CURRICULUM FOR

BACHELOR OF SCIENCE MEDICAL RADIOLOGY & IMAGING TECHNOLOGY

(Applicable w.e.f. academic session 2017-18)

COURSE NAME: B.Sc. (MEDICAL RADIOLOGY & IMAGING TECHNOLOGY)

DURATION OF COURSE: THREE YEARS

FULL-TIME/ PART – TIME: FULL-TIME

SRI GURU RAMDAS UNIVERSITY OF HEALTH SCIENCES, SRI AMRITSAR, PUNJAB

1. Bachelor of Science in Medical Radiology & Imaging Technology (B.Sc. RIT)

This course is aimed at training technician level functionaries in the area of Radiology & Imaging technology. The main objective of the course is to train the technical assistants in radio-diagnosis department in the hospital. This course is designed as a comprehensive and practical oriented program. This is a regular theory & practical oriented program. The mode of teaching will be in the form of regular classrooms, lectures / demonstrations supplemented by handouts, manuals, brochures, checklists, performance with supervised clinical practices.

2. Duration of Course

The Bachelor of Science in Medical Radiology & Imaging Technology Course is proposed to be 3 years.

3. Eligibility Criteria for Admission

The students shall be admitted as per the admission criteria and qualification prescribed in the Notification issued by the Board of Management of Sri Guru Ram Das University of Health Sciences from time to time.

4. Medium of Instructions

The Medium of instruction during the course and for the university examination shall be in English.

5. Examination Scheme

5.1 The examination for the first, second and third year shall ordinarily be held twice year in the months of May/June and November/ December by the Institute as per University rules.

5.2 Annual Examination shall be held in May/June and supplementary within 6 months of annual examination.

5.3 The examination in theory/practical shall be held at the end of the 1st academic year (1st Year) and the end of 2nd academic year (2nd Year) and third exam at the end of the 3rd academic year (3rd Year) with one internal and one external examiners.

5.4 Date of examination and appointment of examiner will be made by the Board of Management on recommendation of Faculty of Medical Sciences.

5.5 The examination for the first, second and third year of B.Sc. Medical Radiology & Imaging Technology Course would be held according to the prescribed syllabus.

6. Rules of Examination for Bachelor of Science in Medical Radiology & Imaging Technology Course:

6.1 The students shall submit his/her application for admission to the examination to Controller of Examinations SGRDUHS, Sri Amritsar through the Director Principal of the SGRDIMSAR, Sri Amritsar on the prescribed form with the required fee (the last date of which will be updated on university website after notification issued from Board of Management time to time).

6.2 The candidates will be given 25 marks for theory and 15 marks for practical as internal assessment in each subject on the basis of their performance during the year. That a candidate be eligible to appear in the examination provided he/she secured a minimum of 35% marks in internal assessment in theory and practical.

6.3 There will be fresh internal assessment and compulsory attendance for the students for the examination in which he/she has failed at the time of subsequent examination in that subject.

6.4 The students will not be allowed to appear in the examination unless he/she attends 75% of the total theory and practical in each subject separately.

6.5 Director Principal of the college is empowered to condone the shortage of attendance of lectures to the extent of 5% lectures delivered in each course of theory and practical.

6.6 A student will be deemed to have passed in the examination if he/she passes in each subject separately.

6.7 In case of students joining late owing to the late admission with the approval of the Vice-chancellor, their lecturers are to be counted from the date of joining. Deficiency in studies should be made up by attending special classes for them at the level of Head of the Department.

7. First Year B.Sc. Medical Radiology & Imaging Technology Examination:

The First Year B.Sc. Medical Radiology & Imaging Technology examination shall be in the following subjects and candidate shall be required to pass all the subjects:-

B.Sc. Part – I

Paper	Subject	Theory			Practical			Grand Total
		Marks	Internal Assessment	Total	Marks	Internal Assessment	Total	
Paper-I	Human Anatomy, Physiology and Pathology	75	25	100	35	15	50	150
Paper-II	Radiation Physics- I	75	25	100	35	15	50	150
Paper-III	Radiography- I	75	25	100	35	15	50	150
Paper-IV	Radiography- II	75	25	100	35	15	50	150
	Basics of Computer	----	-----	--	--	----	----	-----

Note. The Examination in the subject of Basics of Computer will be conducted at college level and Grade will be sent to University for final inclusion in the result.

Grading System

Marks Range	81-100	76 - 80	71- 75	61- 70	51- 60	41- 50	31- 40	0- 30
Grade	**A+**	**A**	**B+**	**B**	**C+**	**C**	**D**	**E**

8. Second Year B.Sc. Medical Radiology & Imaging Technology Examination:

The Second Year B.Sc. Medical Radiology & Imaging Technology Examination shall be open to a person who has previously passed the First Year B.Sc. Radiology & Imaging Technology Examination of this University or an examination of any other recognized University/Institution in India considered equivalent for the purpose by the University.

B. Sc. Part – II

S. No.	Subject	Theory			Practical			Grand Total
		Marks	Internal Assessment	Total	Marks	Internal Assessment	Total	
Paper-I	Radiation Physics- II	75	25	100	35	15	50	150
Paper-II	Clinical Radiography- I	75	25	100	35	15	50	150
Paper-III	Clinical Radiography- II	75	25	100	35	15	50	150
Paper-IV	Special Radiography	75	25	100	35	15	50	150

9. Third Year

The Third Year B.Sc. Medical Radiology & Imaging Technology Examination shall be open to a person who has previously passed the Second Year B.Sc. Radiology & Imaging Technology Examination of this University.

B.Sc. Part-III

S. No.	Subject	Theory			Practical			Grand Total
		Marks	Internal Assessment	Total	Marks	Internal Assessment	Total	
Paper-I	Basics and Advance in CT	75	25	100	35	15	50	150
Paper-II	Basics and Advances in MRI	75	25	100	35	15	50	150
Paper-III	Intervention and Advances in Diagnostic Radiology	75	25	100	35	15	50	150
Paper-IV	Radiation Safety and Quality Control	75	25	100	35	15	50	150

10. Promotion and Number of Attempts allowed

10.1 A candidate who fails in all the subjects in the First Year B.Sc. Medical Radiology & Imaging Technology examination shall not be promoted to Second Year class.

10.2 A Candidate who fails in one more or more subjects will be given four attempts including first attempt as a regular candidate, plus one mercy chance at the discretion of the Vice-Chancellor, at six monthly intervals. However, he/she will have to clear all these attempts within 6 years of admission to the said course.

10.3 The candidate who will absent himself/herself from the examination will be deemed to have been failed in that subject.

10.4 A candidate who passes in at least one subject of University level First Year B.Sc. Radiology & Imaging Technology examination will be permitted to attend classes of Second Year. However, the candidate will be required to pass in all subjects of 1st Year examination at least 6 months before the final examination of 2nd Year examination.

10.5 A candidate who fails in all subjects in the second year B.Sc. Medical Radiology & Imaging Technology examination shall not be promoted to Third Year class.

10.6 A candidate who passes in at least one subject of University level Second Year B.Sc. Medical Radiology & Imaging Technology examination will be permitted to attend classes of Third Year. However, the candidate will be required to pass in all subjects of 2nd Year examination at least 6 months before the final examination of 3rd Year examination.

10.7 Candidate who passes in one or more subjects of Second Year B.Sc. Operation Theatre Technology examination shall be exempted from appearing in these subject at a subsequent examination, but the candidate must pass the examination in a maximum of four attempts including first attempt, as a regular candidate plus one mercy chance at the discretion of the Vice-Chancellor failing, at six monthly intervals. However, he/she will have to clear all these attempts within 6 years of admission to the said course.

10.8 Candidate who passes in one or more subjects of **third Year** B.Sc. Operation Theatre Technology examination shall be exempted from appearing in these subject at a subsequent examination, but the candidate must pass the examination in a maximum of four attempts (including first attempt, as a regular candidate), plus one mercy chance at the discretion of the Vice-Chancellor failing, at six monthly intervals. However, he/she will have to clear all these attempts within 6 years of admission to the said course.

11. Appointments of Examiners:

11.1 There shall be two examiners – One internal and one external.

11.2 Professor & head of the Department shall be Convener. The Examiner at least 3 years post PG teaching experience in that specification field will be appointed as Internal Examiner.

11.3 The external examiner shall be appointed from other Universities at least 3 years post PG teaching experience in that specification field.

12. Paper Setting and moderation of Question Papers

The questions papers for 1st Year, 2nd Year and 3rd Year will be set under the direction of Controller of Examinations.

Each Question Paper covering entire course consists of seven questions out of which six questions carry 10 Marks and one question carry 15 marks.

13. Evaluation of Answer Books

The answer books shall be got evaluated by putting fictitious roll numbers thereon or spot evaluation (Table marking) or any other method under the direction of the Controller of Examinations.

14. Minimum Pass Marks

During all the three annual examinations in each subject paper the candidate shall have to obtain 50% in theory including internal assessment 50% practical including internal assessment.

14.1 The successful candidates shall be classified into divisions as under:-

a) Those who obtain 60% or more marks First Division.
b) Those who obtain 50% or more marks but below 60% marks Second Division.
c) A candidate who will obtain 75% or more marks of the total marks in any subject shall be declared to have obtained distinction in that subject provided he/she passed in all the subjects of the courses in all the parts in the first attempt.

A candidate is eligible to appear in the examination provided he/she secures a minimum of 35% marks in internal assessment in theory and practical separately.

15. Grace Marks

There shall be no provision for grace marks.

16. Declaration of Result

The results will be tabulated and declared by the Controller of Examination's office.

17. Award of Degree

On successfully passing the Third Year B.Sc. Medical Radiology & Imaging Technology examination the students shall be awarded the degree of Bachelor of Sciences in Medical Radiology & Imaging Technology.

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Syllabus (1st Year)

Paper-I: Human Anatomy, Physiology & Pathology

1. ANATOMY- 70 hours

Theory (50 hours):

1. **Introduction:**
   Definition of Anatomy and its divisions, Terms of location, positions and planes.
2. **Musculoskeletal system:**
   - Classification of cartilage with examples
   - Structure of Bone, its classification with examples.
   - Joints- Classification of joints with examples; details of synovial joint.
   - Bones & joints of upper limb, lower limb and their movements.
   - Axial skeleton & appendicular skeleton.
   - Nomenclature of Skull bones, spine & its movements, intervertebral disc.
   - Classification of Muscles with examples.
   - Nomenclature of Muscles of the upper limb, lower limb, trunk and neck.
   - Sites of Intramuscular injections
3. **Cardiovascular System:**
   - Arteries & veins, Capillaries & arterioles.
   - Heart- size, location, chambers, blood supply of heart, pericardium.
   - Systemic & pulmonary circulation.
   - Major blood vessels of Heart- Aorta, pulmonary artery, common carotid artery, subclavian artery, axillary artery, brachial artery, common iliac artery, femoral artery.
   - Great saphenous vein, varicose veins.
   - Sites of Intravenous injections& sites of pulsations
4. **Lymphatic System:**
   - Lymph & Lymph vessels.
   - Structure of lymph node, names of regional lymphatics, axillary and inguinal lymph nodes and their applied aspects.
   - Details of Spleen, Thymus & Palatine tonsil
5. **Gastro-intestinal System:**
   - Parts of GIT, structure of tongue, subdivisions of pharynx, classification of glands with salivary glands in detail .
   - Location & Gross structure of Oesophagus, stomach, features & parts of small and large intestine, differences between small & large gut,Gross features of liver, gall bladder &pancreas.
6. **Respiratory system:**
   - Parts of upper and lower Respiratory tracts; Structure of nose, nasal cavity, larynx, trachea, lungs (gross & differences between right & left lung), pleura, bronchopulmonary segments.(Names & applied aspects)
7. **Urinary System:**
   - Parts of Urinary system, location and gross structure of kidney, ureter, urinary bladder, urethra.

8. **Reproductive system:**
   - Parts of male reproductive system, gross structure of testis, vas deferens, epididymis, prostate (gross features & applied aspects).
   - Parts of female reproductive system, gross structure of uterus, ovary, fallopian tube, mammary gland (gross features & applied aspects).
9. **Endocrine glands:**
   - Name of all endocrine glands, gross structure, functions& applied aspects of pituitary gland, adrenal gland, thyroid gland and parathyroid gland.
10. **Nervous system:**
   - Classification of NS, Types ofNeuron.
   - Inroduction to Meninges, names & location of ventricles, CSF- composition, circulation, functions.
   - Gross features of cerebrum, midbrain, pons, medulla oblongata, cerebellum, name of basal nuclei.
   - Basics of Blood supply of brain
   - Names of 12 cranial nerves.
   - Visual & auditory pathways

Practical (20 Hours):

Demonstration of all bones of the human body.

Demonstration of all organs of the human body.

General Histology:

- Epithelium: Simple (squamous, cuboidal, columnar, ciliated), Stratified, Transitional
- Bone, muscles (skeletal, smooth, cardiac)
- Cartilage (hyaline, elastic, fibro cartilage).
- Connective Tissue (loose and dense).
- Arteries (large & medium sized), Veins.

Reference Books

1. Ross and Wilson, Anatomy and Physiology, Chruchill Livingstone.
2. Companion Pocketbook for quick review
3. B.D. Chaurasia's Human Anatomy -Vol. (1,2,3)
4. B.D. Chaurasia'sHandbook of General Anatomy
5. Textbook of Anatomy & Physiology for Nurses- Nachiket Shankar/ Mario Vaz
6. Anatomy for B.Sc. Nursing – Dr Renu Chauhan

Physiology

Theory Syllabus

Physiology- Elementary tissues of human body- Brief account on Composition of Blood - Functions of blood elements – Blood Group and coagulation of blood.

1. **General physiology**
   - Cardio Vascular System (Structure and functions of various parts of the heart,arterial and venous system, brief account on common cardiovascular disorders).

- Respiratory System (various parts of respiratory system and their functions,Physiology of Respiration).
- Digestive System.-physiology of digestion and absorption)
- Urinary System (-physiology of urine formation - pathophysiology of renal disease and edema.)
- Reproductive System (physiology of Male & Female reproductive system-Prostate & Uterus & Ovaries etc.)
- Musculoskeletal System (–structure of skeletal muscle – physiology of muscle contraction)
- Nervous System (various parts of nervous system- functions of nervous system - Spinal Cord & Nerves).
- Ear, Nose, Throat and Eye (Elementary knowledge of structure and functions of organs of taste, smell, hearing, vision.)
- Endocrine System (Endocrine glands ,their hormones and functions-Thyroid, Parathyroid, Suprarenal, Pituitary, pituitary and Thymus).
- Haemopoietic and Lymphatic System physiology.

Practical Syllabus(20 HRS)

1. The compound microscope
2. Demonstrate blood cell count, coagulation, grouping, Hb, BP, and pulse monitoring.
3. Determintion of ESR-by westergren's method
4. Determination of blood groups.
5. Measurement of human blood pressure.
6. Examination of respiratory system to count respiratory rate
7. Demonstrate Spirometry

Books Recommended

1. Ross and Wilson, Anatomy and Physiology, Chruchill Livingstone.
2. Basics of medical physiology- D Venkatesh, HH Sudhakar
3. Textbook of anatomy and physiology for nurses-Nachiket Shankar,Mario Vaz
4. Manual of practical physiology for BDS-DR. A.K.Jain

Pathology

Pathology relevant to radiology (50 hours)

Outline on pathology of various systems of CVS, RS, CNS, musculoskeletal systems, GIT, GUT, Reproductive systems, pathology of radiation injury, basics in pathology of malignancies.

Paper-II: Radiation Physics-I

Theory

General Physics, Radiation Physics & Physics of Diagnostic Radiology (30hrs)

- Basic concepts of power, work, force, energy, electricity, magnetism and their units and measurements
- Einstein's formula

- Electromagnetic induction
- Atomic structure
- Radioactivity- ionization and excitation
- Electromagnetic waves
- X rays production and properties
- X-ray tube - quality of x-rays
- Factors affecting quality and intensity of x-rays. X-ray circuits
- Interaction of X and gamma rays
- X-radiation measurements etc.
- Principles of Radiation detection and measurements
- TLD, Pocket Dosimeter
- Radiation Survey meter and radiation zone monitor.

Practicals - (20hrs)

Study with charts, models & power point presentations Atomic structure, X-ray tubes, X-ray circuits involving students to present and discuss.

Paper-III: Radiography-I

Theory

- Whole Upper limb with special reference to Hand:

  Wrist joint

  Forearm

  Elbow joint and upperarm.
- Supplementary techniques for carpal tunnel
- Scaphoid bone fracture
- Head of radius andsupra-condylar fracture.
- Whole Lower limb which includes all the bones with special reference to:

  Foot

  Ankle joint

  Lower leg

  Knee joint

  Patella and upper leg.
- Supplementary techniques for calcaneum bone for flat foot
- Intercondylar notch and head of femur etc.

- Shoulder girdle and humerus.

Practicals - (200hrs)

Radiographic positioning of above mention parts of the body.

Paper-IV: Radiography-II

Theory

- Whole vertebral column
- Cervical
- Thoracic
- Lumbar spine
- Sacrum and coccyx with special techniques for:
  Intervertebral foramina
  Cervico-dorsal
  Dorso lumber
- Airways
- Lumbosacral Spine and S.I. joints.Pelvic girdle and hip region.
- Thorax-complete chest radiography for both:
  The lungs-apical,
  Lordotic and oblique views.
- Techniques to demonstrate fluid levels/effusion in the thoracic cavity-decubitus AP and lateral vies.

Practicals - (200hrs)

Radiographic positioning of above mention parts of the body.

BASICS OF COMPUTER

Theory : 30 hours
Practical's : 30 hours
THEORY

Introduction to computer – I/O devices – memories – RAM and ROM – Different kinds of ROM – kilobytes. MB, GB their conversions – large computer – Medium, Micro, Mini computers - Different operating system – Networking – LAN, WAN, MAN (only basic ideas)

Typing text in MS word – Manipulating text – Formatting the text – using different font sizes, bold, italics – Bullets and numbering – Pictures, file insertion – Aligning the text and justify – choosing paper size – adjusting margins – Header and footer, inserting page No's in a document – Printing a file with options – Using spell check and grammar – Find and replace – Mail merge – inserting tables in a document.

Creating table in MS-Excel – Cell editing – Using formulas and functions – Manipulating data with excel – Using sort function to sort numbers and alphabets – Drawing graphs and charts using data in excel – Auto formatting – Inserting data from other worksheets.

Preparing new slides using MS-POWERPOINT – Inserting slides – slide transition and animation

– Using templates – Different text and font sizes – slides with sounds – Inserting clip arts, pictures, tables and graphs – Presentation using wizards.

Introduction to Internet – Using search engine – Google search – Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – E- mail ID creation – Sending messages – Attaching files in E- mail.

Role of Computers in the Health care: - HIS, Medical Equipment, Pharmacy in inventory management, Patient record maintenance.

PRACTICAL

- Typing a text and aligning the text with different formats using MS-Word
- Inserting a table with proper alignment and using MS-Word - Create mail merge document using MS-word to prepare greetings for 10 friends
- Preparing a slide show with transition, animation and sound effect using MSPowerpoint
- Customizing the slide show and inserting pictures and tables in the slides using MSpowerpoint
- Creating a worksheet using MS-Excel with data and sue of functions Using MSExcel prepare a worksheet with text, date time and data Preparing a chart and pie diagrams using MS-Excel
- Using Internet for searching, uploading files, downloading files creating e-mail ID

Syllabus (2nd Year)

Paper-I: Radiation Physics-II

Theory

Properties of matter, heat, light, magnetism, electricity and electromagnetism applied in radiological instruments. Physical principles in the design and working of x-ray tube technology. Construction and working principals of transformers and autotransformers used in xray circuits. Measuring instruments voltage of KV meters. Measurement of tube current in milli and micro amperes. Principles of thermionic emission and rectification in xray technology. High voltage circuits in x-ray Units. Electrical hazards and safety. X-ray tube rating in imaging and therapy xray tube and distance, KV, MA. Introduction to electro- magnetic spectrum, definition of wave length and its quantum relationship with peak kilovoltage physical principles of radiation and optical field coverage and the factors affecting the field projected on patient during x-ray imaging. Exponential and trigonometric functions used in radiological calculations.

- Electrical system and mains supply: The electrical system, generation of electricity, distribution of electric energy, use, ofelectric energy
- High Tension Generators: Rectifications- Types of rectifier-valve and solid state. Self rectified high tension circuit. Half wave, four valve full wave, three phase, full wave rectified circuit voltage wave forms in high tension generators. Constant potential circuits. High frequency generators, falling load generators, Anatomically programmed generators and modular generators.
- The X-ray Tube: Historical developments including General features of the X-ray tube. The fixed anode, rotating anode xray tube. Rating of X- ray tubes, focal spot sizes. Methods of heat dissipation in xray tubes, common tube faults. Developments in the rotating anode tube. Tube stands and ceiling tube supports. Mammography tubes and equipment, accessories. Different types of tubes and choice of an x-ray tube.
- Fuses, switches and interlocks: fuses, switches and circuit breakers, interlocking circuits.
- Components and controls in the X-ray circuits: The high tension transformer, the rectification of high tension. The control of kilovoltage, kolovoltage indication. The filament circuit and control of the tube current . Milliamperes indications. Main voltage compensation. Mains supply and the x-ray set.
- Exposure Switches and Exposure Timers: Switching systems timing system, exposure switching and its radiographic applications
- The control of scattered Radiation: Significance of scatter. Beam limiting devices-cones, diaphragm(collimeters) .Beam centring devices . The secondary radiation grid: its types, components of grid, grid movements. The assessment of grid functions, grid-errors, other Scatter reduction methods- air gap technique.
- Mains requirements. Portable x-ray machines, Mobile X-ray equipment, Capacitor discharge mobile x-ray unit and x-ray equipment for operation Theatre and forward radiography.
- Fluoroscopic Equipment: Structure of a fluorescent screen. The fluoroscopic image. The fluoroscopic table, spot film devices and explorators. Protective measures and physiology of vision, image quality.
- Image Intensifiers (I,I.T.V. System): An Image intensifier tube, its design, its application. The

television process and television tube its various types. Recording of the intensified image. T.V.monitor, video tape recording, cine radiographic cameras, Remote Control table.

- Tomographic Equipment: Principal of tomography. Various types of tomographic movements, multi-section radiography. Transverse axial tomography. Equipment for tomography.
- Equipment for Rapid Serial radiography and angiography:

  Rapid film changer. Rapid cassette changer, X-ray generator, x-ray tube, angiographic tables, contrast medium injection device.

  Equipment for cranial and Dental Radiography:The skull table, general dental X-ray equipment, specialized dental X-ray equipment. Equipment for mammography-general or dedicated

  Care, maintenance and tests of X-ray equipment:General care; functional tests; testing the performance of exposure timers, assessing the MA setting , testing the available KV, measurement of focal spot of an xray tube, testing the light beam diaphragm, practical precautions pertaining to brakes and locks, H.T. cables, meters and controls, tube stands and tracks as well as accessory equipment.
- Basics of CT & MRI Physics

Paper-II: Clinical Radiography-I

Theory

- Radiography of Skull and Radiography of cranial bones including special techniques for:

  Sella turcica

  Orbits

  Optic foramina

  Superior orbital fissure

  Inferior orbital fissure etc.
- Facial bones: Paranasal sinuses , Temporal bone and Mastoids.
- Dental Radiography: Radiography of teeth-intra oral, extraoral and occlusal view.
- Abdomen: Preparation of patient

  General abdominal radiography and positioning for fluid and air levels.

  Plain film examination
- Radiography of female abdomen to look for pregnancy.
- Radiography in case of acute abdomen .

Practicals - (200hrs)

Radiographic positioning of above mention parts of the body.

Paper-III: Clinical Radiography-II

Theory

- Macroradiography: Principle, advantage, technique and applications.

- Tomography - Principle and applications
- Stereography – procedure- presentation, for viewing, stereoscopes, stereometry.
- High KV techniques principle and its applications.
- Ward/mobile radiography- electrical supply, radiation protection, equipment and instructions to be followed for portable/ward radiography.
- Operation theatre techniques: General precautions
- Aspesis in techniques
- checking of mains supply and functions of equipment
- Selection of exposure factors, explosion risk
- Radiation protection and rapid processing techniques.
- Trauma radiography/Emergency radiography and Paediatric Radiography

Practicals - (200hrs)
Radiographic positioning of above mention parts of the body.

Paper-IV: Special Radiography

Theory
Contrast & Special Radiography procedures**:- (100hrs)**

- Barium swallow
- Barium meal
- Barium enema (single and double contrast),
- Enteroclysis
- PTBD
- Sinograms
- Fistulograms
- IVU
- AUG
- MCU
- RGU
- HSG
- Sialogram
- T-tube
- Cholangiography
- Fluroscopy
- Image intensifiers
- Tomography basics, etc

Practicals - (150hrs)

Positioning and imaging of all kinds of contrast & special radiographic procedures

Syllabus (3rd Year)

Paper-I: Basics and Advances in CT

Theory

- CT - Basic physics – Tomography principle - basics of plain studies, contrast studies, Special Procedures.
- CT Head - basics of plain studies, contrast studies, Special Procedures.
- CT Face - basics of plain studies, contrast studies, Special Procedures.
- CT Nack- basics of plain studies, contrast studies, Special Procedures.
- CT Panis- basics of plain studies, contrast studies, Special Procedures.
- CT Chest - basics of plain studies, contrast studies, Special Procedures.
- Abdomen- basics of plain studies, contrast studies, Special Procedures.
- Joints- basics of plain studies, contrast studies, Special Procedures.
- Angiography- basics of plain studies, contrast studies, Special Procedures.
- Cisternography- basics of plain studies, contrast studies, Special Procedures.

Practical

Positioning and techniques for all CT Scan Procedure.

Paper-II: Basics and Advances in MRI

Theory

- MRI -basic principle – imaging methods - slice sectionplain & contrast studies –coils in use – image contrast – factors affecting image quality
- USG -Basic acoustics - ultrasound terminologies – Interaction of US with matter –Ultrasound display modes etc.
- MRI Brain- imaging methods - slice sectionplain & contrast studies –coils in use – image contrast – factors affecting image quality
- MRI Face- imaging methods - slice sectionplain & contrast studies –coils in use – image contrast – factors affecting image quality
- MRI Neck- imaging methods - slice sectionplain & contrast studies –coils in use – image contrast – factors affecting image quality
- MRI Spine- imaging methods - slice sectionplain & contrast studies –coils in use – image contrast – factors affecting image quality
- MRI Joints- imaging methods - slice sectionplain & contrast studies –coils in use – image contrast – factors affecting image quality
- MRI Angiography- imaging methods - slice sectionplain & contrast studies –coils in use – image contrast – factors affecting image quality
- MRI Cisternography- imaging methods - slice sectionplain & contrast studies –coils in use – image contrast – factors affecting image quality

Practical

Positioning and techniques for all MRI Procedure.

Paper-III: Intervention and Advances in Diagnostic Radiology

Theory

- Computerized Radiography(CR): Principle, Equipment & imaging
- Digital Radiography(DR): Principle, Equipment & imaging
- Mammography: Principle, Equipment & imaging
- Digital Substraction Angiography(DSA)
- Picture Archiving & Communication System
- Foreign Body Location: Principle, Equipment & imaging
- Forensic Radiology: Principle, Equipment & imaging
- Soft Tissue Radiology: Principle, Equipment & imaging

Practical

Basic Physics & positioning of X-Ray.

Paper-IV: Radiation Safety and Quality Control

Theory

- Biological effects of Radiation
- Radiation dose
- Effects of time, distance and shielding
- Personnel and area monitoring
- Planning of X-ray rooms, dark rooms
- Inspection of X-Ray installations
- Registration of X-Ray equipment installation-
- Certification
- Evaluation of workload versus radiation factors
- Occupational exposure and protection Tools/devices - ICRP / AERB CT Dose Modulation
- Patient dose management

Practicals - (50hrs)

Radiation protection survey in diagnostic X-ray installations in and around.
AERB safety requirements
Atomic Energy Act.
Radiation protection rules.

Quality Control in Radiology - (50hrs)

Quality control procedure in Radiology as per NABH- Quality assurance in Radiology

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