

BHARATHIAR UNIVERSITY : COIMBATORE 46
CENTRE FOR COLLABORATION OF INDUSTRY AND INSTITUTION (CCII)
B.Sc. CLINICAL LABORATORY TECHNICAL MANAGEMENT
(For the CCII students admitted from the academic year 2013 -2014 and onwards)

SCHEME OF EXAMINATION – CBCS PATTERN

Part	Study Components	Course Title	Hrs Per week	Exam			Credits	
				Dur. hrs	CIA	Marks		Total
SEMESTER – I								
I	Language – I		6	3	25	75	100	4
II	English – I		6	3	25	75	100	4
III	Core Paper – I Biochemistry I		3	3	20	55	75	3
	Core Paper – II General Microbiology– I		3	3	20	55	75	3
	Core Paper III Haematology – I		3	3	20	55	75	3
	Allied Paper I – Anatomy & Histotechnology I		3	3	25	75	100	4
	Core Practical I – Biochemistry I		2	3	20	30	50	2
	Core Practical II General Microbiology I		2	3	20	30	50	2
IV	Environmental Studies		2	3	-	50	50	2
SEMESTER – II								
I	Language – II		6	3	25	75	100	4
II	English – II		6	3	25	75	100	4
III	Core paper IV – Biochemistry II		3	3	20	55	75	3
	Core paper V – Immunology I		2	3	20	55	75	3
	Core paper VI Haematology & Clinical Pathology I		2	3	20	55	75	3
	Allied paper II – Human Anatomy & Physiology		3	3	25	75	100	4
	Core Practical III Biochemistry II		2	3	20	30	50	2
	Core Practical IV Immunology I		2	3	20	30	50	2
	Core Practical V Haematology & Clinical Pathology I		2	3	20	30	50	2
IV	Value Education – Human Rights		2	3	-	50	50	2
SEMESTER III								
III	Core Paper VII – Biochemistry III		5	3	20	55	75	3
	Core Paper VIII – Medical Bacteriology I		5	3	20	55	75	3
	Core Paper IX – Haematology II		5	3	20	55	75	3
	Allied Paper III – Instrumentation & Bioinformatics		5	3	20	55	75	3
	Core Practical VI Biochemistry III		2	3	20	30	50	2
	Core Practical VII Medical Bacteriology I		2	3	20	30	50	2
	Core Practical VIII Haematology II		2	3	20	30	50	2
IV	Skill based subject I – Computer Applications I		2	3	20	55	75	3

IV	Tamil @ / Advanced Tamil #/ (or) Non-major elective – I (Yoga for Human Excellence #/ Women's Rights #	2	3	-	50	50	2
SEMESTER – IV							
III	Core Paper X Biochemistry IV	6	3	20	55	75	3
	Core Paper XI – Medical Virology I	6	3	20	55	75	3
	Core Paper XII – Haematology III	6	3	20	55	75	3
	Allied paper IV– Histopathology	3	3	20	55	75	3
	Allied Practical - Histopathology	2	3	20	30	50	2
	Core Practical IX Biochemistry IV	4	3	20	30	50	2
	Core Practical X Medical Virology I	4	3	20	30	50	2
	Core Practical XI Haematology III	4	3	20	30	50	2
IV	Skill based Subject II – Computer Application II	4	3	20	55	75	3
IV	Tamil @ / Advanced Tamil # (or) Non-major elective – II (General Awareness #)	4	3	-	50	50	2
SEMESTER V							
III	Core Paper XIII Biochemistry V	6	3	20	55	75	3
	Core Paper XIV Medical Mycology and Parasitology	6	3	20	55	75	3
	Core Paper XV Haematology IV	6	3	20	55	75	3
	Elective I: Cytopathology	4	3	20	55	75	3
	Core Practical XII Biochemistry V	4	3	20	30	50	2
	Core Practical XIII Medical Mycology & Parasitology	4	3	20	30	50	2
	Core Practical XIV Haematology IV	4	3	20	30	50	2
IV	Skill based subject 3 – Nutrition	4	3	20	55	75	3
SEMESTER VI							
III	Core Paper XIV – Biochemistry VI	4	3	20	55	75	3
	Core Paper XV – Haematology V	4	3	20	55	75	3
	Core Practical XIV – Biochemistry VI	4	3	20	30	50	2
	Core Practical XV – Haematology V	4	3	20	30	50	2
	Elective II: Nano Biotechnology	4	3	20	55	75	3
	Elective III: Bio Statistics & Methodology	4	3	20	55	75	3
IV	Skill Based Subject 4 – Personality Development	6	6	20	55	75	3
	Project Work & Viva					100*	4
V	Extension Activities	-	-	50	-	50	2
	Total					3750	150

* Project Work : 80% & Viva-voce : 20%

SEMESTER I**CORE PAPER I – BIOCHEMISTRY I****UNIT-I****RADIOISOTOPES**

Isotopes-Radioactive decay- α , β and γ radiations-half life-units of radio activity-research application -diagnostic application therapeutic uses-biological effects of radiation-radiation protection-body fluids-milk -synovial fluid-tears-CSF-Amniotic fluid

UNIT – II**Introduction to Biochemistry**

Solute, solvents and solutions-Percentage solution ,molar solution ,normal solution, molal solution, part dilution solution, structural solution-Standard solution-Preparation of solution of exact concentrations-Common laboratory glasswares and cleaning of glasswares-Laboratory hazards and accidents

UNIT-III

Instrumentation, Photometry- Colorimetric : Principle working and use-Spectrophotometry – flame photometry fluorimetry-Common balance ,centrifuge-Distillation-Quality control in biochemistry lab internal and external Q.C

UNIT-IV**Acids and Bases**

Basic chemistry of acids and bases-Theories of acids and bases-Arrhenius theory ;bronsted-lowry theory ,lewis and usanovich theories-Acids and Hydrogen ion-Bases-pH ; relationship between PH and [H⁺]-titration – Procedure and Calculation -the proton donor –acceptor concept of acids and bases-autoprotolysis ;types of acids and bases

UNIT- V**Urine analysis**

structure of kidney-mechanism of urine formation-composition of normal urine -composition of abnormal urine-specimen collection and preparation -collection of urine specimen-preservation of urine specimen-urine analysis-physical examination of urine ;volume colour ;specific gravity pit-chemical examination of urine-glucose ,protein,ble salt ,bile pigment ,retone bodies-microscopical examination ;for puscells, RBC, cast ,crystals and bacteria ,porphobilinogen estimation.

Reference Books :

1. Clinical Biochemistry – Teitz
2. Practical Biochemistry – Harold Varley
3. Text Book of Biochemistry – D.M.Vasudevan and Sreekumari .S

PRACTICAL I – BIOCHEMISTRY I

Preparation of Reagent-Estimation of Blood Sugar by Folin – Wu Method and Glucose oxides method-Estimation of Cholesterol , Triglycerides , HDL , LDL and VLDL-Estimation of Urea by DAM method-Estimation of creatinine by Jaffe’s method-Estimation of blood uric acid by Caraway’s method-Estimation of Bilirubin-Estimation of Calcium and magnesium-Estimation of sugar protein and albumin-Estimation of inorganic phosphorous-HbA1c

CORE PAPER II GENERAL MICROBIOLOGY I

UNIT – I

The historical foundations and development of microbiology. An overview of microbial world. Microbial diversity-Prokaryotic and eukaryotic diversity .The bacteria and the archaea. Principles of bacterial taxonomy .Molecular methods in taxonomy .intra species classification of bacterial.

UNIT – II

Morphology and structure of bacteria. Surface structure of bacteria. surface structures and inclusions of bacteria. virus –unique properties , morphology and structure .virion ,viroids and prions .viral replication .viral diversity –bacterial plant and animal virus. Fung-properties and classifications.identification of bacteria.staining reactions .cultural physiological and biochemical properties.molecular method for identification

UNIT – III

Factors influencing microbial growth. environmental and nutritional factors. Nutritional types of bacterial. Autotrophs and chemolithotrophs , physiological group of chemolithotrophs. microbial locomotion-flagellar motility,gliding motility and amoeboid motion .chemotaxis , phototaxis and other taxes .cultivation of bacterial – cultural media and methods. measurement of bacterial growth .bacterial growth curve. binary fission ,growth cycle, microbial growth at different temperature pH and oxygen level .continuous culture maintenance and transport of culture .

UNIT – IV

Sterilization – principles and methods , physical and chemical methods. disinfectants –modes of action .testing of disinfectants. antibiotics – mechanism of action .drug resistance in bacteria .antibiotic sensitivity tests.

UNIT –V

Genetic materials in Bacteria. Bacterial chromosome. Extra chromosomal genetic elements. plasmid –copy number and incompatibility ,replication of plasmid. episomes. transposable elements – IS elements and transposon, integrons and antibiotic resistance cassettes , multiple antibiotic resistant bacteria, M13 virus , mutation , site directed mutagenesis, DNA repair , Mutant selection .Mechanism of gene transfer –transformation , transduction and conjugation .recombination – types, mechanism and enzyme involved .gene mapping .bacteriophage genetics –plaque formation and phage mutants , genetic recombination in lytic cycle. genetic system in yeast and neurospora.

Reference Books :

Text Book of Microbiology – Ananthanarayanan and Jayaram Panicker
 Diagnostic Microbiology
 Parasitology - K.D.Chatterjee

**PRACTICAL II
 GENERAL MICROBIOLOGY I**

Handling and Maintenance of bright field microscopy -Micrometry measurement of micro organism-Motility determination – hanging drop method
 STAINING TECHNIQUE-Simple Staining-Gram staining-Acid – fast Staining-Spore Staining-Negative staining
 MEDIA PREPARATION- Liquid media -Solid media- Agar deep- Agar slant-Agar plate
 PURE CULTURE TECHNIQUE- Streak plate method-Pour plate method- Spread plate method

CORE PAPER III - HAEMATOLOGY I

UNIT-I**HAEMATOLOGY – INTRODUCTION**

Blood Collection –capillary blood collection
 ,Anticoagulants,EDTA,Oxalates,Citrates,Heparin,Sodium fluoride,preparation of anticoagulated bottles-Smear preparation ,preparation of Leishman stain,staining technique Differential Leucocyte count-Characteristics of RBCs granulocytes,agranulocytes and platelets clinical significance of leucocytes and their normal values -Abnormal leucocytes and RBCs-Examination of thick smear

UNIT-II

HAEMATOPOIESIS –Erythropoiesis- Pronormoblast -Early normoblast -Intermediate normoblast-Late normoblast -Reticulocyte and RBC-LEUCOPOIESIS-Development of granulocyte –Myeloblast –Promyelocyte-Myelocyte-Metamyelocyte-Bandform-Mature cells-Development of monocytes of lymphocyte-Development of platelets :megakaryocyte,promegakaryocyte-Megakaryocytes-Platelet

UNIT- III**HAEMOGLOBIN**

Functions of Hb-Synthesis of Hb-synthesis of haem and globin- Hemoglobin variants- HbH,HbS,HbE,HbD-Estimation of Hemoglobin variants -Electrophoresis, HPLC

UNIT – IV**Cell Count**

Counting chambers-Different types of counting chambers-RBC pipette -WBC pipette - Microscope- Parts of microscope, working of microscope

UNIT – V**Routine Haematological Tests**

Hb,-RBC Count,-WBC Count,-differential count,-ESR,-PCV-Clinical significance of each tests- Examination of blood smear for malarial parasite

Reference Books :

Practical Haematology - Dacie and Lewis
Clinical Diagnosis by Laboratory Methods – Todd and Sanford

ALLIED PAPER I - ANATOMY AND HISTO TECHNOLOGY I

UNIT – I

ANATOMY

INTRODUCTION-Terms used in Anatomy -The system of the body -General Histology-Cell structure-Cell division-The elementary tissue of the body and their functions-Musculoskeletal system-Gross anatomy of all bones including long bones, flat bones ,irregular bones and sesamoid bones and important cartilages of different parts are to be covered-Detailed study of the vertebral column and specific points about cervical dorsal and lumbar vertebrae

UNIT – II

Respiratory System

Nasal Cavity , Paranasal Sinuses, Nasopharynx, Oesophagus,Larynx,Hypopharynx,Trachea ,Bronches, Bronchial tree, Thoracic Cavity, Mediasternum ,lungs ,position, relation ,structure ,Bronchopulmonary segments-Cardiovascular SystemHeart ,Pericardium,Cardiac Chambers,Artery ,its paired and unpaired branches,major blood vessels of extremities and brain

UNIT – III

Digestive System

Oral Cavity ,Teeth,Salivary Glands,
Tongue,Tonsil,Oropharynx,Oesophagus,Stomach,Duodenum,Small intestine,Caecum,Appendix,Large intestine ,Rectum and Canal,Mesentery ,Omentum,Peritoneum,Peritoneal Cavity-Liver ; position,relations,Structure ,gall bladder,cystic duct,Common bile duct,gall stones,portal circulation -Pancreas;position,structure,pancreatic ductSpleen;position,relation,blood duct,supply

UNIT – IV

Histopathology

Specimen collection –BIOPSY , AUTOPSY-Examination of fresh specimens

Fixation

Functions of fixation -Classification of fixation-Simple Fixatives, Compound Fixatives other methods for fixation-Decalcification agents

UNIT – V

Tissue processing

Fixation-Dehydration –dehydrating agents-Clearing – clearing agents-Automatic tissue processing

Reference Books :

1. Anatomy – B.D.Chaurasia's Human Anatomy
2. Text Book of Anatomy and Physiology – Ross and Wilson

SEMESTER II**CORE PAPER IV – BIOCHEMISTRY II****UNIT- I**

Cell membrane transport Uniport, symport, antiport, active transport ,facilitated transport passive transport Exocytosis ,endocytosis ,pinocytosis, phagocytosis Cellular organelles :- nucleus, endoplasmic reticulum, golgi apparatus, lysosomes, mitochondria, plasma membrane

UNIT – II**CHEMISTRY OF CARBOHYDRATES**

MONOSACCHARIDES ; STEREOISOMERS, EPIMERISM ,Reactions of monosaccharides :- BENEDICT'S REACTION ,Osazone formation, reduction to form alcohols; oxidation of sugars, formation of furfural DERIVATIVES, ACTION OF ALKALI ON SUGARS., Disaccharides – sucrose, lactose, maltose ,Polysaccharides – starch, glycogen ,cellulose, inulin, agar Micropolysaccharides : Heparin , Chondroitin sulphate

UNIT – III**CHEMISTRY OF LIPIDS**

Classification : saturated and unsaturated fatty acids, Properties of fatty acids : Oxidation of fatty acids, Triglycerides : phospholipids ,phospholipases ,Cholesterol

UNIT – IV**AMINOACIDS AND PROTEINS**

Classification ; Based on structure ,based on metabolic fate, based on nutritional requirement Properties and reactions ; special biological functions ,peptide bonds, Primary ,secondary ,tertiary and quaternary structure ,sequence analysis ,isoelectric pH ,Precipitation reactions ; chromatography ,electrophoresis ,ultra centrifugations ,colour reactions ,qualitative estimation

UNIT – V**ENZYMOLGY**

Classification ; Oxidoreductases , Transferases , Hydrolases ,Lyases ,Isomerases,Ligases , coenzymes ,mode of action of enzymes ,active ,specificity ,kinetic michaelis constant,competitive ,non competitive and allosteric inhibitors ,Factors affecting and enzyme reaction ,Clinical enzymology,Individual enzymes and their clinical significance ,LDH , CPK,AST , ALT , ACP, GGT

Reference Books :

Clinical Biochemistry – Teits

Practical Biochemistry – Harold Varley

Text Book of Biochemistry – D.M.Vasudevan and Sreekumari .S

PRACTICAL III BIOCHEMISTRY II

- **Colorimetry , Spectrophotometry, Estimation of SGOT , SGPT, Gamma GT, Estimation of LDH**

CORE PAPER V – IMMUNOLOGY I

UNIT – I

Infection : Sources ,methods of transmission Nosocomial infection.

Immunity : Types ,mechanism of innate immunity ,inflammation ,phagocytosis ,organs and cells with immune functions .CMI ,HMI (cell mediated and humoral radiated immunity)

UNIT –II

Antigens ,Epitopes ,Antibodies ,Immunoglobulin –Structure ,classes and functions ,Monoclonal antibodies – production and application, Antigen – antibody reactions – agglutination, precipitation ,complement fixation, radio immunoassay ,immunofluorescence ,ELISA ,western blotting.

UNIT – III

Major histocompatibility complex ,antigen processing and presentation, Complement system ,complement activation ,regulation, B-cell generation ,activation, differentiation, T-cell generation ,activation, differentiation

UNIT –IV

Organ and tissue transplantation – Allograft reaction and GVH reaction, Immunology of malignancy – tumor Ag's , immune response in malignancy, Immunotherapy for cancer, Immunotherapy – ABO and Rh blood group, Hemolytic disease of newborn

UNIT – V

Autoimmunity – Mechanism, Autoimmune disease, Hypersensitivity – I,II,III & IV ,Immunodeficiency disease ,Immunoprophylaxis : - Vaccines : types of vaccines (live , killed and submit vaccines with eg)

Reference Books :

Text Book of Microbiology – Ananthanarayanan and Jayaram Panicker
Diagnostic Microbiology
Parasitology - K.D.Chatterjee

PRACTICAL IV - IMMUNOLOGY I

AGGLUTINATION TESTS

ABO blood grouping , Rh – typing, Cross matching, Widal Test

LATEX AGGULUTINATION TEST

RA latex agglutination test, ASO latex agglutination test, CRP Latex agglutination test, Beta HCG test

FLOCCULATION TESTS

Rapid Plasma regain test

PREPARATION TESTS

- Ouchterlong double immune diffusion-Counter immune electrophoresis (CIE)-Rocket immune electrophoresis

ENZYME IMMUNO ASSAY

Detection of HIV antibody using ELISA-Detection of HBs Antigen using ELISA

CORE PAPER VI - HAEMATOLOGY AND CLINICAL PATHOLOGY I**UNIT – I**

Quality assurance in haematology -Sample collection-sample handling -external quality control internal quality control-levey-jennings Q.C charts -Safty measures in laboratory-Ethics in laboratory-Relationship maintance with patient and patient care.

UNIT- II

Functions of Hb - Haemoglobin estimation –1.physical method2.colorimetric method3.chemical method4.gasometric method

Hb variants-Hb H,Hb S,Hb C,Hb E,Hb D,

Estimation of Hb variants

Electrophoresis-HPLC

UNIT –III

Haemotomtry-RBC count ; Bulk and micropipette method-WBC count ; Bulk and micro pipette method-Platelet count-Esinophil count-retic count-PCV-ESR-red cell indices –MCV , MCH,MCHCClinical significate of all parameters

UNIT-IV

Automation in haematology lab -Electronic cell counter-Principle and working of coultercounter-Flow cytometry-Volume Histograms-Platelet indices

UNIT – V**CLINICAL PATHOLOGY**

Formation of urine-Composition of urine-Analysis of urine-Physical examination-Chemical examination-Microscopical examination-Analysis of CSF-Physical ,chemical and microscopical examination-Analysis of semen-Physical ,chemical and microscopical examination

Reference:

Practical Haematology- Dacie & Lewis

Clinical diagnosis by laboratory methods, Todd and Sanford.

PRACTICAL V**HAEMATOLOGY AND CLINICAL PATHOLOGY I**

Haemoglobin Estimation-Different methods-Colorimetric method-Physical methodHaemocytometry-1.RBC Count – micropipette method - Bulk dilution method2.WBC count –micropipette method - bulk dilution method3.platelet Count Packed cell volume Erythrocyte sedimentation rate-Red cell indices Proform

Clinical Pathology -Physical chemical and microscopic examination of urine-Physical chemical and examination of CSF-Physical ,chemical and microscopic examination of semen

ALLIED PAPER II - HUMAN ANATOMY AND PHYSIOLOGY

ANATOMY

UNIT – I

GENITO URINARY SYSTEM

Kidney ,collecting system , urinary bladder and urethra in male and female ,testis , Seminal vesicles, Spermatic cord, Prostate, Penis, Ovaries, Fallopian tubes, Uterus, Vagina , Vulva and clitories.

UNIT – II

NERVOUS SYSTEM

Brain – its coverings ,different parts,cerebrum, cerebellum ,mid brain , pons medulla oblongata
-Corpus calosum , cranial nerves,and ventricles of brain -Spinal cord ; its position and structure coverings , spinal nerves and applied anatomy -Sympathetic and parasympathetic system

UNIT – III

PHYSIOLOGY

TISSUES ; epithelial connective , Muscular and nervous tissue , Homeostasis structure of different muscles, Mechanism of muscular contraction rigomortie, Introduction to nervous system and classification of nervous system

UNIT –IV

Structure of heart ,Action potential in candiae muscular , cardiac cycle ,Heart sounds, Conducting mechanism ,Cardiac output , B.P ,Pulmonary and systemic circulation ,organization of respiratory system ,puminary ventilation,gas transport ,control of respiration

UNIT –V

Salivary and gastric glands and their secretions, Hcl secretion and regulation of pancreatic juice structure and functions of liver-Kidney structure and functions .renal regulation and balance . Hormones ,action of hormones , endocrine glands, - Hypothalamus, pituitary ,thyroid ,pancreas and pineal gland, role of reproductive hormones.

Reference Books :

Anatomy – B.D.Chaurasia's Human Anatomy

Text Book of Anatomy and Physiology – Ross and Wilson

SEMESTER III CORE PAPER VII – BIOCHEMISTRY III**UNIT – I**

Plasma proteins-Functions and properties-Albumin ; ceruloplasmin , 1-antitrypsin ,carrier proteins, immunoglobulins, multiple myeloma, clotting factors, anticoagulants, haemophilia, semen pattern in normal and abnormal states-Structural and contractile proteins collagen ,elastin muscle proteins, muscle contraction

UNIT – II

METABOLISM OF CARBOHYDRATES-Digestion and absorption , embden –merotiof ,pathway of glycolysis;cori's cycle, rate of pyruvate, gluconogenesis, HMP pathway, glycogenolysis-Glycogen synthesis, glycogen storage diseases, fructose metabolism ,galactose metabolism, galactosmia, gluconic acid pathway-Regulation of blood groups ,GTT , impaired glucose tolerance , glucose uria ,insulin , glucagone ,diabetes mellitus, ketosis , lactic acidosis , glycosylated Hb

UNIT – III

Metabolism of lipids 1.digestion and absorption 2.transport Lipoproteins Chylomicrons VLDL HDL LDL Hyperlipoproteinemia Free fatty acids, Beta oxidations, Odd chain fatty acids, Alpha oxidation, Lipid peroxidation, Fatty acids synthesis ,elongation , desaturation , synthesis of triglycerides, adipose tissue, hormone sensitive lipase , ketone bodies, ketosis , Cholesterol synthesis and regulation , Plasma cholesterol , steroid hormones, fatty liver , lipotropic factors , bile acid

UNIT – IV

Metabolism of amino acids, Digestion and absorption ,Intra organ transport , Formation of ammonia, Urea cycle, Blood urea, Glycine, Creatine, Creatinine, Serine , serine-choline-glycine cycle, beta alanine, threonine, methionine, cysteine, glutathione, metabolism of sulphur , cystinuria, homocystine uria, cystathionuria, phenylalanine and tyrosine. Melanin, catecholamines, phenyl ketone uria, alkapton uria, albinism, tryptophan, nicotinic acid synthesis Serotonin, melatonin, glutamic acid, GABA, glutamine, aspartic acid, asparagine , histidine, histamine, one carbon metabolism, transmethylation reaction, branched chain amino acids, lysine, arginine, proline,

UNIT – V

Citric acid cycle and biological oxidation, Citric acid cycle ,amphibolic role, regulation ,bioenergetics, redox potential , Biological oxidation ,NAD⁺, FAD ,cytochromes, hydroperoxidases, oxygenases, high energy compounds, Flow of electrons, oxidative phosphorylation, chemiosmotic theory , ATP synthase, inhibitors and uncouplers, superoxide

Reference Books :

Clinical Biochemistry – Teitz

Practical Biochemistry – Harold Valey

Text book of Biochemistry – D.M.Vasudevan and Sreekumari .S

**PRACTICAL VI
BIOCHEMISTRY III**

- Paper chromatography of aminoacids, Thin layer chromatography of aminoacids, Ion exchange chromatography of aminoacids, Serum electrophoresis, Estimation of 17-kelosteroids in urine, Clour reactions of amino acids

CORE PAPER VIII - MEDICAL BACTERIOLOGY I

UNIT – I

Morphology and ultra structure of bacterial cell –Archaeobacteria ,eubacteria ; structure and classification –growth requirement of bacteria : nutritional and environmental factors requirements . Endospore formation ,types of bacterial spores -Bacterial growth ,growth curve Classification of bacteria , - phenotypic and glynotypic classification

UNIT – II

Identification of bacteria

Hanging drop techniques ,staining techniques (simple , geams staining ,AFB ,Sponge , negative staining)- Biochemical identification – indole ,methyl red, voges prostrauer , litrate tests, urease , starch , hydrolysis , catalase , oxidase , TSI etc.

UNIT – III

Detailed study of morphology ,cultural characteristics ,Biochemical , epidermiology ,pathogenesis, laboratory diagnosis , prophylaxis and treatment of the following bacteria .Entrobacteriaceae ,pseudomonas , vibrocholerae

UNIT – IV

Staphylococcus and streptococcus SP, pneumococci, Neisseria, Diphtheria , clostridium ,Treponema , Bacillus

UNIT-V

Mycobacterium, mycoplasma, Rickettsia, chlamydiae ,Borderella, Haemophilus, Actinomyces, Brucella, yersinia, pasteuria ,Francisella, Spirochetes.

Reference Books :

Text Book of Microbiology – Ananthanarayanan and Jayaram Panicker

Diagnostic Microbiology

Parasitology - K.D.Chatterjee

PRACTICAL VII MEDICAL BACTERIOLOGY I

Study of normal flora human body, Isolation , characterisation and identification of pathogens from various clinical specimens, Study of morphology ,cultural and biochemical characters of common bacterial pathogens, Study of antibiotic sensitive of common pathogens, Study of microbial flora of air in various localities, Microbial analysis of water, Microbial analysis of milk Procedure of clipping for lepra bacilli, Preservation of stock culture, Bacteriology of food

CORE PAPER IX – HAEMATOLOGY II

UNIT - I

Haematopoiesis : Erythropoiesis : Pronormoblast ,Early normoblast ,Intermediate normoblast, Lte normoblast,Reticulocyte and RBC, Leucopoiesis : Development of grynulocytes metamyelocyte ,Band form ,Mature cells ,Development of monocytes and lymphocytes Development of platelets : megakaryblast ,promegakaryocyte ,megakaryocyte ,platelet- Examination of blood smear- Normal colure, shape and size of cells- Abnormal types of cells

UNIT – II

Coagulation -Synthesis of haem and globin-Catabolism of Haemoglobin- Homeostatic mechanism- Coagulation : Coagulation factors mechanisam of coagulation Extrinsic pathway and Intrinsic pathways .

UNIT – III

Dessiminated intravascular coagulation-Coagulation disorders-Haemophilias-Laboratory investigation of bleeding disorders – Bleeding time-Clotting time-Clot retraction time-Prothrombin time-Activated patial thromboplastin time-Platelet count

UNIT – IV

Systematic leupus crythematosis-Symptoms of SLE-Diagnosis of SLE-Demonstration of LE – Cell-Treatment of SLE-Physical properties of coagulation factors Fibrinogen ,protrombin ,tissue thromboplastine,calcium ions,labile factors ,stable factors ,antihaemophilic factor,plasma thromboplastic component,stuar prower factor,antihaemophilic factor,Hageman factor,fibrin stabilizing factor

UNIT – V

Fibrinolysis : mechanisam and Tests -Platelete functions tests-Platelet structure-Platelet function tests : Closure time assay viscelastometry ; platelet aggregation tests-Haemostasis analysis system

Reference Books:

Practical Haematology – Dacie and Lewis

Clinical Diagnosis by laboratory Methods – Todd and Sanford

PRACTICAL VIII

HAEMATOLOGY II

Smear preparation ,staining-Examination of thick and thin smear-Coagulation studies-Tests for bleeding disorders-Bleeding time- duke method-Ivy’s method-Clot retraction time-Prothrombian time-Activated pratical Throboplastin time-Platelet count-D-Dimer assay-Protein – C-Protein – S-Fibrinigen asscey-SLE cell estimation

ALLIED PAPER III - INSTRUMENTATION AND BIOINFORMATICS

UNIT –I

Colorimetry :principles and application ,beerlamberts law ,turbid metry ,nephelometry ,lumino metry , flamephotometre-Microscopy ;light , scanning and transmission electronphase contrast ,polarization ,confocan and interference microscopy ,CCD camera-Introduction to atomic microscopic

UNIT – II

Principle instrument design ,methods and application of chromatography-Ion exchange ,molecular ,affinity, chromatography, TLC,GC,HPLC-Basic principles and application of centrifugation -Apparatus and procedures -Differential centrifugation , density gradient centrifugation

UNIT – III

Electrophoresis-Gel electrophoresis, PAGE, SDS PAGE ,Paper electrophoresis ,Two dimensional electro phoresis-Potentiometry ,pH metre, ion selective electrodes-Principle instrument design methods and application of polarimetry ORD ,CD,Lights scattering ,refractometry, flow cytometry ,cytometry.

UNIT –IV**BIOINFRAMATICS**

Introduction to bioinformatics , internet ,datamining online data bases and search tools ,data organization , biological dat bases,structural data bases ,derived and specialized databases,DNA& RNA sequence data bases,genomic sequences,protein sequence data bases-Distance matrix methods and parsimony -Multiple sequence alignment – tree alignment ,star alignment,pattern in pair wise alignment,genetic algorithm

UNIT – V

Sequence analysis software-SS search-BLAST ,FLASTA,CLUSTAL ,phylogenetic analysis ,construction of phylogenetic tree, evolutionary changes in nucleotide and protein sequences, structure prediction , structural alignment tool, homology modeling , drug design -Applications of bioinframatis- pharmasutical industry, immunology, agriculture, forestry, basic research ,geo informatics, legal ethical and commercial condidration

Reference Books :

Biophysical Chemistry Principles and Techniques – Upadhyay ,Nath

SKILL BASED SUBJECT I - COMPUTER APPLICATIONS I**UNIT – I**

Introduction ; Block diagram of a computer -Working of a computer -Parts of a computer - Classification of computer -Identification of various parts of PC

UNIT –II**INPUT AND OUTPUT DEVICES**

INPUT DEVICES-Keybaord – types of keyboard-Mouse -Touch screen ;Touch pads, light pen , track ball, joystic-Scanning devices ; types-Optical bar code reader -Digitizer ; Electronic card reader -Voice recognition devices-Vision input devices ,web camera

OUTPUT DEVICES

Monitors ; - Types of monitors -Other types of displays –Speakers-Secondary Storage devices-Printer type of printers-Plotters

UNIT – III

Generation of Computers-Programing languages-Network -Advantages of networking -Types of computer network-Modem – Type-Processors – Types of processors

UNIT – IV**INTRODUCTION TO OPERATING SYSTEM**

Components of OS-Functions of OS-OS services-UNIX-LINUX-Mac OS-IBM OS/2-Other types

DOS-Installation of MS – DOS-DOS Commands-Limitations of MS – DOS-DOS Structure

UNIT V**SYSTEM FILES**

Batch file Program-Windows users-Configuration files-Booting the system -Re-formatting & Repairing Hard Disk -Windows XP-features Application & Uses

Reference Books: Fundamentals of Computer Application

SEMESTER IV**CORE PAPER X - BIOCHEMISTRY IV****UNIT – I**

Chemistry and metabolism of nucleotides

Purine bases pyrimidine bases ,nucleosides,nucleotide,biosynthesis of purine nucleotides salvage pathway-Degradation of purines, uric acids, gout,synthesis of pyrimidine,nucleotides,regulation of pyrimidine , nucleotide synthesis,disorder of pyrimidine metabolism-Deoxyribonucleotide formation , degradation of pyrimidine, nucleotide,

UNIT – II

DNA structure replication and protein biosynthesis-Structure of DNA, Watson-Crick model,nucleoproteins, introns and exons , cistron ,replication ,DNA polymerases , okazaki fragments , cell cycle,repair enzymes, DNA damage ,restriction endonucleases-mRNA transcription – initiation elongation, termination ,post transcriptional processing ,spliceosome,reverse transcriptase, t-RNA ,r-RNA,ribosomes.protein biosynthesis,genetic code,translation, initiation ,elongation , termination,inhibitors of protein synthesis

UNIT-III

molecular genetics and control of gene expression-principle of hereditary , dominant ,autosomal recessive ,X-linked recessive ,population genetics ,gene location on chromosomes ,mutations ,recombination mutagens,gene amplification,gene switching ,transportation of genes ,somatic recombination ,enhancer,virus ,RNA virus,lysogeny ,antiviral agents

UNIT – IV

Recombinant DNA technology

restriction of endonucleases, vectors, cloning,selection ,gene library ,southern blot, in situ hybridization ,northern blot,western blot ,chimeric molecules, clinical application - DNA fingerprinting ,restriction fragment length polymorphism ,gene therapy ,DNA sequencing ,PCR, hybridoma technology and monoclonal antibodies.

UNIT – V**Hemoglobin**

Structure of haem, biosynthesis of haem, strunt bilirubin , porphyrans,catabolisam of haem,bile pigment,hyper bilirubin emiyas,globin, Hb,quarterinary structure ,transport of gases , oxygen dissocation curve

Foetal Hb , carboxiHb,meth Hb,Hb variens ,Anemias

Reference Books:

Clinical Biochemistry – Teitz

Practical Biochemistry – Harold Varley

Text book of Biochemistry – D.M.Vasudevan and Sreekumari.S

**PRACTICAL IX
BIOCHEMISTRY IV**

- Horminal analysis
- Thyroid hormones ,FSH, LH,BHCA
- Quality control of special biochemistry lab
- Calibration and standardization of hormone analysis mechine.

CORE PAPER XI - MEDICAL VIROLOGY I

UNIT – I

General morphology and ultra structure of viruses -Introduction -Introduction to virology ,size and shape of viruses ; general characteristics of viruses -Ultra structure of viruses - Morphological categories , Helical Icosahedral envelop and complex -Genetic material and viral genome

UNIT –II

Cultivation and viruses-Cultivation of viruses in embryonated eggs,experimental animals and cell culture ;primary and secondary cell culture suspension of cell culture and monolayer cell cultures-Assays of viruses :- physical and chemical methods of assays , protein nuclear acid, radioactivity rules , electron microscopy ,plaque method , pock counting method end point method and infectivity of plant viruses.

UNIT – III

Morphology ,mode of transmission ,pathogenesis ,Lab diagnosis ,prophylaxes and treatment of the following viruses -Pox (vaccinia , variola) Herpes (HSV , Varicella) , Adeno ,Papova (HV -14) ,Hepanda (HBV) parvo viridae.

UNIT – IV

Heading -Orthomyrio uirus (influence) ,paramyrio uirus (paracinfluenze ,mumps , measles),picorna (polio,HAV ,Rhinouiridae) , Rhahto (Rabies) , yellow fever ,Dengue uirus ,Japanees encephalitis , HCV ,HEV , Rheo(Rota uirus) ,Toga uirus (Chikungunya & Rubella) , Rota uirus (HIV – I and HIV II)

UNIT – V

Diagnosis of viral infections -Haemagglutination tests , Haemagglutination inhibition test, CFT, ELISA ,RIA ,Immuno fluorescence

Reference Books :

Text Book of Microbiology – Ananthanarayanan and Jayaram Panicker
 Diagnostic Microbiology
 Parasitology - K.D.Chatterjee

**PRACTICAL X
 MEDICAL VIROLOGY I**

VIRAL CULTIVATION METHOD –ECG INOCULATION

Amniotic route-Allantoic route-Chorio allantoic route-Yolk sac route

SEROLOGICAL TESTS-Detection of HIV antibody using ELISA-Detection of HBs anigen using ELISA-Detection of HCV antibody using ELISA-Compliment fixation test-Haemagglutination test Haemagglutination Inhibition test.

CORE PAPER XII – HAEMATOLOGY III

UNIT – I

Reception ,labeling and recording laboratory investigation-Reception of laboratory investigation-Venipuncture-Labeling of lab investigation-Barcode used in blood banks-Preparation of buffer-Preparation of distilled water-Preparation of reagents-Cleaning of glass wares

UNIT – II

Blood banking -Blood group antigen and anti bodies-Blood group system-ABO blood group, Bombay blood group, Rh blood group system – other blood group system-Inheritance of blood group -Haemolytic diseases of new born-ABO grouping-Forward typing-Reverse typing – Du testing

UNIT –III

Cross maching – major cross maching, minor cross maching-Direct coomb's test, indirect coomb's test-Blood transfusion-Screening of donars, anticoagulants used in blood banks, blood transfusion-Trancprition reaction-Blood and blood components

UNIT – IV

Autologous transfusion-Transfusion transmitted disease-Transfusion therapy -Blood preservation and storage-Changes occued in stored blood

UNIT – V

Orientation of routine blood bank-Quality assurance- general condition , equipment reagents, donar processing -Stemcell processing – storage and transplantation -Disposal of waste and biologically hazard substance in the blood bank

Reference Books:

Practical Haematology – Dacie and Lewis
 Clinical Diagnosis by Laboratory Methods – Todd and Sanford

**PRACTICAL XI
HAEMATOLOGY III**

Preparation of Reagent-Blood banking-Blood grouping –slide method-Forward grouping / tube method-Reverse grouping-Du test-Cross matching – major cross Match-Minor cross match-Direct coob’s test-Indirect coob’s test-Blood transfusion

ALLIED PAPER IV – HISTOPATHOLOGY

UNIT – I

Introduction -Specimen collection – autopsy ,biospsy -Examination of fresh specimen-Fixation Functions of fixative-Classification of fixative – simple fixative , compound fixative-Other methods for fixation -FNAC – procedure and staining

UNIT – II

Tissue processing-Fixation -dehydration-dehydrating agent-clearing – clearing agentimpregnation – impregnation reagent-embedding – procedure -automatic tissue proessing -section cutting-different types of microtomes-rotary ,rking.sledge , sliding and freezing microtomes-microtom knives – part of a knife -horning and stropping -automatic tissue sharpener-section cutting , adhesives

UNIT – III

Staining of smears-theory of staining -types of stainig – mordents -haemotoxlin and eosin staining-PAS staining-Special stains-Stain for carbohydrates and amyloid-Mucicarminc Microwave ancient blue -Microwave colloidal iron method-PAS method-Bet’s carmina method for glycogen-Concored ameloid method

UNIT – IV

Stain for connective tissue-Jone’s method for basement membrane -Microwave aleian blue PAS method for Kidney section -PAS method for skin and liver transplant sections -Gomori’s one step tricro method -Masson’s tricom staine-Vangieson’s method for collagen-Verhoeff’s elastic stain -Modified gomaries method for reticuline-Demonstration and identification of pigment and metals-Lison’s method for Hb-Aluminon stain fore aluminium-Microwave Rh of damine copper method-Pearls method for ferric iron-Dahl’s methods for calcium -Womnkossa’s method for calcium-Silver method for mercury-Hall’s methods for bilirubil-Lillie’s fermous iron – uptake method for melanine -Gomari’s method for mates

UNIT-V

Museum technique -Collection of museum specimes-Preparation of specimens-Storage of specimes-Mounting –methods of mounting-Cancer immunology-Cancer -Carsino genesis-Immune response to cancer –Ongogens-Tumer markers

Reference Books :

Culling – Histopathology Technique

**ALLIED PRACTICAL
HISTOPATHOLOGY**

Tissue processing-Fixation-Clearing-Impregnation-Embedding-Blocking-Microtomy-Section cutting-Slide preparation-Staining-Periodic acid sotiff stain-Haematoxygen and eosin stain-Special stains-Perl’s Prussian blue staining-Reticulin stain

SKILL BASED SUBJECT II - COMPUTER APPLICATIONS II**UNIT – I**

MS Office – Introduction -Versions of MS Office-Components of word window-Preparing documents ;opening document-Editing document ;spell checker-Saving a document ;printing a document

UNIT – II

Formatting document-Creating graphics inserting diagrams-Creating and editing tables-Macros-Inserting header and footer -Inserting characters-Page setup-Features and benefits of writepad-Adding bookmark

UNIT – III

Introduction to MS-excel-Structure of spread sheet-Creating and editing simple work sheets-Applications of spread sheet-Preparing spared sheets-Building a sample worksheet using MS-Excel-Information ,presentation using excel

UNIT – IV

Simple data and numeric operations in spared sheet-Using formula in spred shhet operations - Making tables-Printing reports or worksheets-Formula for calculations-Sorting and quering - Data filters

UNIT – V

Computer aided design-Introduction to CAD-Features,benefits and business applications-Conforming to the drafting specifications-Saving and retrieving drawings-Dimensions – Lettering-Plotting drawings-Importing and exporting graphics through CAD.

Reference Books: Fundamentals of Computer Application

SEMESTER V**CORE PAPER XIII BIOCHEMISTRY V****UNIT- I**

Kidney function tests-Formation of urine,glomerular functions,functions of the tubules,renal threshold reabsorption of the water,renal function tests-Urine analysis ,proteinuria,dearance tests,creatinine clearance, urea clearance ,tubular functions tests, acids and bases, renal regulation of pH-Cellular buffers, disturbances in acid-base balance-Anion gap,metabolic acidosis ,metabolic alkalosis ,fluid and electrolyte balance ,osmolality ,rennin angiotension system,hypotonic and hypertonic contraction.

UNIT-II

Gastrointestinal functions tests-Gastric functions ,hydrochloric acid secretion,gastric juice analysis -Pancreatic secretion,metlabsorption -Liver function tests-Serum bilirubin,total protein,SGOT,SGPT,ALP-Jaunalice ,conjugation

UNIT –III**Vitamins**

Vitamin A- role in vision-Vitamin D,Vitamin E,free radicles,vitamin K-B-complex group of vitamins-Thiamine ,Riboflavin ,Niain,Pyridoxine(B6) pantothemic acid, Biotin, folic acid-Vitamin B12-Ascorbic acid (vitamin C) –deficiency manifestations

UNIT – IV

Mineral metabolisam-Calcium ,calcitonin phosphorous,magnesiumsodium,potassium,chloride,sulphur ,iron –absorption and transport-Iron deficiency ,haemochromatosis,copper,cerloplamic,iodine,manganese zinc,molybdemum,cobalt ,nickel,chromium,fluorine,selenium

UNIT – V**HORMONES**

General properties of hormones,mechanism of action ,radio immunoassay,ELISA,ADH,oxytocin,hypothalamic realeasing factors-Hormones of anterior pituitary ,growth hormone,ACTH,endorphins,TSH,gonadotrophis,Prolactin,thyroid hormones, assessment of thyroid functions-Gastrointestinal hormones,catacholamine adrenal cortex,synthesis of steroid hormones,actions,abnormal secretion,sex hormones

Reference Books:

Clinical Biochemistry – Teitz

Practical Biochemistry – Harold Varley

Text Book of Biochemistry – D.M.Vasudevan and Sreekumari .S

**PRACTICAL XII
BIOCHEMISTRY V**

L FT-R F T-T F T-HORMONAL ASSAY

CORE PAPER XIV - MEDICAL MYCOLOGY AND PARASITOLOGY

UNIT –I

General characters of Fungi –yeast and mold.Nutrition in fungi .cultivation of fungi culture media and cultural characters. Methods for isolation of fungi. Staining methods used in mycology wet and differential staining .Study of microscopic morphology ultra structure of yeast.

UNIT-II

Reproduction in fungi-Asexual and Sexual method classification of fungi principles and approaches .Antifungal agents –mechanism of action

UNIT –III

Fungal diseases ;Causative fungi ,clinical manifestations ,laboratory diagnosis and treatment ,brief account .

Superficial mycoses. Pityriasis versicolor ,Dermatpphytoses ,Piedra

Subcutaneous mycoses.mycetoma,Rhinosporidiosis,Phycomycosis,Sporotrichosis

UNIT-IV

Parasitology ;general Concepts,Introduction to Parasitology ,Classification ,Host parasite relationship.

Laboratory technique in Parasitology – examination of faeces for ova and cysts ,verm burden.Concentration methods,Flotation,Sedimentation technique,staining by iron heamotoxylin methods,blood smear examination,thick/thin Smears,Cultivation of protozoal parasites.

Protozoology ; Pathogenic mechanisms ,disease transmissions and their life cycles,entamoeba and human disease plasmodia,leishmania,Trypanosoma,Giardia ,Trichomonas ,balantidium ,Toxoplasma ,Cryptosporidium and other protozoan parasites causing human infections.Influence of parasitic infections on immunocompromised hosts.

UNIT -V

Helminthology : classification ,Cestodes ,Taenia ,Solium,T .saginata,T.echinococcus,trematodes,Fasciola hepatica,Fasciolopsis buskii,Paragomimus westermanii,Nematodes,

Ascais,Schistosomes,Anchylostoma,Trichuris,Trichinella,Enterobius,Stroglyoids and Wuchereria their

Reference Books :

Text Book of Microbiology – Ananthanarayanan and Jayaram Panicker

Diagnostic Microbiology

Parasitology - K.D.Chatterjee

life cycle,Tranmission ,pathogenicity and Lab Diagnosis.

PRACTICAL XIII**MEDICAL MYCOLOGY AND PARASITOLOGY****FUNGAL INFECTIONS**

Candida albicans-Crypto coccus neoformaqns-Aspergillus infections

DERMATOPHYTE INFECTIONS-Microsporum Canis-Epidermophyton floccusum-

Trichophyton rubrum-Trichophyton mentagrophytes

DIRECT EXAMINATION OF OVA AND CYST IN FAECES-Saline wet mount-Iodine wet mount

CONCENTRATION METHOD-FORMAL ETHER SEDIMENTATION METHOD-Zinc sulphate floatation method-Saturated saline technique

BLOOD SMEAR EXAMINATION-Examination for malarial parasites-Examination for microfilarise

CORE PAPER XV – HAEMATOLOGY IV

UNIT-I

ANAEMINA-Classification of Anaemia-Morphological classification -Normocytic normochromic-Hypochromic microcytic -Normochromic macrocytic -Normochromic microcytic -Anaemia-Etiology classification-Iron deficiency anaemia-Causes of iron deficiency - Laboratory findings

UNIT – II

Aplastic anaemia-Laboratory findings – peripheral picture and bone marrow
Megaloblastic anemia-Vitamine B12 and folic acid deficiency -Laboratory findings –peripheral picture and bone marrow

UNIT – III

Haemolytic anaemia -Common laboratory feature-Sickle cell anaemia-Thalassemia -B thalassemia -A thalassemia

UNIT – IV

Leukaemia – chronic and Acute leukemic -Chronic lymphoid leukemia-Chronic myeloid leukaemia-Acute myeloid and acute lymphatic leukaemia-FAB classification of leukemias-Symptoms,lab diagnosis and treatment of leukaemias-Leukaemoid reaction

UNIT – V

Bone marrow aspiration-Procedure –preparation of smear staining of smear-Staining : PAS ; may gruwald –giemsa stain-Patitive care unit

Reference Books:

Practical Haematology - acie and Lewis

Clinical Diagnosis by Laboratory Methods – Todd and Sanford

PRACTICAL XIV HAEMATOLOGY IV

Detailed study of blood picture-Examination and identification of different types of anaemias-Reticulocyte count-Examination and identification of different types of Leukamias

ELECTIVE PAPER I - CYTOPATHOLOGY

UNIT – I

Uses of cytology -Diagnosis of infections- Sex determinationcytological fixatives-Cytological stains

UNIT – II

FNAC – Procedure ,smear preparation and staining -FNAC and its Clinical applications - Staining ;PAS staining -Giemsa Staining -Branches of diagnostic cytology-Biopsy procedure-Fixation and staining

UNIT – III

CERICAL CYTOLOGY-Cervical scrapings , vaginal smear preparation -Fixation of cervical and vaginal smear-Staining – PAS staining -Cytological Changes in carcinoma

UNIT – IV

Application of cytologic in cancer-Cancer , carcinogenesis and Tumour related genes-Immune response to cancer -Malignant transformation of cells -Oncogenes

UNIT – V

Bone marrow aspiration –Applications-Procedure-Smear preparation and staining -Clinical significance-Mechanism and changes in inflammation -Neoplasm

STAINING TECHNIQUE

PAS -May granuwaled Giemsa stain

Reference Books:

Cytology – Diagnostic Principles and Clinical correlates – Edmund Cibas

SKILL BASED SUBJECT III - NUTRITION

UNIT – 1

Introduction-History of nutrition - Nutrition as science - Foods
-Food groups-RDA-Food guides-Food Pyramid-Balanced diet-Limitations of daily food Guide-Menu planning

UNIT – II

Carbohydrates-Function- sources-RDA, Dietary fiber-Proteins
Sources and functions- Essential and non-essential amino acids-Incomplete and complete proteins-Supplementary food- Nitrogen balance-Changes in the protein requirement Fats- Functions and sources- Essential fatty acids- Excess and deficiency

UNIT – III

Energy-Units of energy- Measurement and energy value of food- Energy expenditure-Total energy/calorie requirement for different age groups and diseases-Energy imbalance – obesity-starvation

UNIT- IV

Minerals-General functions and sources- Macro and micro minerals -Deficiencies and excess

UNIT V

Vitamins-General functions- food sources- Vitamin deficiencies and associated eye disorders with particular emphasis on vitamin 'A'.

Reference Book:

1. Normal and Therapeutic Nutrition, Orinne H. Robinson & Narilyn R. Lawler, 1986
2. Food & Nutrition, Dr. M.Swaminathan, Vol. I & II

SEMESTER VI**Core Paper XIV: BIOCHEMISTRY VI****UNIT – I**

INSULIN -Structure of Insulin ; Biosynthesis, and regulation of Insulin ,Glucose -Diabetes ,Glucose tolerance test, Insulin Tolerance Test,control of diabetes-Gastric analysis,Xylose absorption test,Clearence test for Renel functions,urea and cretinie clearance test -24 hr urine analysis

UNIT – II

ENZYMES-Enzyme analysis;SGOT ,SGPT,ALP,ACP,GGT,LDH,CPK,CPK-MB analysis-Analysis of calculi

UNIT –III

BIOCHEMISTRY OF CANCER AND AIDS - Etiology, mutagens, cancinogenes, antimutagens, progression, oncogenes, Protooncogenes,ancosupressor genes,growth factor cell cycle,doubling time,contact inhibition,tumor markers,anticances drugs-AIDS ; Epidermiology ,transmission ,natural course of the disease,laboratory analysis,virus structure ,replication ,HIV genes and gene products ,immunology ,varine ,anti HIV drugs and prevention

UNIT – IV

Clinical biochemistry-Automation in biochemistry lab-Laboratory organization management-Personal safety masures-Laboratory safety equipments-Chemical spills-Biohazards and infectrous waste -Radio active materials and radiation-Producing equipment

UNIT – V

Maintenance of Lab record-Entering dates, table contents,essential parts of reports formal and informal reports

Energy metabolisam and Nutrition-Caloric value,respiratory quotient ,BMR ,Specific dynamic actron ,energy requirements-Dietary carbohydrates, Nutritional importance of lipids,essential fatty acids and essential aminoacids-Biological value of proteins,malnutrition ,prescription and planning of diet,ideal body weight

Reference Books:

Clinical Biochemistry – Teitz

Practical Biochemistry – Harold Varley

Text book of Biochemistry – D.M Vasudevan and Sreekumari .S

Core Paper XV – HAEMATOLOGY V

UNIT – I

Different types of bleeding disorders-Diagnosis of bleeding disorders-Common laboratory tests for bleeding disorders, second step investigation for bleeding disorder-Coagulation factor assay-Urea solubility test for F XIII-Factor VIII inhibitor study-Fibrinogen assay

UNIT – II

Disseminated intravascular coagulation -Definition ;pathogenesis laboratory investigation-Thrombotic disorders –inherited or acquired-Clinical features-Investigation of thrombotic disorders-Protein C-Protein S-AT =III-Factor V leiden

UNIT – III

Antiphospholipid Absyndrome-Definition, clinical feature, laboratory investigation-Bone marrow examination –aspiration and triphin biopsy –staining-Molecular genetics in haematology

UNIT – IV

Special test in Haematology Lab-Osmotic fragility test -Sickling test -Klehaure acid dilution test -Alkali denaturation test-Ham's test-Sucrose lysis test-Coomb's test-Electrophoresis HbF, HbA, estimation-Test for G6PD deficiency

UNIT – V

Use of radioisotopes in haematology -Safety measures for handling radioisotopes-Cleaning of glassware Biomedical waste management

**PRACTICAL
HAEMATOLOGY V**

SCREENING OF VARIOUS SMEARS, BIOCHEMISTRY - ANALYSIS OF BIOCHEMICAL PARAMETERS, MICROBIOLOGY – CLINICAL MICROBIOLOGY, HISTOPATHOLOGY – PROCESSING OF TISSUE AND SPECIAL STAINING TECHNIQUES

Elective Paper II - NANOBIO TECHNOLOGY

UNIT –I

History –bionanotechnology –concept and future prospects –application in Life Sciences – Terminology –nanotechnology ,biotechnology ,bionanotechnology ,biogenic nanoparticles,nanomedicine,nanowires,quantum Dots,nanocomposite ,nanoparticles.

UNIT –II

Molecular nanotechnology – nanomachines –collagen .uses of nanoparticles –cancer therapy – manipulation of cell and biomolecules .Cytoskeleton and cell organelles.Types of nanoparticles production-physical ,chemical and biological .Biosynthesis of nanoparticles by various groups of microorganisms,Microorganism synthesizing silver nanoparticles,Mechanism involved in silver nanoparticles biosynthesis ,Process design for industrial scale synthesis of nanoparticles

UNIT – III

Nanoparticles –types ,functions –Silver ,gold and titanium ,Physical and chemical properties of nanoparticles .Interaction of nanoparticles with biomolecules ,Characterization of nanoparticles – UV –Vis spectroscopy ,Electron Microscopy –HRTEM ,SEM,AFM ,EDS,XRD,F-IR and DLS

UNIT – IV

Uses of nanoparticles in biology ;Drug delivery –protein mediated and nanoparticle mediated Uses of nanoparticles in MRI ,DNA and Protein Microarrays .Nanotechnology and nanoparticles in health sectors .Toxicology in nanoparticles –Dosimetry.

UNIT – V

Advantages of nanoparticles –drug targeting ,protein detection,MRI ,development of green chemistry –commercial viability nanoparticles .Disadvantages –health risk associated with nanoparticles ,inadequate knowledge on nanoparticles research .

Reference Books :

An Introduction to Biotechnology – Ethud Gazit

Elective Paper III - BIOSTATISTICS AND METHODOLOGY**UNIT – I**

Definition – Scope of Biostatistics ,probability analysis ,variables in Biology –Collection. Classification and Tabulation of data. frequency distribution. Diagrammatical and graphical representations-Bar diagram ,Histogram ,pie diagram

UNIT-II

Measures of Central tendency- Arithmetic Mean, median ,mode ,Calculation of Mean,Median,Mode in series of discrete and continuous observations.Open end classification .Measures of dispersion –standard deviation,standard error etc.ANOVA- one way and two way classification.

UNIT-III

Correlation and regression- Karl Person's coefficient of correlation, positive and Negative Correlation.Regression –linear and non-linear ,regression coefficient

UNIT –IV

Basic ideas of significant tests-Testing of hypothesis ,level of significance ,tests based on –z-test,Student's t-test ,chi square test.Testing of goodness of fit.

UNIT –V

Problem, selection and project designing .Review of literature, collection, processing and presentation of data. Interpretation of results. Editing the final draft. Presentation of research project.

References:

Biostatistics and Research Methodology - Kothari

Research Methods for the biosciences – Debbie Holmes , Peter Moody , Diana Dine

SKILL BASED SUBJECT IV – PERSONALITY DEVELOPMENT**UNIT –I**

What Makes A Winning Personality- Personality Defined- Determinants of Personality- How Personality is Developed

UNIT-II

Corporate Theories on Personality Development-The Development Process-What Makes A Winner

UNIT-III

Building Self – Esteem and Self – Confidence-Indicators of a Positive Self – Image-Indicators of a Negative Self – Image-The Development of Self

UNIT –IV

Image and Self – Esteem- Self – Esteem and Maladjustment

UNIT-V

Behavioral Manifestations of Woundedness-Therapy for Wholeness and Wholesome Self – Esteem

Reference Book:

Roldan, Amelia Samson. A Workbook on Personality Development and Character Building. AR SKILLS DEVELOPMENT AND MANAGEMENT

Project Work and Viva