

SAMA1101	FUNDAMENTALS OF ANATOMY & PHYSIOLOGY	L	T	P	Credits	Total
		3	0	0	5	100

Course Objectives

- To understand how organs and structures present and how they function and how both structure and function are modified by deficiency to disorder or pathology to disease will be understood.
- To achieve through demonstrations using prosected cadavers, student dissection, anatomical models, plastinated specimens, online learning modules, labeled gross specimens and models, medical imaging, lecture, guided review sessions, and self-directed learning.

Unit I: Introduction to Anatomical terms

Organization of the human body - Human Cell Structure, Tissues – Definition, Types, characteristics, classification, location, functions and formation, Membranes and glands – classification and structure, Alterations in disease, Applications and implications in allied health sciences.

Unit II: The skeletal System

Bones – Types, structure, Axial & Appendicular Skeleton, Bone formation and growth, Description of bones. Joints – classification and structure. Alterations in disease, Applications and implications in allied health sciences

Unit III: Cardiovascular and lymphatic system

Blood, Blood groups, Hemoglobin and iron metabolism, Coagulation of Blood, Structure of heart, Cardiac cycle, Electrocardiogram, Blood Pressure, Circulation: systemic, pulmonary, coronary, Lymphatic system, Lymphatic vessels and Lymphatic tissues, Lymph nodes, Alterations in disease, Applications and implications in allied health sciences

Unit IV: The Respiratory System & Digestive System

Structure of the organs of respiration, Muscles of respiration: intercostals and Diaphragm Alterations in disease, Structure of Alimentary tract and accessory organs of digestions Alterations in disease. Applications and implications in allied health sciences

Unit V: The Endocrine System & Excretory System

Structure of Pituitary, Pancreas, Thyroid, parathyroid, thymus and alterations in disease, Structure and application of endocrine glands and their alteration in diseases, Cortex and medulla of Kidney, Ureter, Urinary bladder, Urethra (male and female), Urine Formation, Applications and implications in allied health sciences.

Unit VI: The Nervous system & Special Senses

Structure of neuralgia & neurons, Somatic Nervous system, Structure of brain, spinal cord, cranial nerves, peripheral nerves, Autonomous Nervous system – sympathetic, parasympathetic Structure, location. Alterations in disease. Structure of, eye, ear, nose, tongue, skin, Field of vision, Auditory & Olfactory apparatus, Alterations in disease. Applications and implications in allied health sciences.

Unit VII: The Muscular System

Classification, Structure and properties of muscles, Neuromuscular junction, Electromyogram and disorders of muscles, Applications and implications in allied health sciences

Unit VIII: The Reproductive System

Male Gonad: Testes, Epididymis, Female Gonad: Ovary, Fallopian Tube, Uterus, Vagina and Mammary gland. Introduction of male Genital Organs .Introduction of female Genital Organs, Applications and implications in allied health sciences

Text / Reference books

1. MLT Text book of Anatomy and Physiology, Mahendra Kumar Gupta, 2003
2. Anatomy for MLT & other Allied Courses, Dr. Renu Chauhan, APC Books, 2016
3. Human Anatomy and Physiology for Courses in Nursing and Allied Health Sciences 4th Ed, Yalayaswamy N.N., CBS Publishers, 2017
4. Ross & Wilson Anatomy and Physiology in Health and Illness, Anne Waugh & Allison Grant, Elsevier, 13th edition, 2013
5. Fundamentals of Anatomy & Physiology, Judi L Nath, Edwin F. Bartholomew, Frederic H. Martini, Pearson, 9th Edition, 2016.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1102	BASICS OF BIOCHEMISTRY & CLINICAL PATHOLOGY	L	T	P	Credits	Total
		3	0	0	5	100

Course Objectives

- Aims to provide a basic understanding of the core principles and topics of Biochemistry and their experimental basis.
- To enable to perform routine as well as special investigative procedures in different specialties of Medical Laboratory Technology.

UNIT I Chemistry & metabolism of Carbohydrate

Chemistry of carbohydrates & their related metabolism - Introduction, definition, classification, biomedical importance. Brief outline of metabolism: Glycogenesis & glycogenolysis (in brief), Glycolysis, citric acid cycle & its significance, HMP shunt & Gluconeogenesis

UNIT II Clinical pathology of Carbohydrate

Regulation of blood glucose level. Diabetes mellitus - definition, types, features, gestational diabetes mellitus, glucose tolerance test, glycosuria. Hyperglycemia & hypoglycemia and its causes.

UNIT III Chemistry of Amino acids and Protein

Amino acids - Definition, classification, essential & non essential amino acids. Chemistry of Proteins - Introduction, definition, classification, structure and its biomedical importance

UNIT IV Protein Metabolism and its clinical pathology

Transformation, Decarboxylation, Ammonia formation & transport, Urea cycle, metabolic disorders in urea cycle, catabolism of amino acids especially Phenylalanine, Tyrosine & Tryptophan, Creatinine, Proteinuria.

UNIT V Chemistry of Lipids

Introduction, definition, classification, biomedical importance, essential fatty acids. Non essential fatty acids

UNIT VI Lipids metabolism & clinical Pathology

Brief outline of metabolism: Beta oxidation of fatty acids, fatty liver, Ketosis, Cholesterol & its clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis

UNIT VII Enzymes and its clinical significance

Introduction, definition, classification, coenzymes, isoenzymes, properties, factors affecting enzyme action, enzyme inhibition, diagnostic value of serum enzymes - Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc

UNIT VIII Acid base balance concepts & disorders

Water metabolism, Distribution of fluids in the body, ECF, ICF, dehydration. - pH, Buffers, Acidosis, Alkalosis.

Text / Reference Books

1. Textbook of Medical Biochemistry by MN Chatterjea & Rana Shinde, 7th Edition, Jaypee Publishers.
2. Handbook of Biochemistry & Nutrition by Shivananda Nayak B, Jaypee publishers, fourth edition, 2020.
3. Harper's Illustrated Biochemistry 31st edition, by Lange Publishers, 2018
4. Principles of Biochemistry by Voet & Voet, fourth edition, Wiley publishers, 2010.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1103	GENERAL MICROBIOLOGY AND PATHOLOGY	L	T	P	Credits	Total
		3	0	0	5	100

COURSE OBJECTIVES

- To develop an understanding of the basic concepts and terminology in general pathology and microbiology.
- To understand the methods of microbial staining, media, transport and control of microbial pathogens.

UNIT I General Pathology

Homeostasis and Cellular Adaptations - Normal Cell - Cell Injury - types of cellular adaptations - Cellular adaptations-atrophy, hypertrophy, hyperplasia and dysplasia.

UNIT II Cell Injury and Cell Death

Etiology of cell injury, morphology of cell injury, cellular swelling - Cell death: Types autolysis, necrosis, apoptosis and gangrene

UNIT III Inflammation

Inflammation - Acute inflammation - vascular event, cellular event, inflammatory cells - Chronic Inflammation - general features, granulomatous inflammation, tuberculoma.

UNIT IV Disorders, Neoplasia And Healing

Haemodynamic Disorders: Oedema, hyperemia, congestion, haemorrhage, circulatory disturbances, thrombosis, ischaemia&infarction - Neoplasia - Definition, how does it differ from hyperplasia, difference between benign tumor and malignant tumor – Healing - Definition, different phases of healing, factors influencing wound healing.

UNIT V General Microbiology

General characters and classification of Bacteria - Characteristics of Bacteria - Morphology - Shape, Capsule, Flagella, Inclusion, Granule, Spore - Growth and Maintenance of Microbes - Bacterial division, Batch Culture, Continuous culture, bacterial growth- total count, viable count, bacterial nutrition, oxygen requirement, CO₂ requirement, temperature, pH, light.

UNIT VI Control of Microbes

Sterilization and Disinfection - Physical agents- Sunlight, Temperature less than 100⁰C, Temperature at 100⁰C, steam - at atmospheric pressure and steam under pressure, irradiation, filtration. Chemical Agents- Alcohol, aldehyde, Dyes, Halogens, Phenols, Ethylene oxide

UNIT VII Media & Staining

Culture Media - Definition, uses, basic requirements, classification, Agar, Peptone, Transport Media, Sugar Media, Anaerobic Media, Containers of Media, Forms of Media – Staining Methods - Simple, Grams staining, Ziehl-Neelsen staining or AFB staining, Negative Impregnation.

UNIT VIII Collection and Transportation

Collection and Transportation of Specimen - General Principles, Containers, Rejection, Samples- Urine, Faeces, Sputum, Pus, Body fluids, Swab, Blood.

Text / Reference Books

1. Microbiology with Diseases by Taxonomy Paperback by Bauman Robert W. (Author) June 2017
2. Textbook of Pathology - Harsh Mohan - 8th Edition (english) Paperback – 1 January 2019
Harsh Mohan (Author)
3. Robbins & Cotran Pathologic Basis of Disease: South Asia Edition Paperback – 14 August 2014
Vinay Kumar MBBS MD FRCPath, Abul K. Abbas MBBS, Jon C. Aster

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

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PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1104	HEMATOLOGY	L	T	P	Credits	Total
		3	0	0	5	100

Course Objectives

- To understand basic disorders related to quantitative and qualitative abnormalities of red cells, WBC and platelets
- To understand laboratory techniques used in diagnosis of blood cell disorders

UNIT I Overview of hematopoiesis and blood cells, Components of blood and their functions, Hematopoietic system of the body

UNIT II Red cell disorders, Anemias- classification and approach to diagnosis, Iron deficiency anemia, megaloblastic anemia, hemolytic anemias: Definition, causes and laboratory diagnosis

UNIT III White cell and Platelet disorders, Neoplastic and non-neoplastic disorders of WBC, classification and lab diagnosis of leukemia, chronic myeloproliferative disorders and other malignant disorders of the hematopoietic system, Platelet Disorders

UNIT IV Anticoagulants - EDTA, Citrate, Oxalate, Heparin, sodium fluoride

UNIT V Blood collection- Basic steps

Preparation of specimen collection material, Lab. request form, Basic steps for drawing a blood specimen by vein puncture, Complications of vein puncture, Patient after care, Specimen rejection criteria for blood specimen, Hemolysis of blood, Blood collection by skin puncture (Capillary Blood), Arterial puncture, Deciding specimen types and selection of anticoagulants

UNIT VI Blood collection - Process

Separation of serum, Separation of plasma, Changes in blood on keeping, Maintenance of specimen identification, Transport of the specimen, Effect of storage on Blood Cell Morphology, Discarding procedures

UNIT VII Basic hematology techniques

Cleaning of laboratory glassware in hematology, Determination of Hemoglobin concentration, Calculation of blood cell indices - MCV, MCH & MCHC, Estimation of erythrocyte sedimentation rate, Estimation of packed cell volume

UNIT VIII Introduction to automation in hematology

Principle, advantages, cautions, basic interpretation of histograms

Text / Reference books

- Dacie and Lewis Practical Haematology/ edition 12 (2017) by Barbara J. Bain
- Hand book of Medical laboratory technology, 2nd edition by Robert H Carman, Christian Medical Association of India (publishers)
- Henry's Clinical Diagnosis and Management by Laboratory Methods / Edition 21 by Richard A. McPherson MD, MSc, Matthew R. Pincus MD, PhD, Matthew R. Pincus
- Textbook of Medical Laboratory Technology/ edition 3 (2020) by Godkar P.B

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max.Marks: 100

PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

Part C Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs.

20 Marks

40 Marks

40 Marks

SAMA1301	IMMUNOLOGY, SEROLOGY & PARASITOLOGY	L	T	P	Credits	Total marks
		4	0	0	5	100

COURSE OBJECTIVES

- To understand the basic principles of immunity and serological diagnosis, vaccination, their schedules
- To introduce the students to human parasites of medical and clinical importance.

UNIT I Immunity

Definition and classification- General Principles of Innate & Acquired immunity - Immune Response- Humoral immunity & cell mediated immunity.

UNIT II Antigens and Antibodies - Definition, classes and properties – Antibodies/ Immunoglobulins - Definition, Properties, Sub types of Immunoglobulins

UNIT III Antigen Antibody Reactions I – Ag - Ab Reactions /Serological Refractions-Features of antigen/antibody Reaction – Precipitation – Agglutination - Complement fixation test – Neutralization – Opsonization – Immune adherence – Immunofluorescence - Immunoelectron microscopic test

UNIT IV Structure and functions of Immune System - Parts of Immune system - T/B cells, other cells & their functions

UNIT V Hyper sensitivity Reactions and Autoimmunity - General Principles of different types of hypersensitive reactions i.e., type I, II, III and IV.

UNIT VI Autoimmunity, molecular diagnosis and vaccination – Autoimmune disorders – ELISA - Vaccination - Schedule & Vaccines

UNIT VII General Parasitology Definition - parasitism, host, vectors etc - Classification of Parasites - Phylum Protozoa-general Pathogenic and non - pathogenic protozoa - Phylum Nematelminths/Round worms (Nematoda) - Phylum Platyhelminths - class-Cestoda, class-Trematoda - Lab diagnosis of parasitic infections.

UNIT VIII Human Parasites

Protozoa - Intestinal Amoebae - *E. histolytica* : Life cycle, Morphology, Disease & Laboratory Diagnosis - *E. coli* : Life cycle, Morphology, Disease & Lab Diagnosis - Flagellates of intestine/genitalia - *Giardia lamblia* : Life cycle, Morphology, Disease & Lab Diagnosis – *Trichomonas vaginalis* : Life cycle, Morphology, Disease & Lab Diagnosis - Malarial Parasite - *Plasmodium vivax* : Life cycle, Morphology, disease & lab diagnosis - Differences between *P. vivax*, *P. malaria*, *P. falciparum* and *P. ovale* - Nematodes - Intestinal Nematodes - *Ascaris* : Life cycle, Morphology, disease & lab diagnosis - Brief discussion about *Enterobius vermicularis* (Thread worm) and *Ancylostoma duodenale* (Hookworm) - Tissue Nematodes - *W. bancrofti* - Life cycle, Morphology, Disease & Lab Diagnosis - Phylum Platyhelminths - Cestodes - *T. solium*, *T. saginata* and *E. granulosus* - Trematodes - *S. haematobium* & *F. hepatica*

Text / Reference Books

- Practical Microbiology Protozoology and Parasitology: Including Bacteriology, Virology, Mycology, Immunology, Serology, and Automated Methods Paperback – Import, 1 January 2011 N. C. Dey (Author), T. K. Dey (Author)
- Practical Immunology Paperback – Import, 21 January 2002 Frank C. Hay (Author), Olwyn M. R. Westwood (Author)
- A Handbook of Practical and Clinical Immunology Vol 2 2ed (Pb 2017): Volume II Paperback – 1 January 2017 by Talwar (Author)

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Max. Marks: 100

PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1302	CLINICAL BIOCHEMISTRY	L	T	P	Credits	Total marks
		4	0	0	5	100

COURSE OBJECTIVES

- To impart experiential learning to the students in order to develop a desired workforce to combat ever increasing demand of medical lab technicians in the healthcare sector.
- To enable the students to function efficiently, confidently and safely in clinical laboratory settings including hospital environments.

UNIT I Photometry

Definition, laws of photometry, absorbance, transmittance, absorption maxima, instruments, parts of photometer, types of photometry–colorimetry, spectrophotometry, flame photometry, fluorometry, choice of appropriate filter, measurements of solution, calculation of formula, applications.

UNIT II Water, Vitamins & Mineral Metabolism-

Distribution of fluids in the body, ECF & ICF, water metabolism, dehydration, mineral metabolism, macronutrients (principal mineral elements) & trace elements. Fat & water soluble vitamins, sources, requirement, deficiency disorders & biochemical functions.

UNIT III Liver & Renal Functions & their Assessment

Based on: 1-Carbohydrate metabolism 2-Protein metabolism 3- Lipid metabolism 4-Measurements of serum enzyme levels 4-Bile pigment metabolism, Jaundice, its types and their biochemical findings. Various Tests, GFR & Clearance

UNIT IV Techniques on Immunology

Immunodiffusion Techniques, Radioimmunoassay & ELISA-Principles & Applications.

UNIT V Electrophoresis

Definition, Principle, Types & Applications.

UNIT VI Polymerase Chain Reaction

Definition, Types, Principle & Applications

UNIT VII Lipids and Cardiac Profile

In brief Hypertension, Angina, Myocardial Infarction, Pattern of Cardiac Enzymes in heart diseases, Different methods of Cholesterol Estimation- Principle, advantage and disadvantage of different methods.

UNIT VIII Carbohydrate Profile and Autoanalysers

Auto analysers - Principle & Applications, Different methods of Glucose Estimation- Principle advantage and disadvantage of different methods.

Text / Reference Books

- Textbook of Medical Biochemistry by MN Chatterjea & Rana Shinde, 7th Edition, Jaypee Publishers.
- Analytical Biochemistry by Dr.P.Asokan, Chinnaa publications edition 3, 2010
- Analytical Biochemistry by Asima Hamid, Mohammad Raies, Gulzar Ahmad Book Enclave publisher, first edition, 2019
- Principles of Biochemistry by Voet&Voet, fourth edition, 2018, Wiley publishers.
- Wilson And Walkers Principles And Techniques Of Biochemistry And Molecular Biology 8th edition Cambridge University Press, 2018

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

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PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1303	ENDOCRINOLOGY, TUMOR & CANCER MARKERS	L	T	P	Credits	Total marks
		4	0	0	5	100

COURSE OBJECTIVES

- To develop an understanding of the role of the endocrine system in maintaining homeostasis and health.
- To understand the integrative workings of the human body by studying this signaling system

UNIT I Introduction - Difference between hormones and enzymes - Classification of hormones - Regulation and general mechanism of action of hormones

UNIT II Pituitary gland & hypothalamus, Hormones of the Anterior Pituitary - Growth hormone, Prolactin, Gonadotropin, Follicle Stimulating hormone, Leuteinizing Hormone, Thyroid stimulating hormone (TSH), Adrenocorticotrophic hormone (ACTH), Hormones of neurohypophysis- Oxytocin, Antidiuretic hormone (ADH)

UNIT III - Hormones of the Thyroid gland - chemistry and normal physiology, Thyroid disorders-goiter, myxedema, autoimmune thyroiditis, tumors of the thyroid gland, hyperthyroidism, Graves disease, Calcitonin, Parathyroid Hormone (PTH), Adrenocortical hormones-synthesis and secretion, Aldosterone & its function, Addisons disease, Glucocorticoids & functions, Mineralocorticoids & functions, Cortisol & functions, Cushing's syndrome, Conn's syndrome

UNIT IV - Adrenal medulla-metabolism of catecholamines, Hormones of the gonads, Testosterone, Estrogens, Progesterone, their synthesis and functions, Human Chorionic Gonadotropin (HCG), hormone, menstrual cycle, Menopause

UNIT V- Hormone of pancreas - Insulin- its metabolic effects on carbohydrates, fats & protein, control of insulin secretion, Glucagon- functions, metabolic effects, blood glucose regulation, Diabetes mellitus, Somatostatin, Hormone of kidney – Renin

UNIT VI - Introduction, The Carcinogens - definition, Oncogene - definition, Mechanism of action of Oncogenes (outline), Characteristics of growing tumor cells-general and morphological changes, biochemical changes, Tumor Markers-Introduction and definition, Clinical applications of tumor markers. Enzymes as tumor markers, Alkaline Phosphatase (ALP), Creatine kinase (CK), Lactate dehydrogenase (LDH), Prostatic acid phosphatase (PAP), Prostate specific antigens (PSA).

UNIT VII- Hormones as tumor markers (introduction of each type in brief), Oncofetal antigens, Carcino embryonic antigen (CEA), Squamous cell carcinoma (SCC) antigen Carbohydrate markers (brief introduction of each type) CA 15-3, CA125, Blood group antigen (brief introduction of each type) CA 19-9, CA 50, CA 72-4, CA242.

UNIT VIII - Bladder cancer markers (introduction in brief) - Bladder tumor antigen (BTA), Fibrin- Fibrinogen degradation product (FDP), Nuclear matrix protein (NMP22), Biomarkers still in research (introduction in brief), telomeres, TRAP assay, hyaluronic acid and Hyaluronidase

Text / Reference books

1. Basic Endocrinology for Students of Pharmacy and Allied Health Sciences, Andrew Constanti, Andrzej Bartke, Harwood Academic Publishers 2005.
2. Basic Medical Endocrinology, H. Maurice Goodman, Academic Press, Elsevier, 2003
3. Endocrinology – An Integrated Approach, S.S. Nussey & S.A. Whitehead, 2001
4. Textbook of Endocrinology – S Dharmalingam, Jaypee Publishers, 2010
5. Endocrinology: Hormones and Human Health” Prakash S Lohar, MJP Publishers, 2005

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Max. Marks: 100

PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1304	BLOOD BANK PROCEDURES & HEMOGLOBINOPATHIES	L	T	P	Credits	Total marks
		4	0	0	5	100

COURSE OBJECTIVES

- To understand the principles of immunohaematology and be competent to handle routine blood bank organization and procedures.
- To understand structure and function of hemoglobin and hemoglobinopathies.

UNIT I Principles of blood groups and antigen antibody reactions

Blood Grouping, Introduction, Human Blood Group system, ABO Subgroups, Red Cell Antigen, Natural Antibodies, Rh System, Rh Antigens & Rh Antibodies, Hemolytic Disease of Newborn & Prevention, Principal of Blood grouping, antigen-antibody reaction, Agglutination, Haemagglutination, Condition required for antigen antibody reaction, Blood grouping techniques, Cell grouping, Serum grouping. Methods for ABO grouping. Slide & Tube Method, Cell grouping, Serum grouping, Rh grouping by slide & tube method, Difficulties in ABO grouping, Rouleaux formation, how it interfere with Blood grouping, Auto agglutinins, Antiserum used in ABO test procedures, Anti -A, Anti-B Anti- AB Antiserum, Inheritance of the Blood groups, Control, A&B Cells preparation, Autocontrol, Medical applications of Blood groups.

UNIT II Principles and practice of blood transfusion

Blood Transfusion, Principal & Practice of blood Transfusion, Blood Transfusion service at District level, Guide lines for the use of Blood, Appropriate use of Blood, Quality Assurance, Antilogous Blood Transfusion practices, Objectives of Quality Assurance in Blood Transfusion services, Standard operating procedures for usage, donation & storage of blood, screening of donor, compatibility testing, safety, procurement of supplies, Blood Donation, Introduction, Blood donor requirements, Criteria for selection & rejection, Medical history & personal details, Self-exclusion, Health checks before donating blood, Screening for TT

UNIT III Blood collection and preservation

Blood Collection, Blood collection packs, Anticoagulants, Taking & giving sets in Blood transfusion, Techniques of collecting blood from a donor, Instructions given to the donor after blood donation, Adverse donor reaction, Testing Donor Blood, Screening donor's blood for infectious agents - HIV, HCV, HBV, Trepanoma palladium, Plasmodium, HTLV, Bacterially contaminated Blood.

UNIT IV Blood donor selection and screening

Blood Donor Records, Blood donation record book, Recording results, Blood donor card, Storage & Transport, Storage of blood, Changes in blood after storage, Gas refrigerator, Lay out of a blood bank refrigerator, Transportation, Maintenance of Blood Bank Records, Blood bank temperature sheet, Blood bank stocksheet, Blood transfusion request form.

UNIT V Blood components, preparation, indications, storage and autologous transfusions

Blood components, preparation, indications, storage and autologous transfusions, Compatibility Testing, Purpose, Single tube compatibility techniques using AHG reagent, Emergency compatibility testing, Difficulties in cross matching, Labeling & Issuing cross- matched blood.

UNIT VI Transfusion transmitted diseases & their lab diagnosis

Collection of blood components for fractional transfusion, Platelets packed Red Cell, Platelet rich Plasma, Platelets concentrate, Preparation of concentrated (packed) Red cells, Techniques of preparation, Blood Transfusion Reactions, Investigation of a Transfusion reaction, Hemolytic transfusion reaction, Actions to take when transfusion reaction occurs.

UNIT VII Quality assurance in blood banking practices

Objectives of Quality Assurance in Blood Transfusion services, Standard operating procedures for usage, donation & storage of blood, screening, safety, procurement of supplies.

UNIT VIII - Hemoglobinopathies

Distribution, morphology, kinetics of hemoglobin synthesis, Normal and abnormal hemoglobin molecules

Text / Reference books

1. Dacie and Lewis Practical Haematology/ edition 12 (2017) Barbara J. Bain
2. Hand book of Medical laboratory technology/ edition 2 Robert H Carman, Christian Medical Association of India (publishers)
3. Textbook of Medical Laboratory Technology/ edition 3 (2020) Godkar P.B
4. Clinical Pathology, Hematology and Blood Banking (For DMLT Students)/ edition 3 (2017) Maheshwari Nanda

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1501	HISTOPATHOLOGY & CYTOLOGY TECHNIQUES	L	T	P	Credits	Total marks
		4	0	0	5	100

COURSE OBJECTIVES

- To be able to fix, process, embed tissues and make sections for micro section studies
- To be competent to make routine cytological preparation

UNIT I Introduction to Histopathology and Cytopathology Techniques – Basic concepts and principles. Applications

UNIT II Reception of specimens– Criteria, Requisites, Container, Identity, Labeling, Rejection

UNIT III Tissue processing- Micro techniques I

Basic steps, Fixing – Types of fixatives, Factors, Dehydration Embedding

UNIT IV Micro techniques II

Microtomy, Staining, Mounting, Methods of decalcifications

UNIT V Equipment

Microscope, Microtome -Types, Uses, Parts, different types of microtome knives, care and maintenance, Automated tissue processor- components, working and precautions during use, Tissue floating bath

UNIT VI Staining

Hematoxylin and Eosin staining, preparation of hematoxylin and eosin stains, Reticulin stain, PAP staining- components and methods.

UNIT VII Cytology

Introduction to FNAC and Exfoliative cytology, Processing of fluids- Sputum, bronchial aspirates, bronchial washings, gastric washings, Urine and other watery fluids, Cerebrospinal fluid

UNIT VIII Museum techniques

The mounting of pathological specimens - Introduction., Preparation of specimen, Fixation of specimen- Kaiserling solution-1 and Kaiserlingsolution-2, Precaution taken for the Fixation of Specimens, Storage of Specimens, Mounting of Museum Specimens, Filling and Scaling

Reference books

1. Bancroft's Theory and Practice of Histological Techniques by John D Bancraft /Edition 8 (2018)
2. Handbook of Histopathological and Histochemical Techniques: Including Museum Techniques / edition 3 (1974) by C. F. A. Culling
3. Hand book of Medical laboratory technology, 2nd edition by Robert H Carman, Christian Medical Association of India (publishers)
4. Textbook of Medical Laboratory Technology/ edition 3 (2020) by Godkar P.B

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

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PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1502	SYSTEMIC BACTERIOLOGY, MYCOLOGY & VIROLOGY	L	T	P	Credits	Total marks
		4	0	0	5	100

COURSE OBJECTIVES

- To describe about the important medically important bacteria its mode of disease transmission, pathogenesis, diagnosis, prophylaxis and treatment.
- To aims at understanding important medically important virus and fungi its mode of disease transmission, pathogenesis, diagnostic method and treatment.

UNIT I Cocci and Acid fast bacillus

Systematic Bacteriology. Staphylococcus, Streptococci Neisseria , Corynebacterium and related organisms. Mycobacterium - typical and atypical. Aerobic pathogenic Actinomycetes

UNIT II Enterobacteriaceae

Vibrios, Helicobacter Pseudomonas, Brucella, Haemophilus, Bordetella. Enterobacteriaceae, Salmonella, Shigella, Proteus, Escherichia, Klebsiella

UNIT III Bacilli and Spirochetes

Bacillus, B.anthraxis Clostridia, Mycoplasma, Rickettsiae, Spirochetes, Treponema, Leptospira and Borrelia.

UNIT IV Laboratory diagnosis is bacterial pathogens

Recommendation for collection, transport of specimens, isolation of bacteria from clinical specimens. Primary media for isolation and their quality control - Antibiotic sensitivity discs, testing procedures and their quality control.

UNITV Superficial and opportunistic mycoses

Introduction to Mycology, Dermatophytes and agents of superficial mycoses, Trichophyton, Epidermophyton and Microsporum. Opportunistic mycoses, Candidiasis, Cryptococcosis, Aspergillosis,

UNIT VI Subcutaneous and systemic mycoses

Systemic mycoses Histoplasmosis, Coccidioidomycosis, Blastomycosis. Subcutaneous mycoses, Mycetoma, Morphology, cultural characteristics, pathogenesis/disease caused & lab diagnosis.

UNIT VII Medical importance of DNA Virus

Introduction to Virology General characteristics of virus, Classification of virus, Pox, Herpes, Hepatitis B virus , Adeno virus

UNIT VIII Medical importance of RNA Virus

Orthomyxovirus, paramyxovirus, Adenovirus Arbo HIV, Rabies, Morphology, cultural characteristics, pathogenesis/disease caused & lab diagnosis.

Text / Reference Books

1. David Greenwood, Richard CD., Slack, John Forrest Peutherer. (1992). Medical Microbiology. 16th edition. ELBS with Churchill Livingstone.
2. Ananthanarayan, R. and Jeyaram Paniker, C.K. (1994) Text Book of Microbiology, 6th Edn. Orient Longman, Chennai.
3. Alexopoulos CJ and C W. Mims.(1993).Introductory Mycology (3rd edition) Wiley Eastern Ltd, New Delhi.
4. Jagadish Chander (1996) A Text Book of Medical Mycology. Interprint, New Delhi.
5. Jewetz, E., Melnic, J.L. and Adelberg, E.A. (2000) Review of Medical Microbiology, 19th Edn. Lange Medical Publications, U.S.A
6. Topley & Wilson's. (1990) Principles of Bacteriology, Virology and Immunology, VIII edition, Vol. III Bacterial Diseases, Edward Arnold, London.

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PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1503	COAGULATION STUDIES	L	T	P	Credits	Total marks
		4	0	0	5	100

COURSE OBJECTIVES

- To understand the mechanism and factors involved in coagulation
- To apply the concepts of coagulation in analyzing the associated disorders

UNIT I

Hemostasis - Definition, Basic concept and principle, Basic steps involved in Hemastosis.

UNIT II

Coagulation - Basic Physiology, coagulation factors, Mechanism of blood coagulation, Extrinsic Pathway, Intrinsic Pathway

UNIT III

Regulators of blood coagulation – Factors, Regulation, Clinical Significance

UNIT IV

Blood coagulation tests I, Bleeding Time, Duke's method, Clotting Time- Capillary tube method & Lee white's method.

UNIT V

Blood coagulation tests II - PT, aPTT, TT, Clot retraction time, Determination of fibrinogen.

UNIT VI

Quality Assurance for routine Hemostasis Laboratory - Introduction, Sample collection technique (Phlebotomy, Sample preparation, Anticoagulant used, Importance of use of Sodium

UNIT VII

Bleeding disorders I: Coagulation factor deficiencies – congenital, acquired Fibrinolytic defects

UNIT VIII

Bleeding disorders II: Vascular disorders, Platelet disorders

Text / Reference Books

1. Ramnik Sood, Concise Book of Medical Laboratory Technology (Methods and interpretation), 2nd Ed., N.A. Publishers, 2015
2. Satish Gupta Short text book of Medical Laboratory for technician J.P. Bros, New Delhi, 2014
3. Shirley Mitchell Lewis, Barbara J. Bain, Imelda Bates (2006) Dacie And Lewis Practical Haematology, 10th Ed, Churchill Livingstone/Elsevier.
4. Barbara A. Brown (2008) Hematology: principles and procedures 6th Ed Lea & Febiger.
5. Bernadette F. Rodak, George A. Fritsma, Kathryn Doig (2007) Hematology: Clinical Principles and Applications 3rd Ed, Elsevier Health Sciences.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks

SAMA1504	THEORY OF QUALITY MANAGEMENT & AUTOMATION	L	T	P	Credits	Total marks
		4	0	0	5	100

COURSE OBJECTIVES

- To introduce the concept of quality management
- To apply the significances of analyzers in automation

UNIT I Automation - Introduction, meaning, advantages, history

UNIT II Continuous flow analyzers, Single channel continuous flow analyzers-advantages, disadvantages

UNIT III Multi channel flow analyzers, discrete auto analyzers - basic features, types, semi automated, fully automated Batch analyzers

UNIT IV Random access analyzers (RAA), Component steps in fully automated analyzers, Auto analyzers based on immunoassay techniques

UNIT V Micro particle enzyme immunoassay (MEIA), various random access analyzers - Hitachi- 704, BM/Hitachi -717

UNIT VI Centrifugal analyzers, ASCA, Dry chemistry analyzers, Dimension RxL clinical chemistry system, The Heterogeneous Immunoassay module components, Beckman Array 360 system, Mini Vidas analyzers

UNIT VII Immulite automated immunoassay analyzers, Latest trends in Automation

UNIT VIII Biochips, Lab on a chip (LoC), Nanosensors - advantages and disadvantages, PCR & its applications.

Reference Books

1. Laboratory management – Quality in Laboratory diagnosis – Candis A Kinkus, Demos medical publishers, 2011
2. Quality control in Laboratory – Gaffar Sarwar Zamman, Intech open publishers, 2011
3. Clinical Diagnosis and Management by Laboratory Methods, Henry 23rd edition, 2016

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

PART A: 10 Questions – 2 marks each – No choice

PART B: Short Answers – 5 Questions 8 marks each – 5 out of 8

PART C: Long Answers – 2 Questions 20 marks each – 2 out of 3

Exam Duration: 3Hrs

20 Marks

40 Marks

40 Marks