SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)

SYLLABUS

For

DIPLOMA IN MEDICAL LAB. TECHNICIAN

COURSE : DMLT

Duration of Course : 2 Year

Examination Patteran : Yearly

Department of Paramedical Science and Technology
Swami Vivekanand University, Sironja Sagar (M.P)
2019-2020

Swami vivekanand university , sironja, sagar (M.P.)

Diploma in Medical Laboratory Technology

DMLT 1 Year

SYLLABUS

PAPER (101) HUMAN ANATOMY & PHYSIOLOGY –I

Unit-I:

Cell structure – Structure & function of human cell & their components. Protoplasm, Structure and function of cell membrane, cytoplasm and cell organelles. Membranes and glands: Types- mucous membranes, serous and cutaneous membranes. Skin- epidermis, dermis and accessory organs. Glands – Definition, composition and types. Chromosome- structure and function. Cell division- mitosis and meiosis.

Unit-II:

Tissues- Definition types & functions. Organization of human body: Brief structure and function of digestive system, respiratory system, cardiovascular system, excretory system & urinary system, skeleton system, nervous system, endocrinal system, reproductive system.

Unit-III:

Introduction to chemistry: atom, element compound, atomic structure, atomic number, atomic wt. & mass. Acid, base, alkali & salt. Isotopes, valence, valence, lone pair electron & electronegativity. Introduction of organic & inorganic compound, aliphatic & aromatic compound etc. Introduction of physics: unit of measurements-CGS, MKS & SI unit. Introduction of force, work, heat, light etc.

Recommended Text Books:

1. Biology for class XI & XII, NCRT
2. Chemistry for class XI & XII, NCRT.
3. Physics for class XI & XII, NCRT

Unit –I

-Introduction to human body, Parts of human bone, Muscle & its function) Human body as a whole: Introduction of anatomy and its divisions, Terms of location, positions and planes. Structure & functions of human cell and its organelles. Glands- classification, serous & mucous glands with examples & function, Basic tissues – classification & function with examples.

-Skeleton system: Cartilage – types & function with example. Bone -classification, parts & names of bones of human body. Joints – classification of joints with examples. Muscular system- names & function of muscles of the body.

Lab. Experiments: Practical

Practice session

Identification of organs of the body.

Histology of the 3 types of cartilage

Identification of all bones showing parts, Joints.

Identification of muscles of the body

Histology of skeletal (TS & LS), smooth & cardiac muscle.

Practice based on above practical.

Unit-II

(Digestive and urinary system, cardiovascular system.)

Digestive system: Parts of mouth with function, tonsil, salivary glands. Structure of pharynx, oesophagus. Parts & function of stomach, small and large intestine. Structure & function of liver, gall bladder & pancreas.

Cardiovascular system: Heart - size, location, chambers, exterior & interior. Artery, vein, aorta & blood supply of heart. Valves of heart. Introduction of lymph, lymphatic tissues, names of regional lymphatics, axillaries and inguinal lymph nodes.

Urinary System: Structure & function of kidney, Parts of urinary system, Structure & types of nephron.

Lab. Experiments: Practical, D&T

1. Identification of parts of the heart and vessels of the human body
2. Identification of parts of the Digestive system of the human body.
3. Identification of parts of the liver.
4. Demonstration of parts of respiratory system.
5. Identification of parts of the urinary system.

Unit-III

(Nervous, Endocrine, Respiratory and Organ of sense.) Respiratory System: Structure & parts of nose, nasal cavity, larynx, trachea, lungs, broncho pulmonary segments.

Endocrine Glands: Structure & function pituitary gland, thyroid gland, parathyroid gland, suprarenal glad. Structure of the parts of female and female reproductive system, mammary gland-gross.

Nervous System: Neuron, structure of nervous system, Introduction of cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve, meninges, ventricles & cerebrospinal fluid, Names of basal nuclei, Cranial nerves, Sympathetic trunk & names of parasympathetic ganglia.

Unit-IV

(Blood, Digestive system)

. Blood Volume - Normal value, determination and regulation of blood volume. Plasma Proteins - types& functions. Hemostasis – introduction of normal haemostasis, clotting factors, mechanism of

clotting. Blood groups-A, B, O system, Rh system. Anaemia's– Classification, etiology, effects on body. Red cell indices. Lymph – lymphoid tissue formation, circulation, composition and function of lymph.

1. Digestive System - Functions of various organs of digestive system. Salivary glands. Gastric secretion – Composition function, regulation of gastric juice. Composition, secretion & function of bile secretion. Digestion and absorption of carbohydrates, proteins & lipids.

Lab. Experiment: Practical

Practice session
1.Hb estimation
2.Determination of Blood Groups
3.Determination of body temp, Clotting Time,Bleeding Time
4.Determination of total leucocyte count)
5.Determination of RBC count

Unit-V

(Cardiovascular, Body temperature measurement) Cardiovascular system: Heart –Properties of cardiac muscle, Cardiac cycle, Cardiac output. Blood Pressure - clinical measurement & significance. Physiological variations, regulation of heart rate, cardiac shock, hypotension. Pulse – Jugalar, radial pulse, Triple response. Heart sounds – Normal heart sounds, cause characteristics and signification. Electrocardiogram (ECG)

–significance. Blood circulation.

1. Body temperature measurement, Physiological variation, Regulation of body temperature by physical chemical and nervous mechanisms. Role of Hypothalamus, Hypothermia and fever.

Lab. Experiment: Practical
1. Blood pressure recording
2. Auscultation for Heart Sounds

Measurement of body temperature.

DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

PAPER (102) PATHOLOGY

UNIT-I

(Introduction to blood and anticoagulants) Introduction to pathology. Terminologies used in pathology, Role of hematology in diagnosis of various diseases. Laboratory organization and safety measure

1. Composition, function and of blood and plasma. Morphology of various blood cells and their identifications, abnormal morphology of red blood cells
2. Haematopoiesis: Erythropoiesis, Leucopoiesis and Thrombopoiesis.

Lab. Experiments: Practical

Practice session Collection of blood by VEIN-puncture

1. Demonstration & Identification of blood cells.
2. Collection of blood by finger prick (Lancet)

UNIT-II

(Introduction to stain and blood cell morphology)

1. Romanowsky dyes: Principle of staining, Leishman's stain, Geimsa stain, Field's stain etc, their mechanism of action and preparation.
2. Blood smear: Role of spreader, Preparation and staining procedures of thin & thick blood smear. Basic hematology, physiological variations, normal and absolute values.
3. Immunity- types, Cells & organs of immune system.

Lab. Experiments: Practical

Practice session

1. Collection of blood by vacationer.
2. Preparation of blood smears
3. Staining of blood smears and identification of blood cells

UNIT-III

(Cell Injury and Cell death, Inflammation)

Cell Injury and Cellular Adaptations: Normal cell structure and function, cell Injury- types of cell injury, etiology of cell injury. Cell death: types- autolysis, necrosis, apoptosis & gangrene.

1. Cellular adaptations-Atrophy, hypertrophy, hyperplasia & dysplasia. Definition & types of Neoplasia & hyperplasia-benign tumor and malignant tumor.
2. Hemodynamic Disorders: Introduction & causes of - Edema, Hyperemia, Congestion, Hemorrhage, Circulatory, Thrombosis, Ischemia & Infarction. Inflammation: causes, sign & types.

Recommended text books:

3. Harsh Mohan, Text book of pathology.
4. P. Godkar , Text book of medical laboratory Technology
5. V.H Talib, A hand book of Medical laboratory Technology, CBS Publishers & distributors, New Delhi.

Suggested Reading

1. Rabbins & Cotran, Pathologic Basis & Diseases

Unit-IV

(Training of technician, Sterilization & disinfection)

1. Scope of medical laboratory technology, Role of technician in clinical laboratory, basic ethics of laboratory technician. Training of clinical laboratory technicians.
2. Sterilization & disinfection: Introduction of sterilization & disinfection. Differences between sterilization & disinfection, different methods and procedure of sterilization. Different disinfectants & their procedure of disinfection. Procedure for sterilization of glasswares, infected materials, plastic materials, culture media & solutions. Process of sterilization in autoclave & hot air oven. Concept of septic & aseptic conditions.

Lab. Experiments: Practical

1. Sterilization of glasswares using hot air oven.
2. Sterilization of materials using autoclave.
3. Preparation of 70% ethanol

Unit-V

(Containers for collection of clinical specimens, Anticoagulants)

Introduction of anticoagulants, mechanism of action of an anticoagulants, preparation & merits & demerits of different anticoagulants like EDTA, double oxalate, trisodium citrate, fluoride etc. Introduction of different anticoagulants used in blood banking.

1. Containers for collection of clinical specimens: Containers of collection of blood samples, preparation of an EDTA vial, Preparation of container for collection urine & sputum samples, stool samples, preparation of swab for collection of pus sample.
2. Phlebotomy: Introduction of phlebotomy, syringe & needles. Collection of blood: selection of veins, use of antiseptics, procedure of venipuncture for collection of blood, precautions & contraindication of venipuncture, collection of blood by figure prick.

Lab. Experiments: Practical D&T

Practical:

1. Preparation of EDTA vials.
2. Collection of blood from vein& figure prick.
3. Preparation of container for collection urine & sputum sample.

UNIT-VI

(Introduction to Solution and glassware) Basic concept: Atomic structure, valiancy, Atomic number & mass, Electronegativity, stabilizing forces in biomolecules: Ionic bonds, Hydrogen bond, hydrophobic interaction, van dar waals forces etc.

Carbohydrate: Introduction, classification, Structure, properties and their function of , disaccharides and polysaccharides. Derivatives of polysaccharides. D&L form isomers of carbohydrates, Mutarotation, Oxidation and reduction of carbohydrates.

Lab. Experiments: Practical

Practice session

Qualitative tests of carbohydrates by Molisch test

Qualitative tests of carbohydrates by Saliwanoff's test.

Qualitative tests of carbohydrates by Benedict test.

UNIT VII

(Enzymes, Sterilization and Carbohydrates) Lipid: General structure and classification of lipid fatty acids, Properties & function lipid & fatty acids. Iodine number, sufonification, Acid value and rancidity of fat. Saturated and unsaturated fatty acid, Natural fats, Phospholipids – properties and uses. Cholesterol- Structure, properties & uses.

Enzymes: Definition, Properties, classification, concept of active sites and its general properties, Mode of action of enzymes, Cofactor and coenzymes, Different specificity, Lock and key hypothesis, Koshland's induced fit theory. Factor affecting enzyme activity.

Lab. Experiments: Practical

Qualitative tests for lipids.

UNIT-VIII

(Lipid, Protein, Nucleic acid) Protein: Classification, structural organization and function of protein, peptide and sulfide bonds, Amino acid-classification, isoelectric point, optical activity and concept of pK value of amino acid.

1. Nucleic acids: Structure, function and types
2. of DNA and RNA. Nucleotide, nucleoside and nitrogen bases, Role of nucleic acid, cyclic nucleotide, Synthetic nucleotides. Role of free nucleotide in biological system.

Lab. Experiments: Practical

1. Qualitative tests of amino acid & Proteins

Recommended Text Books

1. Vasudevan DM & Sreekumari S, Text Book of Biochemistry for Medical Students.
2. Satyanarayan, Medical Biochemistry

Suggested reading
Lehninger, Principle of biochemistry

Unit –IX

Introduction to medical microbiology: Scope of medical microbiology. In discovery of microorganism, contribution of Robert Hook, Robert Koch- Koch's postulates, Antony von leeuwenhook, Louis Pasteur, Bordet, Paul Eharlich, Alexander Fleming, Tyndall, Joseph lister, Karl landstainer, Needham etc.

1. Prokaryotic cell: structure of prokaryotic cell, structure and function of components of prokaryotic cell like, cell wall, cell membrane, mesosomes, cytoplasm & cell organells etc. Difference between eukaryotic & prokaryotic cell.

Lab. Experiments: Practical

1. Demonstration of a bacterial cell by simple staining.
2. Demonstration of cell wall by slide.
3. Demonstration of a eukaryotic cell by slide.

Unit –X

(Morphology of bacteria, Bacterial surface appendages)

1. Morphology and nature of bacteria: Size, shape & arrangement of bacteria. Bacterial appendages - structure and functions of flagella, structure and functions of fimbri & pilli.
2. Bacterial capsule- structure and functions. Spores- structure, functions and process of spore formation. Structure and functions cyst. Morphological and biological classification and identification of bacteria. Different forms of microorganism: L-form bacteria, spheroplast, leucoplast etc. Bacterial inclusions bodies.

Lab. Experiments: Practical

Demonstration of a bacterial spore.

1. Demonstration of flagella.
2. Demonstration of inclusions bodies.

Unite-XI

(Introduction to the virology, mycology & parasitological)

1. Introduction to virology, structure of a virus and function of its components, general characteristics of viruses, symmetry of viruses.

2. Introduction to mycology, structure of fungi, Characteristics, morphology and classification of fungi, fungal spores.
3. Introduction to parasitology, terminologies used in parasitology. Structure, characteristics and classification of protozoa, helminthes.

Lab. Experiments: Practical

1. Demo and instruction of microscope,care,and maintenance.
2. Study of equipments and glassware used in microbiology lab.
3. Principle and method of sterilization
4. Prepation of culture media-nutrient and Mac conkey Agar.
5. Preparation of culture plate and isolation of microorganisms.
6. Gram staining method of bacteria.
7. Sputum smear preparation and staining by Zieel Nelsen(AFB).
8. Preparation of broth and slant.
9. Inoculation of the microorganism from liquid medium.
10. Inoculation of the microorganism from slant culture to nutrient broth.
11. Study the mortility of bacteria

Parasitology

1. Saline and pH preparation for Protozoal / Helminthies cysts.
2. Stool examination.
3. Study of life cycle and lab. Diagnosis of malaria parasites.

Virology

1. Study of viruses structure and morphology.
2. Study of sample collection for virology.

Recommended Text Books

1. Baweja, Medical Microbiology
2. Anantha Narayan and Panikar, Text book of Microbiology

Unit XII

1. Principles of assay procedure for biological material (serum/plasma/urine/other body fluid).
2. Principle, clinical condition & requirement with sample collection ,estimation, interpretation and source of error of total protein albumin, glucose, urea, uric acid , creatinine , cholesterol ,bilirubin, sodium and potassium, chloride, calcium, PPD, 17 ketogenic steroid and barbiturate.
3. Glucose tolerance test, insulin tolerance test, gastric analysis, xylose absorption test, clearance test for renal function.
4. Enzymes –acid and alkaline phosphates, AST(SGOT),ALT(SGPT), amylase ,lactate dehydrogenase, CPK.
5. Analysis of calculi and CSF-formation ,factor responsible ,chemical examination and reagent preparations.
6.Quality control of clinical investigation, computer application in clinical biochemistry lab, computerization of clinical lab instrument, auto analyzer, clinical cornea, auto

pacer, ELISA,RIA

7. Laboratory organization management- maintenance of records, stock room and register, lab safety-accident and first aid, biological hazards and bio safety labels, disposal bio hazards sample.

Lab. Experiments: Practical

1. Estimation of blood glucose
2. Estimation of total protein and albumin
3. Estimation of blood urea
4. Estimation of serum creatinine
5. Estimation of serum bilirubin
6. Estimation of sodium and potassium
7. Estimation of GTT(glucose tolerance test)
8. Estimation of alkaline phosphatase
9. Estimation of SGOT and SGPT
10. Estimation of uric acid
11. Estimation of acid phosphatase
12. Estimation of serum total cholesterol
13. Estimation of serum triglycerides

Swami vivekanand university , sironja, sagar (M.P.)

DMLT- II year

SILLAYBUS

(201) HUMAN ANATOMY & PHYSIOLOGY II

UNIT-I

(Physiology of Sense & Respiratory system)

Special senses: Vision – structure & function of different parts of eye. Hearing structure & mechanism of hearing. Taste – Taste buds & functions. Smell –physiology, Receptors.

1. Respiratory system: Mechanism of normal and rigorous respiration. Forces opposing and favouring expansion of the lungs. Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall. Transportation of respiratory gases. Lung volumes and capacities. Mechanisms of Regulation of respiration, Respiratory centre. Applied physiology respiration- Hypoxia, Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial Respiration, Apnoea.

Lab. Experiment: Practical,

Demonstration of mechanism of respiration.

Demonstration of testing of hearing.

Recommended Text Books

1. Shembulingam, Human Physiology
2. A. K Jain, Text Book of Medical Physiology.

Suggested Reading

1. Ross and Wilson, Anatomy a & physiology

UNIT-II

(Nervous system)

1. Nervous system: Functions of nervous system & neuron structure. Neuroglia, nerve fiber. Conduction of impulses continuous and saltatory. Synapse & Receptors. Reflex action– unconditioned properties of reflex action. Babinski's sign. Spinal cord nerve tracts. Functions of Medulla, pons. Hypothalamic disorders. Cerebral cortex lobes and functions, Sensory cortex, Motor cortex, Cerebellum .Basal ganglion-functions. EEG. Cerebro Spinal Fluid (CSF) - formation, circulation, properties, composition and functions. Autonomic Nervous System

Lab. Experiment: Practical ,

Practice session

UNIT-III

(Reproductive system, Nervous system) Reproductive system: spermatogenesis & oogenesis. Endocrine functions of testes & ovary. Menstrual cycle. Physiological changes during pregnancy. Lactation – Composition of milk & factors controlling lactation.

Muscle & nerve physiology: Structure of skeletal muscle - sarcomere contractile proteins. Neuromuscular junction. Transmission across the neuromuscular junction. Mechanism of muscle contraction, muscle tone, fatigue, Rigour, mortis. Skin - structure and function.

Lab. Experiment: Practical

UNIT-IV

(Physiology of Sense & Respiratory system)

1. Endocrine System: Mode of action of hormones. Thyroid hormone – function & regulation of secretion, disorders due to thyroid hormone. Secretion, functions and regulation of hormones of Adrenal, Pituitary, Parathyroid gland & Pancreas, Functions of Adrenaline and nor adrenaline, Insulin – secretion, regulation & function.

2. Excretory System: Nephron & Juxta Glomerular Apparatus - structure and function. Renal circulation peculiarities. Mechanism of urine formation: Ultra filtration, Selective reabsorption, GFR, Plasma fraction, Mechanisms of reabsorption of glucose, urea, H+, Cl, amino acids. Renal threshold % of reabsorption of different substances, Selective secretion. Properties and composition of normal urine, urine output. Abnormal constituents in urine, Mechanism of urine concentration.

Lab. Experiment: Practical

Recommended Text Books

1.Shembulingam, Human Physiology

2.A. K Jain, Text Book of Medical Physiology.

Suggested Reading

1. Ross and Wilson, Anatomy a & physiology

(202) CLINICAL PATHOLOGY

UNIT-I

(Hemoglobin & Methods of Estimation, Anaemia) Haemoglobinometry: hemoglobin - definition, function, structure, various methods of estimation - Sahli's, CMG, oxyhemoglobin, specific gravity method etc., Clinical significance of Hb estimation.

Anaemia: Definition, classification, clinical features. Introduction, causes & lab. diagnosis of - Iron deficiency anemia, Megaloblastic anemia, aplastic anemia, sickle cell anemia - sickling test & thalassemia.

Lab. Experiments: Practical

Practice session.
Hb estimation by Sahli's method.
Hb estimation by CMG method.
Hemoglobin determination by specific gravity method.
Sickling test.

UNIT-II

(Hemocytometry, Leukemia.)
Hemocytometry: Neubaur's counting chamber-structural detail & application, Hb pipette, RBC and WBC pipette - structure & application. Counting of RBCs, WBCs & Platelets - Principle, requirements, specimen, procedure, calculation, precautions, normal values and clinical significance. Differential Leucocytes Count (DLC) - Principle, requirements, specimen, procedure, precautions, normal values and clinical significance. Significance of complete blood count (CBC) & peripheral blood smear.
1. Leukemia: Definition, classification & cause & clinical features. Introduction & laboratory diagnosis of AML, CML, ALL & CLL.

Lab. Experiments: Practical

Practice session
Total leucocyte count (TLC).
Total RBCs count.
1. Total platelets count.
2. Differential leucocytes count (DLC).

1. Examination of peripheral blood smears (PBF). Basic requirements for hematology laboratory.
2. Glasswares for Hematology.

3. Equipments for Hematology.
4. Anticoagulant vial prepration.
5. Complete Blood Counts.
6. Determination of Hemoglobin.
7. TRBC Count by Hemocytometers.
8. TLC by Hemocytometer.
9. Differential Leukocyte count.
10. Determination of Platelet Count.
11. Determination of ESR by wintrobes.
12. Determination of ESR by Westergeren's method.
13. Determination of PCV by Wintrobes.
14. Erythrocyte Indices- MCV, MCH, MCHC.
15. Reticulocyte Count.
16. Absolute Eosinophil Count.
17. Morphology of Red Blood Cells.
18. Basic requirements for hematology laboratory.
19. Glasswares for Hematology.
20. Equipments for Hematology.
21. Anticoagulant vial prepration.
22. Complete Blood Counts.
23. Determination of Hemoglobin.
24. TRBC Count by Hemocytometers.
25. TLC by Hemocytometer.
26. Differential Leukocyte count.
27. Determination of Platelet Count.
28. Determination of ESR by wintrobes.
29. Determination of ESR by Westergeren's method.
30. Determination of PCV by Wintrobes.
31. Erythrocyte Indices- MCV, MCH, MCHC.
32. Reticulocyte Count.
33. Absolute Eosinophil Count.
34. Morphology of Red Blood Cells.

UNIT-III

(ESR, PCV, Raticulocyte count, hemostasis)

Red cell indices - significance and estimation. Determination of packed cell volume (PCV) or Hematocrit (Hct) value - various methods & clinical significance. Erythrocyte Sedimentation Rate (ESR) - wintrob's, westergreen's & automated methods & clinical significance.

1. Hemostasis: Determination of bleeding time (BT), Clotting time (CT), prothrombin time (PT) & activated partial prothrombin time (APTT) - various methods, principle, procedure of methods & clinical significance.
2. LE cell preparation - principle, prodcedure & clinical significance. Raticulocyte count - principle procedure & clinical significance.

Lab. Experiments: Practical

Practice session

1. Determination of ESR by wintrob's method.
2. Deterrmination of ESR by Westergreen method.
3. Determination of PCV.
4. Determination of BT & CT.
5. Determination of prothrombin time (PT).

Recommended text books:

P. Godkar , Text book of medical laboratory Technology

V.H Talib, A hand book of Medical laboratory Technology, CBS Publishers & distributors, New Delhi.

Suggested Reading

Wintrob's hematology

CLINICAL BIOCHEMISTRY

UNIT I

(Introduction to the clinical laboratory, Laboratory management)

1. ntroduction of the clinical laboratory, components & department of clinical Laboratory.
2. Basic principles of laboratories: laboratory quality control. Collection and handling of specimens. Laboratory safety & biohazards: Safety manuals of a clinical laboratory, Management of physical, chemical & biological hazards of clinical laboratory. Maintenance of cleanliness of the laboratory: maintenance of cleanliness, Personal Health and hygiene, cleaning of laboratory glassware, cleaning pipette.
3. Proper clinical waste disposal. Components, uses and management of First Aid Box in the laboratory.

Lab. Experiments: Practical

1. Cleaning of laboratory glasswares.
2. Washing of hands using seven step rules.
3. Preparation of First Aid Box. (0.1 credits)

Unit –II

(Solutions & glassware in clinical biochemistry lab)

Glassware: Introduction of clinical biochemistry, importance of clinical biochemistry. Basic awareness of laboratory in respect to glassware & equipments. Composition of glass. Structure, function & uses of laboratory glassware like graduated measuring cylinders, burettes, volumetric flasks, pipettes, beakers & test tubes. Cleaning of laboratory Glassware & glassware conditioning.

1. Solution: Introduction of solution, solute, solvent & reagents. Expressing the concentration of solution: Qualitative expression - dilute & concentrated solution, Semi-quantitative expression - unsaturated & saturated solution, Quantitative expressions – normality, molarity, mass concentration, mass fraction, mass percentage or %(w/w), volume percentage, molality (m). Types of solutions: stock solution, standard solution, working solution, an acid solution of required normality.

Lab. Experiments: Practical

Cleaning and conditioning of glassware.

1. Preparation of 1normal solution.
2. Preparation of 1molar solution.

Unit- III

(Acid & base, pH & buffer)

1. Acid, base & pH: Introduction of acid and bases, types of acid & base with examples. Introduction of pH and its importance, measurement of pH- litmus paper & paper strip method, application of pH.

2. Buffers: Introduction of buffers, principle of buffering. Type and working of Buffers: acidic and alkaline buffer solutions, working of buffer solution. Preparation of buffer solution: Acetate buffer, Phosphate buffer and Tris(hydroxymethyl) aminomethane buffer or tris buffer. Criteria for selection of buffers.

Lab. Experiments: Practical

1. Measurement of pH by litmus & paper strip method. (0.1 credits)
2. Preparation of phosphate buffer of a desired pH. (0.1 credits)
3. Preparation of acetate buffer of a desired pH. (0.1 credits)

Unit- IV

(Clinical Laboratory equipments)

1. Clinical Laboratory equipments: Principle, working and application of spectrophotometer, colorimeter. pH meter- introduction, principle and working procedure for measurement of pH of a solution, maintainance of pH meter.

2. Principle, and procedure and application of cyclomixture, centrifuge, balance, Incubator etc.

Lab. Experiments: Practical

1. Demonstration of working of colorimeter.
2. Demonstration of working of pH meter.
3. Demonstration of working of incubator.
4. Demonstration of working of cyclomixture.
5. Demonstration of working of centrifuge, balance.

Recommended text books:

1. Ramnik Sood, Text book of medical laboratory Technology.
2. V.H Talib, A hand book of Medical laboratory Technology, CBS Publishers & distributors, New Delhi.

Suggested Reading

1. Singh & Sawhney, Introductory practical biochemistry.
2. P. Godkar , Text book of medical laboratory Technology.

Uniti V

CLINICAL PATHOLOGY

1. Physical, chemical & microscopic examination of urine
2. Stool examination [PHYSICAL ,CHEMICAL &MICROSCOPIC EXAMINATION]
3. Semen examination
4. CSF exam. & other body fluids

HISTOLOGY

5. Fixatives
6. Tissue processing, impregnation
7. Block making
8. Section cutting
9. Types of Microtomes
10. Basic staining of sections
11. Collection of tissue for histology
12. Method of Decalcification

Unit VI

(Introduction to the clinical laboratory, Laboratory management)

4. Introduction of the clinical laboratory, components & department of clinical Laboratory.
5. Basic principles of laboratories: laboratory quality control. Collection and handling of specimens. Laboratory safety & biohazards: Safety manuals of a clinical laboratory, Management of physical, chemical & biological hazards of clinical laboratory. Maintenance of cleanliness of the laboratory: maintenance of cleanliness, Personal Health and hygiene, cleaning of laboratory glassware, cleaning pipette.
6. Proper clinical waste disposal. Components, uses and management of First Aid Box in the laboratory.

Lab. Experiments: Practical

4. Cleaning of laboratory glasswares.
5. Washing of hands using seven step rules.
6. Preparation of First Aid Box. (0.1 credits)