SYLLABUS FOR THE POST OF RADIOGRAPHER IN THE DEPARTMENT OF ESI(MEDICAL) SERVICES

Anatomy: General Introduction to Human Anatomy:

- Definition of Anatomy
- Definition of topographic term/terms used to describe the body.
- Cells and Tissues of Body

Anatomical Description of:

- Skin
- Osteology (Bone structure, individual bones)
- Joint structure joints of upper and limbs, ligaments, Fascia and Bursse.
- Musulo skeletal (upper and lower extremities).
- Cardiovascular system
- Lymphatic system (Structure, Function, Lymphatic glands)
- Respiratory system (Respiratory passages and organs)
- Digestive system (Elementary camel structure)
- Urogenital system (male and Female Organs Kidney structure)
- Endocrine system (name, Location and Functional)
- Sensing organs (Eye, Nose and Ear)
- Central Nervous system

Physiology (Function and Mechanism of):

- Digestion
- Respiratory
- Circulation
- Excretion
- Nervous System
- Role of Endocrine glands
- Physiology of thermoregulation
- Physiology of Blood
- Reproduction (genitor- urinary system)
- Vision, Hearing and Speech.

Biochemistry:

- Definition of Biochemistry
- Elementary ideas/ overview of the following:

General metabolism of;

- Carbohydrates
- Lipids
- Proteins

Different types of Enzymes and their Functions.

Microbiology:

- Microscope and Microscopy
- Introduction- Micro organism- Classification
- Epidemiology
- Sample collection, transportation and preservation, to maintain aseptic condition

Pathology:

Introduction to pathology- Definition.

Etioolgy and Classification of:

- Inflammatory

- Neoplastic
- Metabolic
- Congenital

PRACTICAL

1. Anatomy:
Demonstration of Surface Markings of Organs:
Heart, Lungs, Liver, Spleen, Stomach, Important bony landmarks, Arteries, Veins, Nerves, Joints
Arteries:
Carotid, Brachial, Radial, Anterior Tibal
Veins:
Juglar, Cubital Lateral poplitial and Sciatic
Bony Preminences: Clavicle, Anterior Illiac Crest , Posterror Illiac Crest, Supra sternal Notch, Sternum , Ribs, Verteberal Coloumn, Anterior and Superilliac spine
Pubi9c- symphisis, Medical and Lateral Malleolres, Patela, Tibal tubercle
Joints and Their Movements:

- Ball& Socket joints- shoulder and hip joints, (Elbow and Knee joints).
- Microbiological Study of Microscope: Simple Compound
- Their different parts and functions
- Visit to microbiology Lab for culture media and culture of stool, urine, blood and demonstration.

Joints and Their Movements:

- Cell (Examination of mucous scraping).
- Skin, connective tissues, bone, cartilage, nervous tissues.

Muscle:

- Skeletal, cardiac, (striated, non- striated and cardiac mucles)

Identification of Long Bones, Hip Bones, Vertebra, Ribs, scapula, Mendible, clavicle, skull.

- Demonstration of the in the interior of thorax with organs in (In rnodel) such as lungs, trachea, heart, aorata and venacava, oesophagus, diaphragm.
- Demonstration of interior of abdomen with organs in situ such stomach, liver, spleen, pancreas, gall bladder, intestine, colon and kidneys and ureter (In model).
- Demonstration of pelvic organs such as bldder, rectum

In Female:
Ovaries, Phalopean tubes, Uterus and Vagina'
In Males:
Tests, Vassdeference, Seminal vesicles, prostate, Urethera, Penis Demonstration of brain, spinal cord and spinal nerve Demonstration of sensory organs –eye, ear, surface marking of important organs like heart liver spleen, stomach (Demonstration of organ should be done in modes supplemented by vsits to Museums of medical college .However it must be supplemented by dissecting frog/rabbit/rate/gimping).
2. Physiology:

- Study of Microsoft (Already covered in Anatomy).
- Preparation of blood smear,leishman's staining identification of R.B.C., Different types of W.B.C. and differential count of W.B.C.
- Pulse recording, temperature recording, respiratory and maintenance of T.P.B. chart.
- Effective of exercise of T.P.R. (This may be done amongst the class students themselves).

- Demonstration of blood – pressure instrument (Mercurial type) and recording of blood pressure.

3. Pathology;
   - Visit to pathological Museum
4. Biochemistry:
   - Familiarity with Laboratory glassware's.

Basic Techniques:

- Methods of Measuring Liquids
- Methods of weighing
- Cleaning of Glassware
- Separation of solids from Liquids.

GENERAL PHYSICS (THEORY)

1. Elementary idea of thermo ionic emission, Electron- idea of mass and nature of charge, coulomb' law, Electric field unit of potential.
2. Onm;s lwe, unit of resistance, potential and combination of resistance in series and parallel.

Fuse, units of electric power, earthing of electrical equipment.
Magnetic fields, lines of fore, field pattern due to a straight current carrying conductor, coil carruing current, electromagnet, construction and working of Galvanometer, voltameter and ammeter. (moving coil type and moving magnet type). Basic physics for magnetic resonance imaging including natural and super conducting magnetic. Basic physics for ultrasound, elementary knowledge for generating of ultrasound waves, their nature and inter actions with body tisssues.

General Physics:

- Heat and method of transference of heat condensers, inductance and impedance
- A.C and D.C currents- effective current. RMS value, peak value.
- Electromagnetic induction –Laws, fields, influence.
- Transformers- principles, construction, losses of step down and High transformers.
- Diode valves and its use in rectifier's solid state rectifiers. Its verifying circuits used circuits used in X- ray tube, X-ray certificate, interlocking certificates.

Structure of Atom, Nucleus and orbital Electrons.

PRACTICAL

- Verification of ohm's law.
- Verify the rules of series and parallels combination of resistances.
- Study of the potential drop across different resistance.
- Determine the filed along the axis of a coil carrying current.
- Study the characteristic curve of a diode value.
- Study the impedance of a coiled in A.C and D.C.
- To find the transformation ratio of a transformer.

To construct a rectifying circuit with the help of:

- Diode value
- Transistors
- To study the nature of sound waves (sonometer)

(RADIAION PHYSICS)

- Various used for measuring radiation – Roentgen rad and rem.
- Ionization chambers, G. M. counter and scintillation counter, interaction of X-ray with matter.

- Quality and quantity of X-rays, HVT, linear adsorption coefficient, Grid, cones and filters.
- Inverse square law, scattered radiations and appliances used to reduce it. Radio activity: Half life, Decay factor, Details about radium, cobalt and cesium, Doses- dose and dose rate, exposure dose, exit dose, surface dose isotope charts and their uses, Radiation Hazards- ways of protection for public patient, film badge, pocket ionization chamber, maximum permissible dose, personal monitoring tag, TLD.

PRACTICAL (RADLATION PHYSICS)

- Verification of inverse square law.
- Calibration of a X- Ray machine.
- To study the affect of Kv and mass.
- Find out the HVT of a given beam.
- To check the lead apron for any crack.
- Find out whether the glass in the screen is lead glass or ordinary glass.
- To find out the depth dose at a certain depth of a X- ray beam.
- To survey the X-ray control for radiation.
- Demonstration that the intensifying edict of X- ray intensifying screen is dues to light produced by flour – screen and not due to the X-ray.
- Demonstrate the use of Grid/ potter – bucky diaphragm and radiographic contrast.
- Demonstrate effect of improper of X- ray tube.
- Verification of optical and radiation field coincidence.
- Effect of direct X- ray exposure to the personnel monitoring device like TLD or film badge.

Introduction to Radiology and Radiological Services and Anatomy Physiology and Related Pathology. Introduction
1. Introduction to radiology and Radiological services: Structure of body – cells- tissues.
Musculo- skeletal system Skull- vertebral column –shoulder
griddle Bones of upper extremities
Bones of lower extremities, gornit
Muscles
Cardiovascular system Heart- blood- arteries- veins.
Lymphatic System Circulation of Lymph, Lymph glands,
Thoracic duct.
Digestive System Mouth – esophagus- stomach – small
Intestines- large intestines- spleen liver
Gall- bladder- pancreas.
Respiratory System Nose & larynx- Trachea- lungs.
Nervous System Brain- meanings- ventricles- spinal cord
And nerves.
Reproductive System Female and Male Organs.
Urinary System Kidneys- uterus- bladder, prost are.
Skin Structure and its function.
Endocrine System Pituitary gland- penial gland- thymus gland
- supra- renal glands.
Eye Structure and its function.
Ear Structure and function. Surface Anatomy