

BACHELOR OF RADIO-IMAGING TECHNOLOGY**1st Year****Sub:- ANATOMY****THEORY (Paper-1)****F.M.-70****(Hrs.-3hrs)**

- 1) **Introduction of Bones of the Human Body of :**
- Upper Limb : clavicle, scapula, humerus, radius, ulna, carpal, metacarpal & phalanges
 - Lower Limb : hipbone, femur, tibia, fibula, tarsus, metatarsus & phalanges
 - Skull : name the bone of skull and sutures between them
 - Thorax : ribs and their articulations
 - Vertebral Column : cervical, thoracic, lumbar, sacral and coccygeal vertebrae
- 2) **Surface Markings of the Whole Body :**
- Nine regions of the abdomen
 - Hip
 - Skull
- 3) **Introduction of different Vital Organs :-**
- A) **Respiratory Organs :**
- Nasopharynx
 - Oropharynx
 - Larynx
 - Trachea
 - Bronchi
 - Lungs (and their lobular segments)
 - Thoracic cavity
 - Pleura and Pleural cavity
- B) **Circulatory Organs :**
- Anatomical position of the heart
 - Pericardium of the heart
 - Chambers of the heart
 - Great vessels of the heart
 - Valves of the heart
- C) **Digestive Organs :**
- Tongue
 - Teeth
 - Oral cavity
 - Pharynx
 - Oesophagus
 - Stomach
 - Small intestine
 - Large intestine

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D) Reproductive Organs:

- Introduction of male Genital Organs (Gonads) : Testes, Epididymis
- Introduction of female Genital Organs:- Ovary, Fallopian Tube, Uterus, Vagina

E) Liver, Gall Bladder and Spleen :

- Introduction
- Anatomical position

F) Excretory Organs:

- Cortex and Medulla of Kidney
- Ureter
- Urinary Bladder
- Urethra (male and female)

G) Muscles :

- Introduction, Origin and Insertion, Function

H) Embryology: Only Introduction

I) Endocrine Glands: Morphology and Anatomical relation

- Pituitary Gland
- Thyroid Gland
- Para Thyroid Gland
- Supra-renal glands

J) Nervous System:

- Neuron Theory
- Classification of Nervous System
- Name of Basal membrane
- Blood supply of brain
- Cranial Nerves
- Sympathetic & Parasympathetic system

K) Sense Organs:

- Skin - Histology, Epidermis and Dermis
- Eye - Morphology, Parts of eye, Histology, Visual pathway and Optic nerve
 - Lachrymal apparatus, Extra ocular muscles & it's Nerve supply
- Ear
- Nose
- Tongue


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BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

Sub:-ANATOMY

Practical (Only INTERNAL)

1. Labelled Diagram of different organs and bones
2. Surface Markings of the Body
3. Demonstration of Histological Slides-
 - a. Cartilage b. Bone c. Smooth Muscles d. Skeletal Muscles
4. Radiography of Normal Bones, Joints and Chest.

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BACHELOR OF RADIO-IMAGING TECHNOLOGY**1st Year R****Subject :- PHYSIOLOGY THEORY (Paper-2) F.M.-70 (Hrs.-3hrs)**

1. **Cell: Biology :-** Cell membrane structure, intracellular organelles and their functions and cytoskeleton
 - Definition
 - Structure and functions the cytoplasmic Organelles
 - Reproduction : Meiosis, Mitosis
2. **The important physio-chemical laws applied to physiology**
 - Diffusion
 - Osmosis
 - Dialysis
3. **Fundamentals of different Organ System**
 - Cardiovascular System
 - Respiratory System
 - Digestive System
 - Excretory system
 - Reproductive System
 - Endocrine System
 - Lymphatic System
4. **Blood**
 - Definition
 - Composition
 - Function
5. **Formation of different type of blood Cells**
 - Erythrocytes
 - Leucocytes
 - Thrombocytes
6. **Mechanism of Blood Clotting**
7. **Cerebrospinal Fluid**
 - Formation & Circulation
 - Composition
 - Circulation and Function
8. **Special Senses**
 - Hearing
 - Taste
 - Smell
 - Sight
9. **Kidney, General introduction, structure and function**
10. **Endocrine :** Secretion, regulation and functions of pituitary, thyroid, adrenal, pancreas, parathyroid, testis & ovaries
11. **Respiratory System :** introduction , general Organization, Mechanics of respirations, pulmonary volumes and capacities, Transport of respiratory gases, Nervous and chemical, control of respiration, pulmonary function tests.
12. **Cardiovascular System :** Structure and properties of cardiac muscle, Cardiac cycle Regulation of heart rate, Cardiac output , Blood pressure, its regulation, Regional circulation, coronary , cerebral circulation , Cardio respiratory changes during exercise , Normal ECG.
13. **Physiology of Exercise :** Effects of acute and chronic exercise on Oxygen transport, B.M.R. /R.Q / Body fluids and electrolytes.

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BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

Subject :- PHYSIOLOGY PRACTICAL (Only INTERNAL)

Labelled diagrams of different Vital Organs & System

Labelled diagrams of Corpuscles

Blood grouping Rh Typing

Determination of Vital Capacity.

Auscultations of Heart Sound

Blood pressure Recording

Pulse Rate, Heart Rate

BMI

NO UNIVERSITY PRACTICAL EXAMINATION

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BACHELOR OF RADIO-IMAGING TECHNOLOGY**1st Year****Sub :- Pathology THEORY (Paper-3) F.M.-70 (Hrs.-3hrs)****A) General Pathology**

The Cell in health and disease

- a. Introduction of pathology
- b. Cellular structure and metabolism
- c. Inflammation - Acute and Chronic
- d. Derangement of Body Fluids and Electrolytes
 - Types of shocks
 - Ischaemia
 - Infection
- e. Neoplasia - Etiology and Pathogenesis

B). Hematology (Normal and Abnormal)

- a. Formation of Blood
- b. Erythropoiesis
- c. Leucopoiesis
- d. Thrombopoiesis
- e. Collection of Blood
- f. Anticoagulants- mechanism of coagulation
- g. Red cell count - Haemocytometer, Methods and Calculation
- h. WBC Count - Methods, RBC - Indices, Platelets
- i. Differential Leucocytes Count (DLC) -
 - Morphology of White Cells, Normal Values
 - Romanowsky Stains : Staining procedures
 - Counting Methods, Principle of staining
- j. Hb estimation - Method
 - Colorimetric Method
 - Clinical importance
- k. Normal Haemostasis - BT, CT Prothrombin Time
- l. Blood Bank - Introduction Blood Grouping and Rh Typing, Cross matching.
- m. ESR

C). Clinical Pathology**Body Fluids :**

- a. Urine :
 - Method of Collection
 - Normal Constituents
 - Physical Examination
- b. Stool Examination :
 - Method of Collection
 - Normal Constituents and appearance
 - Abnormal Constituents (Ova, Cyst)
- c. CSF Examination :
 - Physical Examination
 - Chemical Examination
 - Microscopy
 - Cell Count

- > Staining
- d. Semen analysis
 - > Collection
 - > Examination
 - > Special Tests

D). Histopathology

- Introduction
- Techniques of - Receiving, grossing, mounting, section cutting.
- Various fixative modes of action preparation and indication.
- Decalcification of tissues.
- Tissues processing for routine paraffin section.
- Staining of Tissues - H & E staining.
- Maintenance of records and filling of the slides.
- Bio medical waste management.
- Preparation of Museum specimens.

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BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

Sub :- Pathology Practical (ONLY INTERNAL)

- Collection of Sample
- Hb estimation
- TLC and DLC
- RBC, WBC, Platelet Count
- Peripheral blood film - staining and study of Malarial Parasite Thick & Thin
 - a). Urine, Stool, Semen and CSF - Collection, Handling, Examinations
 - b). Absolute Eosinophil Count, PCV, RBC indices, ESR Estimation, Platelet Count
- Blood grouping Rh Factor Tube Method Slide Method
- 1. Bleeding Time, Clotting Time, PT, APTT, TT, Platelet Count & Platelet Function Test
- Histopathology Section cutting and H & E Staining

NO UNIVERSITY PRACTICAL EXAMINATION








BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

Sub :- Microbiology THEORY (Paper---(4-a)) F.M.-35 (Hrs.-1.5hrs)

COURSE CONTENTS :

1. Introduction and brief history of Microbiology
 - Historical Aspect
 - Micro- Organism in Health and Disease
2. Requirement and uses of common Laboratory Equipments
 - Incubator, Hot Air Oven, Water Bath
 - Anaerobic Jar, Centrifuge, Autoclave
 - Microscope
 - Glassware - Description of Glassware, its use, handling and care
3. Sterilization :
 - Methods of Sterilization and it's Principle
 - Culture Media
 - Autoclave - its structure, functioning, control and indicator
4. Antiseptics & Disinfectants
 - Definition
 - Types
 - Mode of Action
 - Uses
5. Collection, Transportation and processing of clinical samples for Microbiology investigations

COURSE CONTENTS

General Bacteriology

- Definition
- Morphology, Physiology and Classification of Bacteria
- Structure of Bacterial cell, Capsule, Flagella and Spores
- Growth of Bacteria
- Nutrition of Bacteria
- Staining Techniques used for Bacteriology

Virology :


- Definition
- General Properties of Viruses
- Pathogenesis of Viral Infection
- Diseases caused by different Virus and mode of infection

Parasitology :

- Definition
- General description of Parasites and Host
- Classification of Parasite
- Mode of transmission of parasitic diseases

Fungus :

- Definition
- Structure
- Classification






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BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

Sub :- Microbiology

Practical

(ONLY INTERNAL)

Demonstration of washing of instruments

Staining - Type of Staining, Principle, Procedure and Interpretation

Culture - Urine, Blood, Body, Fluid, Water Stool, Swab

Types of media

Colony Characteristics

VDRL, ASO, CRP, WIDAL

Stool Exam

Microscopic Stool Exam

NO UNIVERSITY PRACTICAL EXAMINATION











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BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

Subject :- BIOCHEMISTRY THEORY (Paper---(4-b)) F.M.-35 (Hrs.-1.5hrs)

(1) PHYSICAL BIOCHEMISTRY

1. Introduction of Biochemistry
2. Elementary knowledge of inorganic chemistry :- Atomic weight, molecular weight, equivalent weight, acid, bases.
3. Definition and preparation of solutions :- percent solution, Molar solution, Normal solution and Buffer Solution etc.
4. Definition and preparation of Reagent.
5. Unit of measurement
6. PH indicators: pH paper, universal and other indicators, pH measurement : different methods.
7. Ionization of water buffer PH value of solution using.

(2) GENERAL BIOCHEMISTRY

1. Aim and scope of Biochemistry
2. Collection and Recording of Biochemical Specimen, separation of serum/plasma preservation and disposal of Biological material.
3. Chemical examination of urine :Qualitative, Sugar, Protein, Bile Salt, Bile Pigment, Ketones Bodies
4. Chemical examination of Stool :Occult Blood.
5. Chemical examination of other Body fluids : CSF, Pleural Fluid, Ascitic Fluid etc.
6. Laboratory management and Maintenance of Records.

INTRODUCTORY KNOWLEDGE OF :-

Carbohydrates:-

- Importance
- Classification
- Properties
- Estimation of Glucose
- Clinical Significance

Protein :-

- Introduction and Physiological importance
- Amino acids
- Essential amino acids
- Classification
- Denaturation of Proteins
- Estimation of Total protein, albumin, Globulin, A/G Ratio

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Lipids :-

- Definition and Introduction of Lipids
- Functions of Lipids
- Classification
- Properties of Lipids
- Clinical significance
- Steroids
- Estimation :Total lipids, HDL, LDL, VLDL, Total cholesterol, Triglyceride

Electrolytes :

- Function
- Properties
- Estimation of Essential electrolytes: Sodium , Potassium, calcium, chloride and phosphate etc.
- Clinical Importance

Liver Function Test (LFT) :-

- Introduction
- Functions of liver
- Bile pigment
- Type of Jaundice
- Clinical significance

Kidney function tests (KFT):-

- Structure and function of Kidney
- Formation of urine
- Urea and Uric acid estimation

(3) ANALYTICAL BIO-CHEMISTRY

Estimation of specific gravity of urine,

Urinary proteins

Blood sugar

Blood urea

Serum Creatinine

Blood Cholesterol

Serum Bilirubin, SGPT,SGOT,

Alkaline Phosphatase

Australia Antigen

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BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

Subject :- BIOCHEMISTRY

PRACTICAL (ONLY INTERNAL)

Practical

Introduction and usage of Glassware and Instruments.

Glassware :

- Composition of Glass
- General glass wares

Instruments :

- Balance
- Hot plate and Magnetic stirrer
- Centrifuges
- Incubators
- Constant temperature bath
- Colorimeter : Principle Function
- Photometer
- Flame Photometry
- Urine Examination Physical, Microscopic, Biochemical
- Stool Examination
- Body Fluids : Physical and chemical examination CSF Pleural Fluid , Ascitic fluid.
- Methods of estimation of glucose : Benedicts Reaction, Glucose oxidase
- Methods of estimation of urea.
- Methods of estimation of creatinine.
- Methods of estimation of Cholesterol.
- Methods of estimation of Bilirubin.
- Methods of estimation of SGOT, SGPT

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BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

SUBSIDIARY SUBJECT ----- COMMUNICATIVE SKILLS (ENGLISH)

THEORY F.M.-35 (Hrs.-1.5hrs)

COURSE OUTLINE

COURSE DESCRIPTION : This course is designed to help the student acquire a good command and comprehension of the English language through individual papers and conferences.

BEHAVIOURAL OBJECTIVES :

The student at the end of training is able to

1. Read and comprehend English language.
2. Speak and write grammatically correct English.
3. Appreciates the value of English literature in personal and professional life.

UNIT - I: INTRODUCTION :

Study Techniques

Organization of effective note taking and logical processes of analysis and synthesis use of the dictionary

Enlargement of vocabulary

Effective diction

UNIT - II : APPLIED GRAMMER :

Correct usage

The structure of sentences

The structure of paragraphs

Enlargement of Vocabulary

UNIT - III : WRITTEN COMPOSITION :

Pracee writing and summarizing

Writing of bibliography

Enlargement of Vocabulary

UNIT - IV : READING AND COMPREHENSION :

Review of selected materials and express on self in one's words.

Enlargement of Vocabulary

UNIT - V : THE STUDY OF THE VARIOUS FORMS OF COMPOSITION :

Paragraph, Essay, Letter, Summary Practice, in writing

UNIT - VI : VERBAL COMMUNICATION :

Discussions and summarization, Debater, Oral reports Use in teaching

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BACHELOR OF RADIO-IMAGING TECHNOLOGY

1st Year

SUBSIDIARY SUBJECT - COMPUTER SKILLS

THEORY F.M.-20 (Hrs.-1.5hrs)

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PRACTICAL F.M.-15

Basic Computer Course (BCC)

1. **Knowing computer:** What is Computer, Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Concept of Computing, Data and Information; Applications of IECT; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply.
2. **Operating Computer using GUI Based Operating System:** What is an Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows; Using help; Creating Short cuts, Basics of O.S Setup; Common utilities.
3. **Understanding Word Processing:** Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document.
4. **Using Spread Sheet:** Basics of Spreadsheet; Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet.

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd Year

Subject :- PHYSICS AND ELECTRONICS OF RADIOLOGY

THEORY (Paper-1-a) F.M.-35 (Hrs.-1.5hrs)

The Structure of the Atom Nucleus, Atomic Number (z), Mass Number (A), ionization & Excitation, isotopes, the Periodic Table.

X-Rays :

Conductivity of Electricity Through Gases At Low Pressure, Cathode Rays - Production & Properties. Sources of Electrons (Discharge Through Gases, Thermionic Emission & Photo Electric Emission), Discovery of an Electron, Concept of Electron Volt.
Discovery of X-Rays, Production & Properties of X-Rays. Factors Influencing The Intensity & Quality of X-Rays, Construction & Working of Modern X-Ray Tube (Fixed Anode & Rotatory Anode Tubes (Continuous Spectrum & Line or Characteristic Spectrum), Factors Upon Which The X-Ray Emission Depends, Soft & hard X-Rays, Distribution of X-Rays in Space, The Diagnostic X-Ray Tubes (Inserts and Shields), Filament Design, Anode Design (Fixed & Rotatory), Methods of Cooling, Basic X-Ray Circuit.

Mains Supply :

Generation of Electrical Energy, Distribution of Electrical Energy, Use of Electrical Energy, Polyphase Supplies, Availability of Different Voltages, Feeder Cables, Line Voltage Drop; Mains Switches, Fuses, Circuit Breakers, Earthing Insulation, High Tension Cables Construction, Design.
Diagnostic High Tension Circuits:

Switching and Timing:

Exposure Timers, Spring Activated, Synchronous, Electronic, Auto Timers, Exposure Switching - Mechanical Contactors, Electronic Switching in Low Tension and High Tension Circuits. Interlocking Circuit - Use of Relays, Tube Overload Protection. Circuit Diagrams - Simple Circuit Diagrams as illustration of Sequence from Mains Supply to Controlled X-Ray Exposures, Block Diagrams.

X-Ray Tube.

Control of Scattered Radiations:

Cones, Tube Diaphragms, Single and Multileaf Grids, structure and Materials; Grid Ratio and Lines/Cm. Parallel and Focussed Grids, Stationary Grids, Crossed Hatched Grids. Gridded Cassettes, Grid Movements, Potter-Bucky Diaphragms; Single Stroke, Reciprocating and Oscillating Mechanisms; Beam Centring Devices - Centre Finders, Optical Centring Devices, Light Beam Collimators.

BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd Year**Subject :- RADIATION PHYSICS****THEORY (Paper-1-b) F.M.-35 (Hrs.-1.5hrs)**

Basic Interactions Between X-Ray and Matter > Coherent scattering, Photoelectric Effect Compton Scattering, Pair Production & Photodisintegration, Attenuation and Absorption, Reduction in Intensity Due To Absorption & Attenuation and The Inverse Square Law (Exponential Formula), Filtration, Attenuation Coefficients and Half Value Layer. Energy Absorbed From X-Rays, Factors Affecting Transmission of A Homogenous Beam Through An Object), Transmission of A Heterogeneous X-Ray Beam, Transmission of X-Rays Through Body Tissues: Relative Amount of Scattered Radiation in an X-Ray Beam During its Passage Through A Patient. The Practical Aspects of X-Ray Absorption and Transmission in Body Tissues. The Physics of the Radiograph. The Basic of The X-Ray Measurements. The Units of Exposure and Absorbed Dose Simple Principles of Dosimeters. The Fluorescent Effect of X-Rays. The Photographic Film as a Dosimeter.

Radiation Quantities & Units:

Radiometric Quantities (The Fluency of Photons & Fluency Rate, The Energy Fluency and Energy Fluency Rate).

Dosimetric Quantities (Mean Energy Imparted, The Specific Energy, Exposure & Exposure Rate, Absorbed Dose And Absorbed Dose Rate, Concept of Karma.

Protection Quantities (Dose Equivalent & Effective Dose Equivalent).



BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd Year

Subject :- PHYSICS AND ELECTRONICS OF RADIOLOGY

PRACTICAL (Paper-1-a)

&

Subject :- RADIATION PHYSICS

PRACTICAL (Paper-1-b)

Equipments:

i. Fluoroscopy and Image Intensifiers:

Direct fluoroscopy, Fluoroscopy Image, Fluoroscopy Screen, , Spot Film Devices And Accessories. Intergrating Timer, Tables.

ii. Equipment for Special Procedures:

Special Trolleys and Chairs, Portable and Mobile X-Ray Units, Cordless Mobile X-Ray Equipment, Capacitor Discharge Mobile Equipment, Equipments for O.T. Bi-Plane Radiography, Cranial and Dental Equipment, Skull Tables, Mammography, Mass-Miniature Radiography, Tomography, Multi Section Cassettes, Rapid Cassette Changer, Rapid Film Changer, Magnification Radiography.

iii. Care and Maintenance of X-Ray Equipment:

General Principles of Cleaning Routines. General Care In Use And Special Care of Mobile Equipments. Simple Test. Uses of Spinning Top And Step Wedge , Checks on Generator Output; Check for Integrity of Tomography Equipment; Procedure for Obtaining Radiography of The Focal Area. Use of ma And Timer Wisconsin Test Tool, Test of Kilo Voltage, Wisconsin Test Cassette, Use of Focal Spot Test Tool, Testing Light Beam Diaphragm, Failures of X-Ray Tubes and Ht Cables.

NO PRACTICAL UNIVERSITY EXAM

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd Year**Sub. :- RADIOLOGICAL INSTRUMENTATION****THEORY (Paper-2) F.M.-70 (Hrs.-3hrs)****Radiation safety instruments**

Radiation Detection Instruments Ionization chamber, proportional counter, GM counter, Scintillation counter, TLD, Solid state detectors chemical dosimeters. Radiation monitoring instruments pocket dosimeter, film badge, TLD , area monitoring instruments, Survey monitors.

Introduction of Radiological Instruments

A X-Ray Technology (1) X-Ray tube, Diagnostic and therapy tubes gas tube collidge tube, Rotating anode tube, stationary anode. Line focus tube, Dual focus tube, Hooded anode tube other therapy tube qualitative.

B Ultrasonography instruments

C CT Scanner

D MRI

E Radiological protective devices

F Computer application in medical imaging.

G PET and cyclotron

Introduction of Nuclear medicine instruments.

1. Radiation Detection instruments, Their types and protective devices in relation to nuclear medicine.

BACHELOR IN RADIO-IMAGING TECHNOLOGY

2nd Year

Sub. :- RADIOLOGICAL INSTRUMENTATION

Paper-II

Practical F.M.-50

Radiation safety instruments.

TLD, Solid state detectors chemical dosimeters. Radiation monitoring instruments pocket dosimeter, film badge , TLD , area monitoring instruments.

Radiological Instruments.

- A X-Ray
- B Ultrasonography instruments
- C CT Scanner
- D MRI
- E Computer application in medical imaging.

UNIVERSITY PRACTICAL EXAMINATION




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BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd Year
Sub. :- RADIATION BIOLOGY & RADIATION PROTECTION
THEORY (Paper-3) F.M.-70 (Hrs.-3hrs)

RADIATION BIOLOGY

Principles of radiobiology, biological effects of Radiation, Exposure - somatic, genetic, acute, chronic stochastic and deterministic effects.

Chemical Effects of Radiation - Radiolysis of water ; Production of free Radicals, Radicals Reactions, G-Value. Effects Non-Stochastic effects, Chromosome Aberrations and Mutations. Radiation Effects on whole Body (Early Effects and Late Effects).

Concept of Doubling Dose. Risk Factors.

Radiation exposure control critical organs and tissues quantities used in radiology protection.

Radiation weighting factory :- Equivalent dose

Tissue weighting factory :- Effective dose

Types of tumors :- Tumor lethal dose, tissue tolerance dose.

RADIATION PROTECTION

Philosophy of Radiation Protection - Historical Development, Maximum Permissible Exposure Concept; Annual Dose Equivalent Limits (Adel) Alara Concept; International Recommendations and Current Code of practice for The Protection of Persons Against ionizing Radiation's from Medical and Dental use.

Protective Materials: Lead - Impregnated Substances, Building Materials, Concept of Barriers, Lead Equivalents and Variations with Quality. Design of X-Ray Tubes Related to Protection. Structural Shielding Design (Work-Load, Use Factor, Occupancy Factor, Distance) Departmental Protection. Radiation Protection of Staff Members, Patients and Public. Protection Instruments & Personnel and Area Monitoring.

Units :- Roentgen, Rad, Gy, REM, Sievert

Radiation hazards :- Evaluation and control.

Radiation emergencies :-Medical management of personnel exposed to ICRP Recommendations Brief.

Protection for the Radiologist and the Radiographer.

Protection for the patient.

AERB Safty codes :- National regulatory requirements for radiological and Nuclear Medicine.

Radiation protection measures in the departments of Radiology, Radiotherapy and nuclear Medicine.

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BACHELOR IN RADIO-IMAGING TECHNOLOGY**2nd Year****Sub. :- RADIATION BIOLOGY & RADIATION PROTECTION****PRACTICAL Paper-III F.M.-50**

Annual Dose Equivalent Limits (Adel) Alara Concept; International Recommendations and Current Code of practice for The Protection of Persons Against ionizing Radiation's from Medical and Dental use.

Protective Materials: Lead - Impregnated Substances, Building Materials, Concept of Barriers, Lead Equivalents and Variations with Quality. Design of X-Ray Tubes Related to Protection. Structural Shielding Design (Work-Load, Use Factor, Occupancy Factor, Distance) Departmental Protection. Radiation Protection of Staff Members, Patients and Public. Protection Instruments & Personnel and Area Monitoring.

Units :- Roentgen, Rad, Gy, REM, Sievert

Radiation hazards :- Evaluation and control.

Radiation emergencies :-Medical management of personnel exposed to ICRP Recommendations Brief. Protection for the Radiologist and the Radiographer.

Protection for the patient.

AERB Safty codes :- National regulatory requirements for radiological and Nuclear Medicine.

Radiation protection measures in the departments of Radiology, Radiotherapy and nuclear Medicine.

UNIVERSITY PRACTICAL EXAMINATION

BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd Year

SUBSIDIARY SUBJECT - COMPUTER

THEORY F.M.-20 1.5 Hrs

Basic Computer Course (BCC)

1. **Communication using the Internet:** Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting.
2. **WWW and Web Browsers:** World Wide Web; Web Browsing softwares, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website.
3. **Communications and collaboration:** Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging; Netiquettes.
4. **Making Small Presentation:** Basics of presentation software; Creating Presentation/handouts.



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BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd Year

SUBSIDIARY SUBJECT - COMPUTER

PRACTICAL & VIVA

PRACTICAL F.M.-15

Basic Computer Course (BCC)

1. **Communication using the Internet:** Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting.
2. **WWW and Web Browsers:** World Wide Web; Web Browsing softwares, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website.
3. **Communications and collaboration:** Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging; Netiquettes.
4. **Making Small Presentation:** Basics of presentation software; Creating Presentation/handouts.

UNIVERSITY PRACTICAL EXAMINATION

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd Year**SUBSIDIARY SUBJECT - Public Health THEORY PAPER -V****THEORY F.M.-20 (Hrs.-1.5hrs)**

- 1) Concepts in Health & Disease
- 2) Basics in Epidemiology
- 3) Nutrition and Health
- 4) Environment and Health
- 5) Communication in Health
- 6) Demography and Family Planning with National Population Policy 2000
- 7) Essential Medicine and Rational use of Drug (RUD)
- 8) Health care Delivery System with National Health Policy 2000
- 9) Health Planning and Management
- 10) Hospital waste Management
- 11) Disaster management
- 12) National Rural Health Mission
- 13) National Health Programmes in India



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BACHELOR IN RADIO-IMAGING TECHNOLOGY 2nd YEAR

SUBSIDIARY

SUBJECT - Public Health

PRACTICAL & VIVA

F.M.-15

- 1) Concepts in Health & Disease
- 2) Basics in Epidemiology
- 3) Nutrition and Health
- 4) Environment and Health
- 5) Communication in Health
- 6) Demography and Family Planning with National Population Policy 2000
- 7) Essential Medicine and Rational use of Drug (RUD)
- 8) Health care Delivery System with National Health Policy 2000
- 9) Health Planning and Management
- 10) Hospital waste Management
- 11) Disaster management
- 12) National Rural Health Mission
- 13) National Health Programmes in India

UNIVERSITY PRACTICAL EXAMINATION

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 3rd Year

Subject:- MEDICINE 3RD YEAR
THEORY (Paper-1) F.M.-70 (Hrs.-3hrs)

DERMATOLOGY - Acne, Scabies, Boil, Carbuncle

CARDIOVASCULAR SYSTEM

- 1. Introduction of Hypertension

RESPIRATORY SYSTEM

- 1. PULMONARY TUBERCULOSIS
- 2. Introduction OF BRONCHIAL ASTHMA
- 3. Introduction OF CHRONIC BRONCHITIS
- 4. Introduction OF PNEUMOCOCCAL PNEUMONIA

EXCRETORY SYSTEM

- 1. Introduction OF RENAL FAILURE

NERVOUS SYSTEM

- 1. Introduction of MENINGITIS
- 2. Introduction of ENCEPHELITIS

HAEMATOLOGY

- 1. Introduction and Clinical features OF IRON DEFICIENCY ANAEMIA, MEGALOBlastic ANAEMIA

GASTRO INTESTINAL SYSTEM

- 1. MANAGEMENT OF DIARRHOEA and VOMITING

ENDOCRINOLOGY

- 1. Introduction and Clinical features OF DIABETES MELLITUS
- 2. Introduction and Clinical features OF HYPOTHYROIDISM

NUTRITIONAL DEFICIENCY DISEASES

Clinical features of the following deficiency diseases – protein, energy, Vitamin A, Vitamin B Complex, Vit. C and Vit. D

COMMON DISEASES

- Typhoid
- Malaria
- Kala-azar
- Dengue fever

Note:- Short term posting in Medicine Department for practical knowledge.

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 3rd Year**Sub. :- DARK ROOM TECHNIQUE
THEORY (Paper2) F.M.-70 (Hrs.-3hrs)****Dark Room Planning;**

- For A Small Hospital, For A Large Hospital
- Location of Dark Room
- Construction of Dark Room
- Ventilation
- Wall Protection
- Entrance To Dark Room - Single Door, Double Door, Labyrinth

Dark Room:

- Instruction To Staff
- Dry Bench
- Hopper, Drawer, Cupboard
- Loading And Unloading Cassettes
- Hangers, Types Of Hangers And Storage Of Hangers
- Printing
- Wet Bench
- Cleanliness, Control Of Dust, Dark Room Sink
- Hatches
- Drier
- Safe Lights, Direct And Indirect, Uses, Factors Affecting Safelight Performance, Safelight Tests
- Viewing Room, Film Dispensing

X-Ray Films:

- Glass, Cellulose And Ployester Bases
- Structure of X-Ray Films - Emulsion, Gelatin, Base And Supercoating
- Types of X-Ray Films
- Single Coated, Duplited
- Spectral Sensitivity
- Colour Sensitivity
- Grainness Of Films
- Speed of Films

Intensifying Screens:

- Construction of Intensifying Screens
- The Influence of Kilovolatge In Different Phosphors
- Intensification Factor
- Resolving Power in Intensifying Screens
- Speed of Screens
- Screen Film Contact Tests
- Types of Intensifying Screens
- Advantages And Limitations of Intensifying Screens

X-Ray Cassette:

- Construction of X-Ray Cassettes
- Types of Cassettes

- Mounting Intensifying Screens on Cassettes
- Care of Cassettes

Photochemistry:

- Chemistry of Image Formation
- Formation of Latent Image
- Conversion of Latent Image to Visible Image
- Meaning of Ph
- Importance of Ph In Processing Films

Processing Methods:

- Preparation of Solution
- Manual Processing Apparatus
- Control of Temperature
- Radio processing
- Automatic Processor - Principle And Features, Water Supply, Use of Thermostat, Regeneration of Solutions, Maintenance, Advantage And Limitations. Processing of Cut Films And Roll Films.

Computer Photography:

- Digital Radiography - Principles, Processing, Equipments, Advantages
- Radiological Information Systems.

The Radiographic Image:

- The Emergent Beam Related To Densities On Film Contrast - Objective And Subjective
- Long Scale And Short Scale
- Radiation Contrast, Film Contrast And Radiographic Contrast
- Resolution
- Factors Affecting Resolution Choice of Kilovoltage and Millamperage Choice of Short Focus and Broad Focus Selection of Focus to Film Distance and Object to Film Distance Selection of Cassettes
- Avoiding Scatter Radiation, Magnification, Distortion, Penumbra Presentation of a Radiograph - Identification Markers

Developer:

- Constituents
- Characteristic
- Manual and Automatic Processors
- Effects on Developing Time, Temperature, Agitation
- Replenisher

Fixer:

- Constituents
- Characteristics
- Manual and Automatic Processors
- Fixing Time and Clearing Time
- Factors Affecting Fixing Time
- Replenisher
- Exhaustion

Washing and Drying:

- Objects
- Methods
- Factors Affecting Washing and Drying
- Wetting Agents
- Comparison of Different Methods

BACHELOR IN RADIO-IMAGING TECHNOLOGY 3rd Year

Sub. :- DARK ROOM TECHNIQUE Practical

Paper - II F.M.-50

Processing Methods:

- Preparation of Solution
- Manual Processing Apparatus
- Control of Temperature
- Radio processing
- Automatic Processor - Principle And Features, Water Supply, Use of Thermostat, Regeneration of Solutions, Maintenance, Advantage And Limitations. Processing of Cut Films And Roll Films.

Developer:

- Constituents
- Characteristic
- Manual and Automatic Processors
- Effects on Developing Time, Temperature, Agitation
- Replenisher

Fixer:

- Constituents
- Characteristics
- Manual and Automatic Processors
- Fixing Time and Clearing Time
- Factors Affecting Fixing Time
- Replenisher
- Exhaustion

Washing and Drying:

- Objects
- Methods
- Factors Affecting Washing and Drying
- Wetting Agents
- Comparison of Different Methods

UNIVERSITY PRACTICAL EXAMINATION

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 3rd Year

Sub. :- Radiography Techniques & Emergency Radiology

THEORY (Paper-3) F.M.-70 (Hrs.-3hrs)

Principles of Radiography:

Positions of The Patient: Erect, Sitting, Supine, Prone, Lateral , Oblique, Decubitus Etc., Relative Position of X-Ray Tube And Patient, Relevant Exposure Factors. Use of Accessories Such As Radiographic Cones; Grid And Positioning Aids.

Anatomic And Physiological Basis of The Procedure, Association with Theory with Practical work.

Radiographic Appearances, Both Normal And Common Abnormal Conditions Where Elementary.

Knowledge of The Pathology Involved Will Ensure The Application of The Appropriate Radiographic Technique. Modifications In Technique for Various Disabilities And Types of Subject. Radiation Protection, Use of Gonad Shield, Practical Methods Reducing Radiation Dose To The Patient.

Upper limb:

Routine Projections for The Whole Hand, Fingers, Wrist Joint, Forearm, Elbow Joint And Humerus. Supplementary Projections for Scaphoid, Carpal Tunnel Ball Catchers Projections, Head of The Radius, Supracondylar Fracture And Olecranon Process.

Lower limb:

Routine Projections for The Whole Foot, Toes, Calcaneum, Ankle Joint, Leg, Knee-Joint, Patella And Femurs.

Supplementary Projections for Talo-Calcaneal Joint , Forced Projections for Torn Ligaments, Flat Feet, Club Feet, Intercondylar Projections for Loose Bodies in The Knee, Axial Projection for Patella.

Shoulder Girdle And Thorax;

Routine Projections For The Shoulder Joint, Scapula, Acromio-Clavicular Joint, Clavicle, Sternoclavicular Joint, Sternum And Ribs.

Supplementary Projections for The Axial Projection of Clavicle, Bicipital Groove Carotid Process, Classification of Tendons, Subluxation, Upper Ribs, Lower Ribs And Axillary Ribs.

Pelvic Girdle And Hip Region;

Routine Projections for The Whole Pelvis, Sacro-Ileac Joints, Hip Joint And neck of Femur.

Supplementary Projection for the greater and lesser Trochanters of Femur. Frog Leg Protection , Ischeum Symphysis Pubis ,Ileum, Scetabulum land Congenital Dislocation of Hip Arthrodesis.

Vertebral Column :

Routine [rojection for Atlanto Occipital Joint, Cervical Spine, Cervico Thoracic Junction , Thoracic Spine, Lumber Spine , Lumbo Sacral Region, Sacrum and Coccyx.

Supplementary Projection for the Intervertebral Foramina, Posterior Arch of Atlas, Flexion and Extension of cervical Spine , Scoliosis and Kyphosis, Sacro Ileac Joint.

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Skull:

Routine Projections for Cranium and Facial Bones.

Supplementary Projections for Trauma, Towne's & Method, Sella, Turcica, Optic foramina, Jugular Foramina, Temporal Bones, Mastoids Petrous Bone, Zygomatic Arches, Orbits, Maxillae, Nasal Bones, mandible, Temporomandibular Joints.

Nasal Sinuses:

Techniques for Frontal, Maxillary, Ethmoidal and Sphenoid Sinuses, Erect and Horizontal Projections for Fluid Levels.

Teeth:

Routine Projections of All Teeth - Intra Oral And Extra Oral Projections.

Supplementary Projections For Localisation of Roots, Children, Eduntulous Subjects And Use of Occlusals And Bitewings, Orthopantomography.

Chest:

Routine Projections For Lungs, Cardia And Diaphragm.

Supplementary Projections for Opaque Swallow, Thoracic Intel, Soft Tissue Neck, Decubitus, Apicograms, Paediatric Cases.

Abdomen:

Erect Abdomen and Decubitus Projection, Supplementary Projections for Acute Abdomen.

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 3rd Year

Sub. :- Radiography Techniques & Emergency Radiology

Practical

Paper - III F.M.-50

Practical

- Radiographic Technique I
- Radiography - Plain Views of Upper Limb Hands
- Fingers
- Thumb
- Wrists
- Forearm
- Humerus

Radiography - Plain Views of Shoulder:

Shoulder Joint, Acromio - Clavicular Joint, Scapula Various Views and Projections, Clavicle, Sterno - Clavicular Joint

Radiography - Plain Views of Lower Limb:

- Foot
- Toes
- Tarsal & Metatarsal
- Ankle
- Tibia, Fibula & Patella
- Knee Joint
- Femur
- Hip Joint
- Pelvis & Sacroiliac Joint

Radiography of Vertebrae:

- Cervical Spine Upper, Cervical Spine Lower
- Cervico - Thoracic, Cervico - Middle
- Thoraco Lumbar
- Sacrum & Coccyx
- Ribs Upper & Lower
- Sternum

Radiography of Skull Plain Views:

AP, Lateral & Towne's view, Sinuses, Mandible, Mastoids

Radiography of Chest:

- Lungs & Trachea; Heart & Diaphragm
- Radiography of G.I. Tract
- Plain X-Rays Abdomen - Erect

UNIVERSITY PRACTICAL EXAMINATION

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 3rd Year

**Sub. :- Subsidiary-
THEORY (Paper-4-a) F.M.-35 Pharmacology
(Hrs.-1.5 hrs)**

Fundamentals of Pharmacology

1. Routes of administration of drugs.
2. Antihistaminic drugs - Chlorpheniramine, Cetirizine
3. Emergency drugs - Dexamethasone, Hydrocortisone
4. Branchodialators - Amino phylene, Theophyline
5. Local Anesthesia - Lignocaine
6. Antibiotic drugs - Erythromycin, Azithromycine, Cephalexin,
Levofloxacillin, Ofloxacillin
7. Anti Emetic Drugs:- Metoclopramide, Domperidone

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 3rd Year

**Subsidiary Sub. - Hospital Waste Management -
THEORY (Paper-4-b) F.M.-35 (Hrs.-1.5hrs)**

1. Introduction to Biomedical wastes
2. Classification and categories of hospital wastes
3. Routes of transmission of disease by biomedical waste
4. Safety measures
5. The laws regarding biomedical waste treatment
6. Collection and segregation of Biomedical wastes
7. Transportation and storage of Biomedical wastes
8. Disposable techniques
9. Awareness and education
10. Persons at risk, rag pickers

Note:- Practical training in hospitals.

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Seminar have to attend by all 3rd years Medical Imaging Technology degree student.

1. Importance of X-Ray in Trauma and in Medical Emergency radiology.
2. Indications of Ultrasonography and importance of Ultrasonography in diagnosis of IUGR.
3. Radiological approach in Abdominal trauma.
4. Radiological investigation in case of head and maxilla facial injury.

BACHELOR IN RADIO-IMAGING TECHNOLOGY 4th Year

**Sub. :- ADVANCE RADIO DIAGNOSIS
THEORY (Paper-1) F.M.-70 (Hrs.-3hrs)**

Imaging Technique:

- Computed Tomography
- History
- Principles of Computed Tomography
- Generation - Spiral C.T.
- Instrumentation
- Data Acquisition
- Data Presentation
- Image Reconstruction
- 2 D And 3 D Image
- Image Display
- Pixel And Voxel
- C.T. Number
- Window Level And Window Width
- Scan Artifacts
- Patient Positioning in Computed Tomography
- Contrast Materials And Administration
- Basic Diagnostic Aspects
- Interventional C.T. Guided Procedures

Magnetic Resonance And Imaging:

History

The Spinning Proton - Magnetization, Precession, Larmor Frequency Radio Frequency Pulse And Proton - Resonance, Free Induction Decay, Relaxation, T - L & T-2

Instrumentation - Magnet, Shim Coils, Gradient Coils, Radio Frequency Transmitter And Receiver, Coils, Computer.

Pulse Sequences - Saturation Recovery, Spin Echo, Inversion Recovery.

Flow Techniques - Magnetic Resonance Angiography spectroscopy. Mr. Contrast Agents - Paramagnetic And Ferromagnetic.

Ultrasound Imaging:

History

Ultrasound Characteristics - Nature, Propagation, Frequency, Wavelength, Velocity, Amplitude, Interface, Acoustic Impedence, Reflection, Refraction Etc. interference with Media, Interface, Attenuation.

Transducer-Piezoelectric Effect, Construction, Types of Arrays-Mechanical & Electronic.

Acoustic Coupling Media.

Ultrasound Instrumentation.

Display Modes - A Mode, B Mode, M Mode, Real Time.

Grey Scale Imaging

Doppler Methods - Introduction of Continuous Wave Doppler, Pulsed Doppler, Duplex, Real Time Colour Flow

BACHELOR IN RADIO-IMAGING TECHNOLOGY 4th Year

Sub. :- ADVANCE RADIO DIAGNOSIS

Practical Paper - I F.M.-50

Imaging Technique:

- Computed Tomography
- Image Reconstruction
- 2 D And 3 D Image
- Image Display
- Window Level And Window Width
- Scan Artifacts
- Patient Positioning in Computed Tomography
- Contrast Materials And Administration
- Interventional C.T. Guided Procedures

Imaging Technique in Magnetic Resonance And Imaging:

Techniques - Magnetic Resonance Angiography and Spectroscopy.

MRI Contrast Agent

Paramagnetic and Ferromagnetic

Ultrasound Imaging:

Acoustic Coupling Media.

Ultrasound Instrumentation.

Display Modes - A Mode, B Mode, M Mode, Real Time.

Grey Scale Imaging

Doppler Methods-Continuous Wave Doppler, Pulsed Doppler, Duplex, Real Time Colour Flow

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 4th Year

**Sub. :- Special Procedure Radiology
THEORY (Paper-2) F.M.-70 (Hrs.-3hrs)**

Gastro - Intestinal Tract:

- Barium Swallow - Tracheo - Oesophageal Fistula
- Barium Meal - Single Contrast And Double Contrast
- Hypotonic Duodenography
- Barium Meal Follow Through
- Small Bowel Enema
- Barium Enema - Gastrograffin Enema, For Reducing Intussuception Loopogram

Biliary Tract:

- Oral Cholecystography
- Intravenous Cholelithography
- Pre Operative Cholelithography
- Post Operative Cholelithography - Percutaneous Extraction of Retained Biliary Calculi
- Percutaneous Transhepatic Cholelithography - Biliary Drainage
- Endoscopic Retrograde Cholelithopancreatography.

Urinary System:

- Excretion Urography
- Percutaneous Renal Puncture
- Retrograde Pyeloureterography
- Micturating Cysto Urethrography - Urodynamic Investigations
- Ascending Urethrography

Reproductive System:

- Hystero Salpingogram
- Vesiculography

Angiography:

- Percutaneous Catheterization
- Catheterization Sites, Asepsis
- Guide Wire , Catheter, Pressure Injector And Accessories
- Use of Digital Subtraction, Single Plane And Biplane
- Head And Neck Arteriography
- Pulmonary Arteriography
- Coronary Arteriography
- Ascending Aortography
- Trans Lumbar Aortography
- Celiac Axis, Superior Mesenteric And Inferior Mesenteric Arteriography
- Renal Arteriography
- Trans Femoral Arteriography
- Interventional Vascular Radiography

Venography:

- Peripheral Venography - Lower Limb, Upper Limb
- Central Venography - Superior Venacavography
- Inferior Venacavography
- Pelvic Venography
- Ascending Lumbar Venography
- Intra Osseous Venography
- Percutaneous Splenoportography
- Transhepatic Portography
- Selective Retrograde Venography - Renal Venography
- Adrenal Venography
- Hepatic Venography
- Internal Jugular Venography
- Orbital Venography
- Interventional Vascular Radiography

Central Nervous System:

- Cervical Myelography - Cisternal Puncture And Lateral Cervical Puncture
- Lumbar Myelography
- Myelography with Water Soluble And Oily Contrast Media
- Ventriculography
- Lumbar Discograph

Respiratory System:

- Nasopharyngography
- Laryngography
- Bronchography
- Percutaneous Lung Biopsy

Miscellaneous:

- Arthrography
- Sialography
- Lymphography
- Sinography
- Fistulography
- Mammography
- Soft Tissue Radiography
- Foreign Body Localisation
- Mobile Radiography
- Theatre Radiography
- Domiciliary Radiography
- Forensic Radiography
- Tomography

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 4th Year

Sub. :- Special Procedure Radiology

Practical Paper - II F.M.-50

Special Procedure Radiology - Practicals

- Barium Swallow Exam
- Barium Meal Exam
- Barium Follow Through Exam
- Barium enema Exam
- Hypotonic Duodenography
- Barium Double Contrast Study
- Intravenous Pyelography
- Angiographic Studies 1. Arterial 2. Venous
- Lymphangiographic Studies
- Myelographic Studies
- Ventriculographic Studies
- Bronchographic Studies
- Mammography

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 4th Year

Sub. :- Nuclear Medicine & Introduction to Radio Therapy

THEORY (Paper-3) F.M.-70 (Hrs.-3hrs)

NUCLEAR MEDICINE

Introduction of Nuclear Medicine Imaging:

- History
- Isotopes and Radionuclide
- Production of Radionuclide
- Radio Activity
- Positron Emission Tomography (PET)
- Single Photon Emission Computed Tomography (SPECT)
- Radio Immuno Assay (RIA)

INTRODUCTION TO RADIO THERAPY

- Introduction, Dose measurement , Dosimetry, Dosemetry instrument
- Target volume, Tumour volume, Tumour dose
- Factors affecting percentage depth dose
- Radiation sources and its mode of administration
- Brachytherapy - Advantage and disadvantage
- Remote after loading device - Advantage and disadvantage
- Teletherapy - Definition, Advantage and disadvantage
- Definition of cyclotron

Elementary pathology of health and disease -

- Degeneration , Repair of wound , inflammation
- Tumour - Definition , Classification, Causes of tumour, Spread

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 4th Year

Sub. :- Nuclear Medicine & Introduction to Radio Therapy

PRACTICAL

Paper - III F.M.-50

SECTION :- Radiotherapy & Nuclear Medicine instruments handling

1. Teletherapy instruments.
2. Simulator.
3. Brachytherapy instruments.
4. Linear acceleator.
5. Positron Emission Tomography (PET)
6. Single Photon Emission Computed Tomography (SPECT)

UNIVERSITY PRACTICAL EXAMINATION

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BACHELOR IN RADIO-IMAGING TECHNOLOGY 4th Year

Paper - IV Subsidiary

Subject - PROJECT WORK (F.M.-50)

A project work in RADIO-IMAGING TECHNOLOGY will have to be done in any concerned subject

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- Seminar have to attend all 4th years Medical Imaging Technology degree student.

Seminar all following Topics.

1. Indication of Mammography.
2. Importance of CT Scan and MRI in intra cranial injury.
3. SOL in intra cranial disease in CT Scan and MRI.
4. Recent advancement in Radiological investigation

BOOKS FOR ANATOMY (TEXT & REFERENCE)

<u>Name Of Books</u>	<u>Author's Name</u>
1) Understanding Human Anatomy & Physiology	William Davis
2) A Text Book of Anatomy	Chaurasia
3) A Text Book of Human Anatomy	T.S.Rangnathan
4) Human Anatomy (Description & Applied)	Fattana
5) Physiology and Anatomy with Practical consideration	ESTER .M. Grishcimer

BOOKS FOR PHYSIOLOGY (TEXT & REFERENCE)

<u>Name Of Books</u>	<u>Author's Name</u>
1) Text Book of Physiology	Guyton
2) Human Physiology	Chatterjee
3) Concise Medical Physiology	Choudhary
4) Review of Medical Physiology	Ganong

BOOKS FOR BIO - CHEMISTRY (TEXT & REFERENCE)

<u>Name Of Books</u>	<u>Author's Name</u>
1) Bio-chemistry for Medical students	Vasudewan
2) Text book of Bio-chemistry	Harper
3) Clinical Chemistry	Kaplan
4) Clinical Chemistry	Varley
5) Clinical Chemistry	TEITZ
6) Text book of Medical Biochemistry	Ramakrishna
7) Biochemistry	Das
8) Practical Biochemistry	K. P. Sinha

BOOKS FOR PATHOLOGY (TEXT & REFERENCE)

<u>Name Of Books</u>	<u>Author's Name</u>
1) Laboratory Technology	Ramanic Sood
2) Laboratory Technology	Gwadkor
3) Clinical Pathology & Bacteriology	Sachdev K. N.
4) Text book of Pathology	Krishna
5) Histopathology Techniques	Culling
6) Histopathology Techniques	Bancroft
7) Cytology	Koss
8) Diagnostic Cytopathology	Winfred Greg
9) Practical Haematology	Dacie & Lewis
10)Text book of Medical Laboratory For Technician	Satish Gupta

BOOKS FOR MICROBIOLOGY (TEXT & REFERENCE)

<u>Name Of Books</u>	<u>Author's Name</u>
1) Medical Microbiology	Anathnarayana & Panikar
2) The Practice of Medical Microbiology	Roberty Cruckshank
3) Parasitology-Interpretation to Clinical Medicine	Chatterjee
4) Medical Mycology	Rippon
5) Medical Mycology	Emmons
6) Mediical Parasitology	Ajit Damle

BOOKS FOR COMPUTER (TEXT & REFERENCE)**REFERENCE :**

1. A. Mansoor, "Internet and Wed Design Made Easier," Pragma Publication.
2. B. Ram , " Computer Fundamentals.
3. T. N. Trainer, "Computer" McGraw Hill.

BOOKS FOR ENGLISH (TEXT & REFERENCE)**REFERENCE**

1. English Grammar Collins, Birmingham University, International Language Data Base, Rupa & Co.1993
2. Wren and Martin - Grammar and composition, 1989, Chanda Inter& Co.Delhi
3. Letters for all Occasions, A S Myers. Pub - Harper Perennial
4. Spoken English V Shasi Kumar and P V Dhanija Pub by Tata Mcgraw Hill, New Delhi
5. Journalism Made Simple D Wainwright.
6. Writers Basic Book self Series, Writers Digest series
7. Interviewing by Joan Clayton Platkon
8. Penguin Book of Interviews.

BOOKS FOR Public Health (TEXT & REFERENCE)**Refrence**

- 1) Paarks texts bookpreventive and Social medicine
- 2) Text book of Community medicine
- 3) Health Policies and Programme in India

BOOKS FOR RADIO-IMAGING TECHNOLOGY**2nd year****Reference:**

W.J. Meredith & J.B. Massey. Fundamental Physice of Radiology (Varghese Publishing House).
 Robin J. Wilks. Principles of Radiological Physics. (Churchill Livingstone)
 George A. Hay & Donald Hughus First year Physics for Radiographer (Elbs).

3rd year**Reference Book:**

Philip W. Balling: Atlas of Radiographic Positioning and Radiological Procedures (Mosby) Ra
 Swallow, E Naylor; Clarks Positioning in Radiography E J Roebuck, A S Whitley
 Santé Lr. Roentgenologic Technique (Edwards Inc)

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Goldman: A Radiographic Index
 Ross and Gailway: A Handbook of Radiography (Lewis)
 Glenda J Bryan: Diagnostic Radiography (Mosby)
 Piles Medical Radiographic Technique (Thoms)

3rd year

References :

R.F. Fatr & P.J. Ahisy :Physics for Medical Imaging (Saunders)
 D.N. Chesney & M.O. Chesney : X-Ray Physics and Equipment for Student radiographers (Cbs)
 Christensen, Curry & Dowdey : An Introduction of Physics to Diagnostic Radiography (Lea & Febiger)
 Cullinan :Illustrated Guide Techniques (Blackwell)
 Jamdrell, Thompson & Ashworth : X-Ray (jusocs and Equipment (Blackwell)
 Adrianaaa K. Dixon : Body C.T. - A Handbook (Churchill Livingstone)
 John M. Stevens, Alan R. Valentine & Brain E. Kendall :Computed Cranial & Spinal Imaging (Williams & Wilkins)
 John R. Haaga, Charles F. Lanzion ,David J. Sartoris & Elias A. Aaerhouni.
 Computerised Thomography and Magnetic Resonance Imafing of the Whole Body (Vol.1 & li) (Saunders).
 Philip T. English & Christine Moore :Mei for Radiographers (springer)
 Pablo R. Ros & W. Dean Bidgood :Abdominal Magnetic Resonance Imaging (Mosby)
 Roger C. Sounders :clinical Sonography : A Practical Guide (Little Brown & Company)
 Pes Palmer : Manual of Diagnostic Ultrasound (Who)
 S Sandra L Hagen Ansert: text Book of diagnostic Ultrasonography (Bi Publications).
 Rehani : Diagnostic Imaging - Quality Assurance.

3rd year

Text Book Prescribed-V.R. Narayana Sharma Strengthen your writing
 Orient Longman, New Delhi

Reference Book:

Philip W. Balling: Atlas of Radiographic Positioning and Radiological Procedures (Mosby) Ra
 Swallow, E Naylor; Clarks Positioning in Radiography E J Roebuck, A S Whitley
 Santé Lr. Roentgenologic Technique (Edwards Inc)
 Goldman: A Radiographic Index
 Ross and Gailway: A Handbook of Radiography (Lewis)
 Glenda J Bryan: Diagnostic Radiography (Mosby)
 Piles Medical Radiographic Technique (Thoms)

BOOKS FOR HOSPITAL WASTE MANAGEMENT

- 1) Hospital waste management and its monitoring ,
 Madhuri Sharma - J.P. Brother's medical publisher(P) Ltd.

BOOKS FOR MEDICINE

Davidson's text book of medicine

BOOKS FOR PHARMACOLOGY

A short text book of pharmacology - Tripathi
 Medical Pharmacology - Padmaja Udaykumar - CSB Publishers & Distributors Pvt. Ltd.

BOOKS FOR LABORATORY MANAGEMENT

Text book for laboratory management - Sharma

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 Dr. Lata Sinha

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 Dr. Rabinoloin Prasad

Goldman: A Radiographic Index
 Ross and Gailway: A Handbook of Radiography (Lewis)
 Glenda J Bryan: Diagnostic Radiography (Mosby)
 Piles Medical Radiographic Technique (Thoms)

3rd year

References :

R.F. Fatr & P.J. Ahisy : Physics for Medical Imaging (Saunders)
 D.N. Chesney & M.O. Chesney : X-Ray Physics and Equipment for Student radiographers (Cbs)
 Christensen, Curry & Dowdey : An Introduction of Physics to Diagnostic Radiography (Lea & Febiger)
 Cullinan : Illustrated Guide Techniques (Blackwell)
 Jamdrell, Thompson & Ashworth : X-Ray (jusocs and Equipment (Blackwell)
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