THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI

POST GRADUATE DEGREE COURSE IN M.D. RADIO DIAGNOSIS (BRANCE VIII)

RECOMMENDED LIST OF BOOKS AND JOURNALS

TEXT BOOKS (Latest Editions)

1. Text Book of Radiology & Imaging – Sutton
2. Radioncleide section scanning. An atlas of clinical practice-khan.
3. Alimentary tract Radiology – Abdominal Imaging – Mafgulis
4. Fundamental physics of Radiology – W.J. Meredith & J.B. Massey
5. Diagnostic Ultrasound – Sarti
6. Oral Radiology – Principles & Interpretation – Goaz
7. Radiographic Anatomy – Meschan

REFERENCE BOOK: (Latest Editions)

1. Radiology : Diagnosis Imaging Intervention Physics-Traveras
2. Seminars in Ultrasound
3. Caffey's Paediatric X-Ray Diagnosis – Frederic silverman
4. Roentgen signs in Diagnostic Imaging – Meschan
5. Diagnostic Radiology – An Anglo American Text Book of Imaging – Grainger & Allison

JOURNALS:

1. British Journal of Radiology
2. Clinical Radiology
3. Radiology
4. American Journal of Roenfgenology
5. Radiology Clinics of North America
6. Recent Advances in Radiology and Medical Imaging
7. Year Book of Radiology
8. Indian Journal of Radiology & Imaging
9. British Medical Journal
10. LANCENT.

Syllabus for M.D(RADIO-DIAGNOSIS)
PART I

Fundamentals of applied Medicine and related pathology, and applied surgery and related pathology as related to Radio-Diagnosis and nuclear medicine.

SYLLABUS FOR RADIOLOGY PHYSICS – GENERAL AND APPLIED PRELIMINARY OF PART – II M.D. (RADIODIAGNOSIS)

Fundamentals of Electricity : Basic principles of electrostatics – conductor and insulators – Ohm's law – Units of measurement of potential difference, current, resistance and charge – P.D. And E.M.F, cells, primary and secondary.

Resistances in series and parallel – specific resistance – effect of temperature on conductors and insulators.

Capacitors in series and parallel – units of measurement of work, energy, power and heat – mechanical equivalent of heat.

Electromagnetic induction – principles of production of A.C. and D.C peak value, R.M.S value and average value of A.C – self and mutual inductance, impedance (qualitative definitions only) power in A.C.

The ammeter, the voltmeter and the Galvanometer.

Transformers: Step up, step down and auto transformers.

Rectifiers and Rectification: Thermionic valves, diode and triode0metal rectifiers – self, half – wave and full wave rectification – Greinacher and Villard circuit.

Timers.

X-rays: Production and properties of cathoderays the simple Gas X-ray tube – the modern X-ray tube (hot cathode tube) – its parts – choice of target materials – focal spot and its size – shape of filament – rotating anode.

Methods of cooling the target – tube rating.

Electromagnetic radiations – their general properties – wave length, energy and velocity.

The X-ray beam – continuous and characteristic rays – factors which control these.

Quantity of X-rays (intensity) – roentgen, rad, be and rem-the standard ionization chamber – integrating and rate meters.

Interaction of X-rays with matter – linear attenuation coefficient and mass attenuation coefficient photoelectric effect compton - effect – pair production.

Med-7.

Use of filters in radiology.

Quality of X-rays – half value layer.

Physical principles of X-ray diagnosis: Photographic effect X-ray films – density, definition, contrast and distortion – factors controlling these – gamma and speed of X-ray films.

Fluoroscence – fluoroscent and intensifying screens.

Scattered radiation and use of cones and grids.

High KV technique.

Basic principles of localisation of foreign bodies, tomography image intensification and cineradiography.

Physical principles of X-ray therapy; air dose, surface dose and depth dose – factors controlling these phantom materials - isodose – curves and their use in planning of treatment, single and multiple fields, moving beam therapy use of pin and back pointer.

Radioactive Isotopes: Atomic Structure – electrons, protons and neutrons Isotopes – radioactivity, natural and artificial, decay constant, half life and average life – alpha, beta and gamma rays – radioactive – equlibrium principles of radiation detection.

Production of radio-isotopes

CLINICAL APPLICATION OF RADIO NUCLIDE TECHNIQUES

Basic instruments in the use of radioactive isotope – G.M. Counters, phototmultiplier tubes, scintillation counters and scanners.

Important radioactive Isotopes and their physical properties.

Radium and its use.

Radiation Protection: Effect of over exposure – maximum permissible does use of film badge – methods of protection – protective barriers – protective measures in diagnostic and therapy departments – safe – handling of radio active isotopes: tracer and large therapy doses, layout of a radioisotope laboratory.

Super voltage Radiations:- Physical principles of linear accelerator and betatron – the cyclotron megavolt radiations and their properties cobalt 60 and cesium 137 teletherapy units.

LIST OF EXPERIMENTS FOR PRACTICAL WORK IN RADIOLOGY PHYSICS

1. Measurement of air dose, surface does and calculation of back scatter.
2. Measurement of depth dose.
3. H.V.L. Measurement.
4. Absorption coefficient.
5. Verification of inverse square law.
6. Measurement of focal spot.
7. Localisation of foreign bodis.
8. Determination of plateau of G.M. Counter.
9. Use of spectometer in counting.
10. Absorption of beta particles.
11. Efficiency of counter and iso-response curve of a scintillation counter.
12. Diffusion experiments (estimation of volume of a liquid, using radio-active isotopes.)
13. Determination of resolving power of a G.M. Counter.
14. Counting statistics – determination of standard deviation.
15. Shielding experiments with beta and gamma rays.
16. Medical Applications of Electronics as applied to imaging science.
17. Fundamentals of
    a) Computer application
    b) Medical Statistics
    c) Equipment maintenance.