SYLLABUS OF

DIPLOMA IN MEDICAL LAB TECHNOLOGY

DURATION - 2 YEARS

COURSE - D.M.L.T **DURATION - TWO YEARS**

SYLLABUS OF SUBJECT : ANATOMY & PHYSIOLOGY -1ST YEAR

ANATOMY

1. INTRODUCTION TO ANATOMY & HISTOLOGY, STRUCTURE OF CELL, EPITHELIAL TISSUE, MUSCULAR TISSUE, NERVOUS TISSUE.
2. SKELETAL SYSTEM, STRUCTURE OF BONES, TYPES OF BONES, BONES OF CRANIUM,FACE VERTEBRAL COLUMN UPPER AND LOWER LIMBS, FRACTURE OF BONES, VARIOUS MOVEMENTS OF JOINTS.
3. MUSCULAR SYSTEM, STRUCTURE AND TYPES OF MUSCLES IN HUMAN BODY, IMPORTANT MUSCLES AND THEIR GROUP ACTION.
4. CIRCULATION SYSTEM, STRUCTURE OF HEART, NAMES AND POSITION OF MAIN BLOOD VESSELS.
5. LYMPHATIC SYSTEM, LYMPH VESSELS,LYMPH NODES AND LYMPHOID ORGANS, THEIR STRUCTURE & FUNCTIONS.
6. DIGESTIVE SYSTEMS. PARTS OF GASTROINTESTINAL TRACT AND ASSOCIATED GLANDS.
7. RESPIRATORY SYSTEM. PARTS OF RESPIRATORY SYSTEM.
8. URINARY SYSTEM. PARTS OF URINARY SYSTEM.
9. ENDOCRINE SYSTEM. VARIOUS ENDOCRINE GLANDS. THYROID. PARATHYROID. ADRENAL GLANDS PITUITARY PANCREAS. THYMUS AND SEX GLANDS.
10. REPRODUCTIVE SYSTEM. MALE & FEMALE REPRODUCTIVE ORGANS.
11. SKIN AND SENSE ORGANS. EYE, EAR, NOSE. TASTE BUDS.
12. NERVOUS SYSTEM. PARTS OF BRAIN, SPINAL CORD, PERIPHERAL NERVES.

PHYSIOLOGY

1. BLOOD. COMPOSITION AND FUNCTION OF BLOOD, HAEMOPESIS, BLOOD COAGULATION, BLOOD GROUPS, BODY FLUID.
2. CARDIOVASCULAR SYSTEMS. CIRCULATION OF BLOOD, FUNCTION OF HEART AND BLOOD VESSELS. CONTROL OF HEART RATE, PULSE, REGULATION OF BLOOD PRESSURE, BLOOD VOLUME.
3. RESPIRATORY SYSTEM. FUNCTION OF LUNGS, MECHANISM OF BREATHING AND EXCHANGE OF GASES IN THE LUNGS, REGULATION OF RESPIRATION, RESPIRATION DISORDER LIKE ANOXIA. DYSPNEA CYANOSIS ETC.ARTIFICIAL RESPIRATION LUNG FUNCTION TESTS.
4. DIGESTIVE SYSTEMS. DIGESTION OF FOOD IN MOUTH, STOMACH & SMALL INTESTINES. ABSORPTION OF FOOD, FUNCTION OF LIVER FUNCTION TESTS.
5. EXCRETORY SYSTEMS. STRUCTURE & FUNCTION OF KIDNEY AND URINARY BLADDER. MECHANISM OF URINE FORMATION. DISORDERS OF KIDNEY.
6. ENDOCRINE SYSTEMS. PHYSIOLOGY & FEMALE REPRODUCTIVE ORGANS.
7. NERVOUS SYSTEM. NEURONE & ITS FUNCTIONS, FUNCTION OF CENTRAL NERVOUS SYSTEM. AUTONOMIES NERVOUS SYSTEM, PHYSIOLOGY OF VISION, HEARING & OLFACTION.

SUBJECT : HAEMATOLOGY & BLOOD BANKING

1. **INTRODUCTION TO HAEMATOLOGY:** (A) DEFINITION, (B) IMPORTANCE, (C) IMPORTANT EQUIPMENT USED.
2. LABORATORY ORGANIZATION AND MAINTENANCE
3. INTRODUCTION TO BLOOD, ITS COMPOSITION, FUNCTION AND NORMAL CELLULAR COMPONENTS.
4. **BASIC FORMATION OF BLOOD:** (A) ERYTHROPOIESIS, (B) LEUCOPOIESIS, (C) THROMBOPOIESIS.
5. COLLECTION AND PRESERVATION BLOOD SAMPLE FOR VARIOUS HAEMATOLOGICAL ESTIMATION.
6. **HAEMOGLOBIN:** DEFINITION AND TYPES, NORMAL VALUES, SYNTHESIS AND BREAKDOWN, HAEMOGLOBIN ESTIMATION TECHNIQUES, PRINCIPLES & PROCEDURES FOR HB ESTIMATION, ERRORS INVOLVED AND MEANS TO MINIMIZE ERRORS FOR HB ESTIMATION.
7. **TOTAL LEUCOCYTES COUNT (TLC):** NORMAL VALUES, CLINICAL SIGNIFICANCE, METHOD OF ESTIMATION, SOURCE OF ERRORS.
8. **DIFFERENTIAL LEUCOCYTES COUNT(DLC):** NORMAL VALUES, CLINICAL SIGNIFICANCE, SOURCES OF ERRORS AND MEANS TO MINIMIZE THEM

9. **ERYTHROCYTE SEDIMENTATION RATE(ESR)**: NORMAL VALUES, DEFINITION, PRINCIPLE AND PROCEDURE TO DETERMINE ESR, FACTORS INFLUENCING ESR AND CLINICAL SIGNIFICANCE, ERRORS INCLUDED AND THEIR MINIMIZATION.
10. **PACKED CELL VOLUME/HAEMATOCRIT VALUE:** NORMAL VALUES, ESTIMATION BY MACRO AND MICRO METHOD, MERITS AND DEMERITS OF ESTIMATION METHOD, FACTORS INFLUENCING PCV, CLINICAL SIGNIFICANCE.
11. **RED CELL INDICES(RCI):** DEFINITION,PROCEDURE AND GENERAL FORMULA FOR CALCULATING INDICES, CLINICAL SIGNIFICANCE, NORMAL VALUE, NUMERICAL PROBLEMS RELATED TO RCI.
12. **ABSOLUTE EOSINOPHIL COUNT:** PRINCIPLE AND PROCEDURE FOR COUNTING AEC, CLINICAL SIGNIFCANCE, NORMAL VALUE, RISK OF ERROR INVOLVED IF ANY.
13. **RETICULOCYTE COUNT:** PRINCIPLE AND PROCEDURE, CLINICAL SIGNIFICANCE, NORMAL VALUE, RISK OF ERROR INVOLVED IF ANY.
14. **PLATELETS COUNT:** NORMAL VALUES, PROCEDURE AND ESTIMATION, CLINICAL SIGNIFICANCE, ERRORS AND RE-CORRECTION.
15. **PREPARATION OF BLOOD FILMS:** TYPES, METHODS OF PREPARATION.
16. **ROUTINE STAINING TECHNIQUES IN HAEMATOLOGY:** GIEMSA STAN, LEISHMAN STAIN, PRINCIPLE, COMPOSITION, PREPARATION OF STAINING REAGENTS AND PROCEDURE.
17. BLOOD GROUP SYSTEM AND BLOOD GROUP INCOMPATIBILITY ABO, RH SYSTEMS, CROSS, MATCHING TEST IN EMERGENCY.
18. **BLOOD BANKING PREPARATION:-** BLOOD COLLECTION PROCEDURE, TRANSPORT AND STORAGE. PREPARATION AND USE OF WHOLE BLOOD AND BLOOD COMPONENTS-WASHED RED CELLS, PLASMA PREPARATION, ETC.
19. **QUALITY CONTROL IN BLOOD BANKS:-** SPECIMEN COLLECTION, RISK ASSESSMENT FOR AIDS AND SERUM HEPATITIS.

SUBJECT : CLINICAL PATHOLOGY

1. **URINE ANALYSIS:-** COMPOSITION OF NORMAL URINE, COLLECTION OF URINE SPECIMENS, ROUTINE URINE ANALYSIS-PHYSICAL, CHEMICAL & MICROSCOPIC EXAMINATION.
2. **STOOL ANALYSIS:-** COMPOSITION OF NORMAL STOOL, COLLECTION OF STOOLS SPECIMENS, ROUTINE STOOL ANALYSIS –PHYSICAL, CHEMICAL & MICROSCOPIC EXAMINATION.
3. **CEREBROSPINAL FLUID ANALYSIS:-** COMPOSITION OF NORMAL CSF, COLLECTION AND PROCESSING OF SPECIMENS, ROUTINE CSF ANALYSIS-PHYSICAL, CHEMICAL & MICROSCOPIC EXAMINATION.
4. **SEMEN ANALYSIS:**- COLLECTION OF SEMEN, ROUTINE SEMEN ANALYSIS-PHYSICAL, CHEMICAL & MICROSCOPIC EXAMINATION.
5. **SPUTUM ANALYSIS:**- METHODS AND PRESENTATION IN COLLECTION OF SPUTUM, PHYSICAL, CHEMICAL & MICROBIOLOGICAL EXAMINATION, CONCENTRATION METHOD FOR AFB(ACID FAST BACILLUS).

SYLLABUS OF SUBJECT : MICROBIOLOGY - 2nd YEAR

1. **INTRODUCTION TO MEDICAL MICROBIOLOGY**:- DEFINITION, HISTORY, HOST-MICROBE RELATIONSHIP.
2. **SAFETY MEASURES IN CLINICAL MICROBIOLOGY**
3. **GLASSWARE USED IN CLINICAL MICROBIOLOGY LABORATORY:-** INTRODUCTION, CARE AND HANDLING OF GLASSWARE, CLEANING OF GLASSWARE.
4. **EQUIPMENTS USED IN CLINICAL MICROBIOLOGY LABORATORY**:- INTRODUCTION, CARE & MAINTENANCE.
5. **MICROSCOPY** :- INTRODUCTION AND HISTORY, TYPES OF MICROSCOPES:- (a) LIGHT MICROSCOPE, (b) DGI, (c) FLUROSCENT, (d) PHASE CONTRAST, (e) ELECTRON MICROSCOPE:- (i) TRANSMISSION, (ii) SCANNING., PRINCIPLES OF OPERATIONAL MECHANISMS OF VARIOUS TYPES OF MICROSCOPES.
6. **STERILIZATION :-** DEFINITION, TYPES AND PRINCIPLES OF STERILIZATION METHODS:- (a) HEAT(DRY HEAT, MOIST HEAT WITH SPECIAL REFERENCE TO AUTOCLAVE), (b) RADIATION, (c) FILTRATION., EFFICIENCY TESTING TO VARIOUS STERILIZERS.
7. **ANTISEPTICS AND DISINFECTANTS:-** DEFINITION, TYPES AND PROPERTIES, MODE OF ACTION, USES OF VARIOUS DISINFECTANTS, PRECAUTIONS WHILE USING THE DISINFECTANTS, QUALITIES OF A GOOD DISINFECTANTS, TESTING EFFICIENCY OF VARIOUS DISINFECTANTS.
8. **BIOMEDICAL WASTE MANAGEMENT IN A MICROBIOLOGY LABORATORY:-** TYPES OF THE WASTE GENERATED, SEGREGATION, TREATMENT, DISPOSAL.
9. **GENERAL CHARACTERISTICS & CLASSIFICATION OF MICROBES:-** (BACTERIA & FUNGI):- CLASSIFICATION OF MICROBES WITH SPECIAL REFERENCE TO PROKARYOTES & EUKARYOTES, MORPHOLOGICAL CLASSIFICATION OF BACTERIA, BACTERIAL ANATOMY(BACTERIAL CELL STRUCTURES)
10. **GROWTH AND NUTRITION OF MICROBES:-** GENERAL NUTRITIONAL & OTHER REQUIREMENTS OF THE BACTERIA, NUTRITIONAL TYPES OF THE BACTERIA AUTOTROPHS, HETEROTROPHS, PHOTOTROPHS, CHEMOTROPHS, SAPROTROPHS, ITHOTROPHS & ORGANOTROPHS, PHOTOAUTOTROPHS, CHEMOHETEROTROPHS, PHOTOORGANOTROPHIC, HETEROTROPHS, CHEMOLITHOTROPHIC AUTOTROPHS MIXOTROPHIC., PHYSICAL CONDITIONS REQUIRED FOR GROWTH, NORMAL GROWTH CYCLE OF BACTERIA(GROWTH CURVE), TYPES OF MICROBIAL CULTURES: SYNCHRONOUS, STATIC, CONTINUOUS CULTURE.

SUBJECT : BIO-CHEMISTRY

1. **TERMS:-** NORMAL SOLUTION, MOLAR SOLUTION, SATURATED SOLUTION, UNSATURATED SOLUTION AND BUFFER SOLUTION.
2. **PREPARATION OF SOLUTION:**- NORMAL, MOLAR, SATURATED, UNSATURATED AND BUFFER.
3. **CLEARING:-** GLASS WARES.
4. **PIPPETS:**- TYPES AND USE OF PIPPETS.
5. **PH:**- DETERMINATION OF UNKNOWN.
6. **CALORIMETER:**- TYPES COMPONENTS USE AND MAINTENANCE.
7. **DISTILLATION:**- WATER
8. **PROTIENS:**- AMINO ACIDS, ESSENTIAL AMMINO, PROTIENS, DENATURIATION OF PROTIENS, METABOLISM FORMATION OF UREA, CREATININE etc. DETERMINATION OF PLASMA PROTIENS (ALBUMEN, GLOBULIN, FIBRINOGEN) BLOOD UREA, URIC ACID & CREATININE.
9. **NUCLEIC ACIDS:-** DNA, RNA, AND THEIR IMPORTNACE.
10. **CARBOHYDRATES:**- CLASIIFICATION, PROPERTIES METABOLISM, DEIFNITION OF GLYCOLYSIS, GLYCOGENELYSIS,CLUCONEGESIS AND HORMONAL REGULATION OF BLOOD SUGAR. DIABETES MELLITUS KETOSIS, GLYCOURIA, WATER AND MINERAL METABOLISM, DETERMINATION OF BLOOD GLUCOSE, GTT & INSULIN TOLERANCE TEST.
11. **LIPIDS:-** DEFINITION, CLASSIFICATION, STERIODS, METABOLISM, TRIGLYCERIDES, CHOLESTROAL, PLASMALIPOOPROTIENS-KETONE DODIES AND KETOSURIA. DETERMINATION OF SERUM CHOLESTROL, HDL, LDL, VLDL & TRIGLYCERIDES.
12. **ELECTROLYTES IN BODY FLUIDS:**- SODIUM, POTASSIUM,CLACIUM, PHOSPHORUS & CHLORIDES-DETERMINATION & CLINICAL SIGNIFICANCE.
13. **ENZYMES:**- ASSAYS IN CLINICAL LABORATORIES:- (a) CREATINE KINASE, (b) PHOSPHATASE(ACID & ALKALINE), (c) TRANSAMINASE(SGOT & SGPT), (d) AMYLASE.
14. **JAUNDICE:**- DEFINITION AND ITS TYPES, ESTIMATION OF SERUM BILIRUBIN (TOTAL DIRECT & INDIRECT) AND ITS MEDICAL IMPORTANT.
15. **LIVER FUNCTION TEST (LFT):**- AND SERUM BILIRUBIN ESTIMATION (TOTAL DIRECT & INDIRECT)AND ITS MEDICAL IMPORTANT.
16. **RENAL FUNCTION TEST (RFT).**
17. **HORMONES:-** DEFINITION & FUNCTIONS OF SOME IMPORTANT HORMONES. RADIOISOMETRIC ASSAYS FOR T3, T4 & TSH.

SUBJECT : LABORATORY MANAGEMENT

1. **LABORATORY PLANNING:-** LABORATORY PRINCIPLES, GOALS, OPERATIONAL DATA, MARKET DATA, MARKET,POTENTIAL, HOSPITAL/LABORATORY, COMPETITIONS, LABORATORY TRENDS, GUIDING, PRINCIPLES FOR PLANNING HOSPITAL LABORATORY SERVICES PLANNING FOR A BASIC HEALTH LABORATORY.
2. **LABORATORY ORGANIZATION:-** PRINCIPLE COMPONENTS AND FUNCTIONS OF A LABORATORY, STAFFING THE LABORATORY, JOB, DESCRIPTION SPECIFICATIONS, WORK SCHEDULE,PERSONNEL RE-ARRANGEMENT AND WORK LOAD ASSESSMENT.
3. **CARE OF LABORATORY GLASSWARE EQUIPMENT AND CHEMICALS:-** CARE AND CLEANING OF GLASSWARE, CARE OF EQUIPMENT AND APPURETUS, LABORATORY, THEIR, PROPER USE AND CARE, LABORATORY, CHEMICALS. THEY'RE PROPER USE AND CARE. LABELING.
4. **SPECIMEN HANDLING:-** COLLECTION TECHNIQUES AND CONTAINERS, TYPES OF SPECIMENS, ENTRY, SPECIMEN TRANSPORT, TRANSFERENCE DISTRIBUTION AND RE-ASSIGNMENT DISPOSAL, PRESERVATION OF SPECIMEN.
5. **LABORATORY SAFETY: -** LABORATORY HAZURDS, SAFETY, FIRST AID.
6. **SAFETY MEASURES:-** MECHANICAL, ELECTRICAL, CHEMICAL, BIOLOGICAL, REDUCTIVE
7. **COMMNICATION:-** PERSONNEL DEVELOPMENT AND RELATIONS, REQUEST/REPORT FROMS
8. **QUALITY CONTROL:-** NON-ANALYTICAL FUNCTIONS, ANALYTICAL FUNCTIONS
9. **MATERIAL MANAGEMENT:-** PROCUREMENT IDENTIFICATIONS AND CORRESPONDENCE OF MATERIALS WITH SOURCES. INVENTORY, CONTROL AND ANALYSIS INSPECTION AND STORAGE, RECORDS AND REPORTS, COST CONTROL, PURCHASE AND UTILIZATION OF SUPPLIES.
   NATIONAL HEALTH PROGRAMMES.