclerosis and coronary artery disease. Disorders of lipoprotein metabolism. Measurement of lipids, lipoproteins and apolipoproteins. Sources of analytical and biological variations in measurements.

Disorders of protein metabolism: plasma proteins, proteins in body fluids. Analysis of proteins in blood and other body fluids. Electrophoresis of plasma proteins. Aminoacidurias-selected disorders of amino acid metabolism-phenylalanine, tyrosine, alkaptonuria, melanuria, cystinuria, homocystinuria, **cystinosis**, organic acidurias. Analysis of amino acids – screening test, quantitative tests for specific amino acids.

Unit-3

Disease related to organs: Liver- LFT, Jaundice, hepatitis, cholestasis

Kidney- RFT, renal failure, uremia, nephritic syndrome, renal calculi, renal tubular acidosis, diabetes insipidus, dialysis. Early markers of renal pathology – microalbuminuria, albumin: creatinine ratio.

GIT- Gastric and pancreatic function tests, pancreatitis, malabsorption syndrome.

Unit – 4

Electrolytes and blood gas analysis – specimens for electrolyte determination- sodium, potassium, chloride, bicarbonate, determination of pCO₂, O₂ and pH.

Unit – 5

Miscellaneous topics: Composition of CSF, meningitis, encephalitis, cancer, oncogenes, tumour markers, AIDS – basic concepts, diagnosis, Cytokinetics.

Endocrinology and Nutritional Biochemistry

Unit – 1

General concepts of endocrinology- the endocrine system, hormones- chemical nature, classification, hormonal action- receptors, hormone receptor interaction, regulation of gene expression by hormones, second messengers (cAMP, GMP, Ca⁺⁺) Protein kinase cascade. Concepts of hormones assay.

Unit- 2

Hypothalamus and pituitary- anatomy, chemistry, functions, regulation. Diseases related to the hormones of these glands. Assessment of anterior and posterior pituitary.

Unit – 3

Thyroid anatomy, chemistry, synthesis, functions, regulation, thyroid function test in various abnormal conditions, parathyroid – anatomy, chemistry, synthesis, functions, regulations, diseases of parathyroid glands.

Hormones involved in calcium and phosphate metabolism. Diseases related to its metabolism. Calcium chemistry and functions.

Unit- 4

Adrenal cortex and medulla – anatomy, chemistry, synthesis, metabolic effects, pathophysiology of the adrenal cortex. Assessment of adrenal functions, Gonadal hormones – anatomy, chemistry, functions, regulations and diseases related to these glands. Endocrinology of male and female infertility, pregnancy and lactation.

Unit – 5

Gastrointestinal and pancreatic hormones – chemistry, synthesis, metabolic effects, regulation, diseases related to the hormones of these glands. Detection of anomalies.

Unit - 6

Nutritional requirements of carbohydrates, proteins and lipids. Deficiency states of carbohydrates, proteins and lipid. RDA, Nutritional requirements of vitamins (fat and water soluble)- Structure, functions, deficiency states, dietary source, Nutritional requirements of macro and microelements- functions, deficiency states, dietary source, RDA.

Practicals

Procedures using automated analyzers

1. Estimation of blood glucose, GT, glycated haemoglobin, fructosamine, urine microalbumin.
2. RFT- Estimation of blood urea, serum creatinine, uric acid, GFR, urinary proteins, protein, Creatinine ratio.
3. LFT – Estimation of total bilirubin, total protein, albumin, SGOT, SGPT, ALP, GGT
4. Lipid profile- total cholesterol, triglycerides, HDL, LDL
5. Cardiac enzymes – creatinine kinase, CK- MB, LDH
6. Pancreatic function tests – amylase.
7. Estimation of calcium, phosphorous, magnesium, iron
8. Electrolytes
9. Quantitative analysis of urine- protein, uric acid, creatinine, calcium chloride
10. Analysis of CSF
11. Hormones: Thyroid profile- FT2, FT4, TSH, Fertility profile – LH, FSH, prolactin, estradiol, testosterone; cortisol, insulin
12. Tumor markers : P:SA
13. CAD risk assessment: Apo A, Apo B 100, hs Homocysteine, Lp(a)

PAPER – II SYSTEMIC BACTERIOLOGY, VIROLOGY AND MYCOLOGY

Systhemic Bacteriology

Unit – 1

Gram positive cocci- staphylococci, pneumococci, **streptococci** Gran Negative cocci – N. Ggonorrhoeae, N. meningitides

Unit – 2

Gram positive bacilli- corynebacteria, Mycobacteria, Clostridia, Actinomycetes Bacillus Anaerobes

Unit- 3

Gram negative bacilli – Enterobacteriaceae, Pseudomonas, Vibria Brucella, Bordetella, Haemophilus, Yersinia

Unit – 4

Spirochetes – Treponema, Leptospira, Borrelia Rickettsiae, Chlamydiae, Miscellaneous bacteria

Practicals

Introduction of Clinical specimen, identification of bacteria, staining methods Biochemical tests, antibiotic sensitivity testing

Darkground microscopy, special staining methods, use of experimental animals Food milk and water bacteriology

Air Sampling and theatre sterility

Virology

Unit – 1

Classification and general properties of viruses – interferon, inclusion bodies

Cultivation of viruses and laboratory diagnostic methods of viral diseases

Unit – 2

Pox virus, herpes virus, myxoviruses, enteroviruses

Unit - 3

Rabies, Arbo viruses, hepatitis, HIV, viruses causing gastro enteritis, miscellaneous viruses

Practicals

Tissue culture methods

Fluorescent microscopy, ELISA, PCR

Mycology

Unit – 1

General properties of fungi, cultivation methods, laboratory methods of diagnosing fungal infection.

Unit - 2

Superficial and deep fungal infections, opportunistic fungal infection Mycotoxins

Practicals

Identification of fungi, microscopy, culture, special staining methods

References:

1. Practical medical microbiology – Mackie and McCartney – latest Ed
2. Medical microbiology – David Green Wood, Richard – latest Ed
3. Medical lab Manual- Vol I and II – ELBS

4. Manual of Clinical Microbiology – latest Ed
5. Lab immunology and serology – N – Bryant
6. Textbook of Diagnostic Microbiology – Conne R. Mahon and George – WB Saunders 2nd Ed

Journals

1. Journal of Microbiological Methods
2. IRCS- Microbiology, Parasitology and infectious Diseases
3. Journals of Parasitology

PAPER – III ADVANCED HAEMATOLOGY AND IMMUNOHAEMATOLOGY

Coagulation disorders and basics of their work up Thrombotic disorders and basics of testing

Automated cell counters and coagulation analysers - principles Manual Haemoglobin and Counts Peripheral smear –Preparation and Interpretation Manual tests of coagulation, factor assays

Urine and stool – analysis, micro and interpretation

Immunohaematology:

Basic Genetics and immunology ABO and Rh blood group systems

Other major blood group systems – clinical significance of Compatibility testing, Antibody screening and identification, clinical significance of Choice of reagents and QA of the same

Donor Screening and bleeding

Blood bags, Anticoagulant and preservative solutions Blood Components – preparation, Quality control Apheresis

Infectious disease screening

Transfusion reactions, Haemolytic Disease of the Newborn Some basics of appropriate use of blood

Choice of blood in specific clinical scenarios – HDN, Multiply transfused etc Basics of HLA typing and anti HLA antibody detection

PAPER IV TECHNIQUES IN HISTOPATHOLOGY AND CYTOLOGY

Unit -1

PAS (Periodacid – Schiff) Stain, Stain for micro organisms Argentaffin and argyrophil stains

Amyloid stains

Reticulin Stains Trichrome stains

Posphotugstic acid hematoxylin stain(PTAH) Stains for hemosiderin, Melanin and CA
Stains for neural lipids

Mucin stains Giemsa Stain Elastic stain Myelin stain

Romanowsky sain

Unit - 2

Enzyme histochemistry and immunoenzyme techniques

Immunohistochemistry and the various immunohistochemical stains in the diagnosis of various - disorders

Tissues of special interest – nervous system Hard tissue Miscellaneous cells Endocrine cells

Unit – 3

Cytology techniques Quantitative methods Micro incineration

Unit – 4

Autoradiography Museum tech Specimen photography and microphotography

Unit -5

Microscopy General Microscopy Dark ground microscopy Immunofluoresence

Dissertation is to be submitted three months before the final year examination.