Bachelor of Vocation in Radiology & Medical Imaging Technology

B.Voc (RMIT)

Year -1 Diploma

I Semester				
S. No.	Course Code	Subject	Content Type	Credit
1	BVRMIT-101	General Human Anatomy & Physiology	General	4
2	BVRMIT-102	Fundamentals of Radiology and Imaging	Skill	4
3	BVRMIT-103	Orientation in Para clinical science	Skill	4
4	BVRMIT-104	Medical Ethics and Patients Care	General	3
5	BVRMIT-105	**Fundamentals of computer**	General	3
6	BVRMIT-106	**General English**	General	2
7	BVRMIT-107	**Personal Grooming**	General	3
	BVRMITP-1	**Vocational Practical**	**Skill**	**13**

II Semester				
S. No.	Course Code	Subject	Type of Course	Credits
1	BVRMIT-201	Human Anatomy & Physiology-II	Skill	4
2	BVRMIT-202	Patient positioning & clinical Radiography	Skill	4
3	BVRMIT-203	Special Radiographic Procedure	Skill	4
4	BVRMIT-204	Dark room techniques	Skill	2
5	BVRMIT-205	Radiation Physics	Skill	3
6	BVRMIT-206	**Communication Skills - I**	General	3
7	BVRMIT	**Computing Skill – I**	General	3
8	**BVRMITP-201**	**Vocational Practical**	**Skill**	**13**

B.VOC Radiology & Medical Imaging Technology

B.Voc (RMIT)

Year -1 Advance Diploma

III Semester				
S. No.	Course Code	Subject	Type of Course	Credits
1	BVRMIT-301	Principles of CT and Mammography	Skill	4
2	BVRMIT-302	Component of CT and Mammography	Skill	3
3	BVRMIT-303	CT procedure and Imaging Process	Skill	4
4	BVRMIT-304	Advanced CT and Mammography	Skill	3
5	BVRMIT-305	**Financial Literacy**	Gen	3
6	BVRMIT-306	**Digital Literacy**	Gen	2
7	BVRMIT-307	**Basics of Legal & HR Policies**	Gen	3
8	**BVRMITP-301**	**Vocational Practical**	**Skill**	**13**

IV Semester				
S. No.	Course Code	Subject	Type of Course	Credits
1	BVRMIT-401	MRI Principle and Physics	Gen	4
2	BVRMIT-402	MRI Component and Procedure	Skill	4
3	BVRMIT-403	Ultrasound imaging	Skill	4
4	BVRMIT-404	Organization and Management of imaging department	Gen	3
5	BVRMIT-405	**Functional English II**	Gen	3
6	BVRMIT-406	**Basics of Accounting**	Gen	2
	BVRMITP-4	**Vocational Practical**	**Skill**	13

B.VOC Radiology & Medical Imaging Technology

B.Voc (RMIT)

Year -3 B.Voc Degree

v. Semester				
S.No.	Course Code	Subject	Type of Course	Credits
1	BVRMIT-501	Dental radiography and BMD	Skill	2
2	BVRMIT-502	Quality Control and Safety Measure	Skill	3
3	BVRMIT-503	Radiation hazard and safety	Skill	3
4	BVRMIT-504	Angiography	Skill	3
5	BVRMIT-505	**Communication Skills II**	Gen	3
6	BVRMIT-506	**Health and Fitness**	Gen	2
7	BVRMIT-507	**Basics of Economics & Markets**	Gen	3
8	BVRMITP-5	Vocational Practical	Skill	13

VI Semester				
S.No.	Course Code	Subject	Type of Course	Credits
1	BVRMIT-601	Advancement In imaging Modalities	Skill	4
2	BVRMIT-602	Interventional Radiography	Skill	4
3	BVRMIT-603	Doppler Ultrasound and PET Scan	Skill	3
4	BVRMIT-604	**Entrepreneurship**	Gen	3
5	BVRMIT-605	**Employment Readiness**	Gen	3
6	BVRMITP-6	Vocational Practical	Skill	13

Year 1 (Diploma)

Semester I

BVRMIT -101 Fundamental of Human Anatomy & Physiology-1

UNIT-1

Anatomy : Introduction to human body , definition of anatomy, planes, position and movement of human body, anatomy of head and neck, cranial cavity, mouth pharynx, nose, pectoral region, shoulder, scapular region, upper and lower limbs ,bones and joints, pericardium and heart, lungs , diaphragm, trachea,esophagus, thoracic duct, brief introduction of skeletal system, organization of skeleton, definition, classification, constituents of bones and bone tissue, growth and development of bones, bones of cranium,electronic microscopic structure of cell,Structure of arteries, veins and capillaries

UNIT-2

Anatomy:Tissue- classification, functions and structure of primary tissues – epithelial tissue, connective tissue, muscular tissue, nervous tissue, function of arteries, veins and capillaries, cardiac cycle and heart sound, factors affecting heart rate and its regulation, physiological variations, factors controlling blood pressure, hemorrhage and shock, disease related to cardiovascular system, definition and classification of muscular tissue, characterization of skeletal, smooth, cardiac muscles, types of cartilage, skeletal, smooth and cardiac muscle.

UNIT-3

Physiology: introduction on physiology, cell-description of cell and its components, functions of cell, homeostasis, basics about different organs and systems, structure and functions of urinary system, organs of urinary system, glomerular filtration, physiology of urine formation, functions of kidney, glomerular filtration rate.

UNIT-4

Physiology: Introduction to blood and its components, functions of RBCs, WBCs and platelets, difference between serum and plasma components and organs of lymphatic system, introduction to reproductive system, structure and functions of male and female reproductive organs, parts of male and female reproductive organs.

BVRMIT -102 (FUNDAMENTALS OF RADIOLOGY AND IMAGING)

UNIT- 1

Atomic and nuclear structure (protons, neutrons, electrons), Atomic number, atomic masses, nuclides and isotopes, early atomic models, the hydrogen spectra, difficulties with Rutherford's model, Bohr's model, limitations of Bohr's model, the wave function of an electron, Quantum mechanics of hydrogen atom, Quantum numbers, Pauli exclusion principle, periodic table of element.Introduction, Maxwell's equation, electromagnetic waves, energy density and intensity, momentum, electromagnetic spectrum and radiation in Atmosphere,Fundamental and derived quantity, SI unit, various physical/radiation quantity used in diagnostic radiology and its unit (for example, KvP, mA, mAS, Heat unit (HU), Radiation exposure, Absorbed dose, Equivalent dose, etc.). Measurements, significant figures/digits in calculation, uncertainty in measurement, Propagation of errors, kinetic and potential energy, conservation of energy, work done by constant forces, work done by variable forces. Elastic and inelastic collisions.

UNIT -2

X-Ray tube : historical aspects, construction of X-Ray tubes, requirements for X-Ray production (electron source, target and anode material), tube voltage, current, space charge, early X-Ray tubes (coolidge tubes, tube envelop and housing) cathode assembly, X-Ray production efficiency, advances in X-Ray tubes, anode angulation and rotating tubes. Common factors affecting thermionic emission, specialized types (metallic, biangular, fluoro, CT) grid controlled and high speed tubes, focal spot size, speed of anode rotation, target angle, inherent filtration, radiation leakage and scattered radiation). Interlocking and X-Ray tube overload protection. Heat dissipation methods, tube rating, heat units, operating conditions, maintenance and Q.A procedures.

UNIT -3

X-Ray films and film processing ,Image characteristics , Interaction of ionising radiation with matter , Detection of ionising radiation . Dosimetry , Biological effects of ionising radiation , Radiation protection (related to Phase-II topics) , Biological effects of non-ionizing radiation , Quality assurance , Presentation and viewing of radiographs , Basic Mammography , Xeroradiography, Introduction of Dental Radiography. Interaction of ionizing radiation with matter . Types of interactions of X- and gamma radiation, Photoelectric & Compton, Bremsstrahlung, pair production, annihilation radiation..Exponential attenuation (linear/mass attenuation coefficients), Half ValueThickness (HVT), Tenth Value Thickness (TVT), dependence on energy and atomic number.. Radiation intensity and exposure, photon flux and energy flux density. . LET, range of energy relationship for alpha, beta particles and X-Rays,Characteristics X-Rays, factors affecting X-Ray emission spectra, X-Ray quality and quantity, HVL measurements, heel effect, soft and hard X-Rays, added and inherent filtration, reflection and transmission targets

UNIT -4

Filament current and voltage, X-Ray circuits (primary circuit, auto transformer), types of exposure switch and timers, principle of automatic exposure control (AEC) and practical operation, filament circuit, high voltage circuits, half wave, full wave rectification, three phase circuits. Types of generators**,** 3 phase, 6 and 12 pulse circuits, falling load generators, capacitors discharge and grid control systems.Types of generators, 3 phase, 6 and 12 pulse circuits, falling load generators, capacitors discharge and grid control systems**.**

BVRMIT-103 ORIENTATION IN PARACLINIC SCIENCE.

UNIT-1

PARASITOLOGY

Entamoeba Histolytica ,Leishmania , Material Parasites of man ,Helminthology TaeniaSaginata , TaeniaSoleum , Echinococcusgranulosus , AscarisLumbricoidesAncylostomaduodenale ,Strongylidsstercoralis

UNIT-2

MICROBIOLOGY

Morphology & Physiology of Bacteria , Staphylococcus ,. Streptococcus Mycobacterium tuberculosis ,Spirochetes,CornybacteriumDiptheria.

UNIT-3

VIRUS 1

General Properties of Virus, Herpes virus ,Poliovirus ,Hepatitis virus ,Oncogenic virus , HIV

UNIT-4

PATHOLOGY

Inflammation,Neoplasia ,Osteomyelitis , Fractures , Osteoporosis , Rickets.

BVRMIT-104 MEDICAL ETHICS AND PATIENT CARE

UNIT 1

Medical ethics

Definition - Goal - Scope Introduction to Code of conduct Basic principles of medical ethics – Confidentiality Malpractice and negligence - Rational and irrational drug therapy

Autonomy and informed consent - Right of patients Care of the terminally ill- Euthanasia Organ transplantation, ethics and law

Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information – Unauthorizeddisclosure - retention of medical records - other various aspects. Professional Indemnity insurance policy Development of standardized protocol to avoid near miss or sentinel events Obtaining an informed consent

UNIT -2

Hospital structure and organization,Radiography as a profession - professionalism, projecting professional image, professional and personal qualities (both essential and desirable) of the radiographer, Communication and Relational Skills - development of appropriate communication skills with patients, verbal and non-verbal communication, appearance and behaviour of the radiographer, Moving and lifting patients - hazards of lifting and manoeuvring patients, rules for correct lifting, transfer from chair or trolley to couch and vice-versa, safety of both “Lifter” and “the Lifted” must be emphasised. Highlight on handling of geriatric, paediatric and trauma patients.

UNIT -3

Communicable diseases (special reference to AIDS), cross infection and prevention, patient hygiene, personal hygiene, departmental hygiene, handling of infectious patients in the department, application of asepsis, inflammation and infection processes,Patient vital signs - temperature, pulse, respiration and blood pressure - normal values and methods of taking and recording them, Medico-legal considerations - radiographers clinical and ethical responsibilities, misconduct and malpractice ; handling female patients, practic in pregnancy.

UNIT-4

Radiological contrast media - classification, need for radiological contrast media, methods of administration, dosage, reactions to contrast media, role of the imaging department and the radiographer in management of patient with contrast reaction.Basics of emergency care and life support skills Vital signs and primary assessment, Basic emergency care – first aid and

triage, Ventilations including use of bag-valve-masks (BVMs),Choking, rescue breathing methods,One- and Tworescuer CPR, Using an AED (Automated external defibrillator),Managing an emergency including moving a patient

BVRMIT -105-Fundamental of Computers

Unit-1

Introduction to Computers

History of Computer , Generations, Characteristics, Advantages and limitations of

Computer,Classification of Computers, Functional Components of Computer, Imput ,Output and

Processing, Concept of Hardware and Software, Data & Information .Concept of data storage .

Number system. Decimal, Binary, Hexadecimal ASCII .

UNIT-2

Introduction to GUI Based Operating System

Basics of Operating system , Basics of DOS & LINUX, The User interface, File and directory

management, Windows setting, Control Panel, devices and Printer setting, Using various

window commands for desktop.

UNIT-3

Word Processing

Word processing basics, Menu Bar, Opening and closing documents ,save & save as , Page

setup ,print preview, and printing. Text creation and manipulation Editing, cut copy paste.

Document creation ,editing, Formatting the text – Paragraph indenting, bullets and numbering

,changing case, Table manipulation – creation of table ,insertion and deletion of cell, row and

column.

UNIT-4

Network basics , Internet

Basics of computer network LAN, WAN etc, Concept of Internet ,Basic of Internet Achitecture,

Services on Internet Architecture, World wide web and websites, Communication on Internet ,

Internet Services, Preparing Computer for Internet Access, ISPs and Examples ,Internet Access

Technologies. Web Browsing , Configuring web browser, Popular search engines Downloading

and printing web pages.

Internet application

Basics of E-mail , E-mail addressing , forwarding and searching, Composing

BVRMIT-106-GENERAL ENGLISH AND SOFT SKILL

Introduction to English language

a) Role and significance of English language in the present scenario

b) English language: its relevance for the Indian industry.

c) Introduction to listening, speaking, reading, writing and bench marking of

the class.

Functional Grammar

a) Parts of speech, articles, tenses, verbs and modals.

b) Practice of daily use words, numerals and tongue twisters

c) Vocabulary building, construction of simple sentences: Basic sentence

pattern, subject and predicate.

d) Sentence construction – simple, complex and compound

English communication- About myself

a) Let’s talk, making conversation, meeting and greeting

b) Introduction myself, my family and my friends

c) My opinions, my likes and dislikes

d) Life at collage, hostel and workplace

PRACTICALS

BVRMITP-101.PRACTICAL ANATOMY AND PHYSIOLOGY

Human anatomy (practical)

Demonstration of

- Study of Human Skeleton parts with skeletal models.
- Study with charts and models of all organ systems mentioned above.
- Microscopic slides examination of elementary human tissues, cells.
- Major organs through models and permanent slides.
- Parts of circulatory system from models.
- Parts of respiratory system from models.
- Digestive system from models.
- Excretory system from models.

Human Physiology (Practical)

- To measure pulse rate
- To measure blood pressure
- To measure temperature
- Measurement of the Vital capacity
- Determination of blood groups
- Transport of food through esophagus
- Calculation and evaluation of daily energy and nutrient intake.
- Measurement of basal metabolic rate
- Demonstration of ECG
- Bile juice secretion and execration 11. Urine formation and execration

BVRMITP-102.Practical Fundamentals of Radiology and Imaging

Practical

- X-ray tubes general features and mobile equipment's.
- Care and maintenance of X-ray equipment and image intensifier
- To study effects of Kilo Voltage Peak (KVP) and Milli Ampere Second (MAS)

- Congruence of Radiation and optical field and beam.
- Determination of focal spot size of diagnostic X-ray tube.
- KV and exposure time testing.
- Linearity testing of the timer.
- Consistency of mA loading.
- Consistency of Radiation output.
- Evaluation of total filtration of the tube.
- Table top exposure rate measurement in fluoroscopy.
- Demonstration of basic procedures with all radiographic equipment.

BVRMITP-103. Practical Orientation in Para clinical science

- Know the diagnostic techniques used in pathology
- Know the various categories of the causes of diseases
- Know the course, outcome, consequences of diseases
- Compound Microscope
- Dark ground Microscopy
- Measurement of Microorganisms
- Hanging drop Preparation
- Isolation of Pure Cultures
- Bacterial Staining
- Simple Staining
- Gram's Staining
- Acid Fast Staining
- Albert's Staining
- Capsule Staining
- Spore Staining
- Negative Staining

BVRMITP-104. Practical Medical Ethics and Patients Care

- law and liability and duties of staff
- Workplace issues

- Bioethical issue
- Care and handling of patient
- Medico legal cases
- emergency care and life support skills
- CPR
- Vital signs and primary assessment
- bag-valve-masks

BVRMITP-105- PRACTICAL FUNDAMENTALS OF COMPUTER

- Starting MS WORD, Creating and formatting a document,
- Changing fonts and point size,
- Table Creation and operations, Autocorrect, Auto text, spell Check, Word Art, Inserting
- objects, Page setup, Page Preview, Printing a document, Mail Merge.
- Starting Excel, Work sheet, cell inserting Data into Rows/ Columns, Alignment, Text
- wrapping , Sorting data, Auto Sum, Use of functions, referencing formula cells in other
- formulae , Naming cells, Generating graphs, Worksheet data and charts with WORD, Creating
- Hyperlink to a WORD document , Page set up, Print Preview, Printing Worksheets.
- Starting MS–Power Point,, Creating a presentation using auto content Wizard, Blank
- Presentation, creating, saving and printing a presentation, Adding a slide to presentation,
- Navigating through a presentation, slide sorter, slide show, editing slides, Using Clipart, Word
- art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing
- note pages, preparing audience handouts, printing presentation documents, MS-Access,
- Creating tables and database, Internet, Use of Internet (Mailing, Browsing, Surfing).

SEMESTER –II

BVRMIT- 201 HUMAN ANATOMY AND PHYSIOLOHY II

UNIT 1

1.Cardiovascular System

Heart-size, location, chambers, exterior & interior, Blood supply of heart, Systemic & pulmonary circulation, Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial, artery, superficial palmar arch, femoral artery, internal iliac artery, Peripheral pulse, Inferior venacava, portal vein, portosystemic anastomosis, Great saphenous vein, Dural venous sinuses, Lymphatic system- cisterna chyli& thoracic duct, Histology of lymphatic tissues, Names of regional lymphatics, axillary and inguinal lymph nodes in brief.

2.Gastro-intestinal System

Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands Waldeyer's ring), Oesophagus, stomach**,** small and large intestine, liver, gall bladder, pancreas Radiographs of abdomen.

3. Respiratory System

Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments, Histology of trachea, lung and pleura, Names of paranasal air sinuses.

4. Peritoneum: Description in brief

UNIT 2

1.Urinary System

Kidney, ureter, urinary bladder, male and female urethra, Histology of kidney, ureter and urinary bladder.

2.Reproductive System

Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology), Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology), Mammary glandgross.

3. Endocrine Glands

Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal glad (gross & histology).

4.Nervous System

Neuron, Classification of NS, Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology), Meninges, Ventricles & cerebrospinal fluid, Names of basal nuclei, Blood supply of brain, Cranial nerves, Sympathetic trunk & names of parasympathetic ganglia

5. Sensory Organs

Skin: Skin-histology, Appendages of skin, Eye: Parts of eye & lachrymal apparatus, Extra-ocular muscles & nerve supply, Ear: parts of ear- external, middle and inner ear and contents

UNIT 3

Cardiovascular System

Respiratory System

Excretory System

UNIT-4

Reproductive System

Endocrine System

Lymphatic System

BVRMIT-202 CLINICAL RADIOGRAPHY

UNIT 1

1. Upper extremity - basic views

2. Lower extremity (including pelvis) - basic views

3. Chest including thoracic age and sternum

4. Spine - Cervical, dorsal, lumbar, lumbo-sacral (including functional views).

5. Skull – including trauma cases

6. Facial bones (nasal bones, zygoma, orbits, maxilla)

7. Mandible, Temporo-Mandibular Joints, Mastoids, petrous temporal bones

8. Abdomen - erect, supine, lateral decubituS

UNIT 2

Soft tissue radiography : Larynx, pharynx, nasopharynx, thoracic inlet

Dental radiography

Foreign body localization

High kV technique

Macroradiography

UNIT 3

1.General Pediatric Radiography

Special needs of patient and radiographer – equipment considerations (use of dedicated equipment and accessories) Technical considerations - the need to modify "adult" techniques – selection of exposure factors – image quality considerations – radiation protection of the patient - special techniques peculiar to children as follows : – Anorectal malformation – contrast study,intersex disorders - contrast study – esophageal atresia – pre/post op. – intussusception – congenital dislocation of hip – scoliosis – Leg–length measurements – assessment of bone age – non accidental injury – radiography of babies in incubators

2. Geriatric radiography

Understanding patient profile - possible difficulties during radiography – Technical considerations – need to carry out standardised projections in unconventional position – equipment and accessories – exposure factor considerations in view of variations in skeletal tissue – special care

UNIT 4

1.Operation theatre radiography

Operative cholangiography – orthopaedic procedures – pre-operative chest. Strict observation of asepsis – preparation of radiographer and equipment/accessories – careful safe use of mobile and fluoroscopic equipment – radiation protection – patient care – protection of theatre staff – rapid availability of radiographic image

2.Trauma/Emergency Radiography

Limb fractures - Fracture of thoracic cage, spine, skull – GIT obstruction – lung collapse – pleural effusion – pneumo-thorax. Selection of suitable X-Ray equipment – patient position

radiographic projections and sequence for each patient – modification of routine positioning, X-Ray tube and film – radiation protection – patient care

BVRMIT-203 SPECIAL RADIOGRAPHIC PROCEDURE.

UNIT-1

Urinary system imaging (IVU, MCU, RGU) Revision of anatomy and physiology, clinical indications and contraindications - patient preparation - contrast media used and dosage - physiological process by which urinary tract is outlined film sequence (projection and timing), normal anatomy on films, additional techniques, radiation protection, care of patient during and after examination. Pathological conditions of urinary system : kidneys, ureter, urinary bladder, urethra.

UNIT 2

Gastrointestinal tract imaging (Barium swallow, Barium meal upper GI, Barium meal follow through, Barium enema, small bowel enema, distal colography, defaecography).Revision of anatomy and physiology - clinical indications and contraindications - contrast media used : preparation and dosage - patient preparation – preparation of equipment – control of radiographic and fluoroscopic equipment – film sequence – radiographic projections – radiation protection – patient management – after care of patient – radiographer's role in the team. Pathological conditions of the GI tract.]

UNIT 3

Biliary system (PTC, ERCP, T-Tube cholangiography, per-op. cholangiography) Revision of anatomy and physiology – clinical indications and contraindications – contrast media – patient preparation – film series - radiation protection – patient care - normal anatomy. Pathological conditions of biliary system. [D] Sialography and sinography Anatomy - Clinical indications and contraindications – patient preparation – contrast media and dosage – injection procedure – techniques for radiographic projections - radiographic appearances – radiation protection – patient care

UNIT 4

Hysterosalpingography (HSG) Revision of anatomy and physiology – clinical indications and contraindications – contrastinjection-projections – radiation protection – patient care Procedures which are obsolete or rarely

Myelography :indications and contraindications – contrast used – patient preparation – injection technique – film sequence – projections – patient care • Pelvimetry

Oral cholecystography/intravenous cholangiography

Dacrocystography

Arthrography

Discography

BVRMIT 204 IMAGE PROCESSING TECHNIQUES

UNIT-1

Dark room design and accessories Site

Layout and safe light compatibility

UNIT-2

X-Ray film and Image processing Composition of single and double coated radiographic films, structure of emulsion, film characteristics (speed, base + fog, gamma, latitude) ; effect of grain size on film response to exposure, interpretation of characteristics curve. Latent image formation ; process of film developing (composition of fixer, developer and other processing solution), common errors and faults while processing (densitometry), automatic processing (processing cycle), developer replenishment, silver recovery and economics. Image intensifiers and cassettes (structure and function) ; types of image intensifiers and relative advantage, loading and unloading of cassettes and their care/maintenance ; effects of kV and mA on variation of emitted radiation intensity, determination of relative speeds, film contrast, film screen contact. Film storage, handling.

UNIT-3

Cassettes Structure and function Types - single, gridded, filmholder. Design features and consideration with loading/unloading Care and maintenance (cleaning)

Grid Purpose and function, effect on radiation exposure, use of grid, structure and material,stationary, parallel, focused, cross-hatch Moving grids.
Purpose,advantages,disadvantages.

UNIT 4

Intensifying screens Structure and functions, common phosphors used for determination of relative speeds, types, screen mounting, care and maintenance of film screen contact.

BVRMIT-205 Radiation physics

UNIT 1

Sound

The nature and propagation of sound wave (the characteristics of sound, wave theory), speed of sound in a material medium, intensity of sound, the decibel, Interference of sound waves, beats, diffraction, Doppler's effect, Ultrasonic wave, production of ultrasonic wave (piezo-electric effect) in ultrasonography. Use of principle of Doppler's effect in Diagnostic radiology (e.g. Echo, blood flow measurement).

Heat

Definition of heat, temperature, Heat capacity, specific heat capacity, Heat transfer-conduction, convection, radiation, thermal conductivity, equation for thermal conductivity (k), the value of k of various material of interest in radiology, thermal expansion, Newton's law of cooling, Heat radiation, perfect black body, Stefan law, application in diagnostic radiology (Heat dissipation in both stationary and rotating X-Ray tubes).

UNIT 2

Electrostatics

Electric charge (positive and negative charge), Coulomb's law, Electric field, electric potential and potential difference, equipotential lines, the eV (electron volt), Electric potential due to a point charge, Capacitance, dielectric, Capacitor, series and parallel combination of capacitors, energy stored on capacitor, charging and discharging of capacitors, use of capacitors in diagnostic radiology (e.g Mobile X-Ray generators, radiation detectors etc.).

UNIT 3

Electricity and Magnetism

DC circuit, Ohm's law, resistivity, series and parallel combination, EMF, Krichoff's law, heating effect of current, Ammeter, voltmeter, Galvanometer. Magnets and magnetic field, force on an electric current in a magnetic field, force on electric charge moving in a magnetic field, magnetic field due to straight wire ; force between two parallel wires, Ampere's law, electromagnet and solenoids.

UNIT-4

Electromagnetic Induction

(A.C. Circuit) Induced EMF, Faraday's Law, Lenz's law, EMF induced in a moving conductor, changing magnetic flux produces electric field, Transformer, Inductance, Energy stored in a magnetic field, resonance in A.C circuit. Light Index of refraction, Snell's law, total internal reflection, lens law, rectilinear propagation of light, umbra and penumbra effect, use of principle of rectilinear propagation of light in radiology (e.g. magnification, patient positioning device, setting areas for exposure, etc.). Photometry : Total radiation flux, luminosity of radiant flux, Luminous flux : relative luminosity, luminous efficiency, Illuminance, Inverse square law, Lambert's cosine law. Electromagnetic waves Introduction, Maxwell's equation, electromagnetic waves, energy density and intensity, momentum, electromagnetic spectrum and radiation in Atomsphere

BVRMIT-206-BASIC OF HEALTH MARKET AND ECONOMY

Unit I

Health Care Market An Introduction : Main Problems in the Market for Health Care, Health Care and

Economic Basics, Analyzing Health Care Markets. Demand-Side Considerations: Demand for Health

and Health Care, Market for Health Insurance

Unit II

Supply-Side Considerations: Managed Care, Health Care Professionals, Hospital Services,

Confounding Factors Public Policy in Medical Care: Policies to Enhance Access, Policies to Contain

Costs, Medical Care Systems Worldwide,

UNIT-III

Health Sector in India: An Overview Health Outcomes; Health Systems; Health Financing

Evaluation of Health Programs Costing, Cost Effectiveness and Cost-Benefit Analysis; Burden of

Diseases ,Role of WHO , Health Care Budget: purpose, types & practices in Indian context.

UNIT-IV

Health Economics: Fundamentals of Economics: Scope & coverage of Health Economics, demand for

Health Sciences; Health as an investment, population, Health &Economic Development.

Tools of Economics-Concepts of need, demand, supply & price in Health Services.

Methods & Techniques of Economic Evaluation of Health Programmes: Cost benefit

&cost effective methods-output & input analysis.

Market, monopoly, perfect & imperfect competition. Health Financing from various sources – Public ,

Private, TPA.

Economics of Health Programmes for Nutrition, diet &population control, economics of abuse of

tobacco & alcohol, environmental influences on health and feeding.

Economics of Communicable (STDs & Malaria) & non-communicable (IHD & Cancers) diseases.

PRACTICALS:

BVRMITP-201 Practical Human Anatomy & Physiology-II

Human Anatomy-II (Practical)

Demonstration of:

- Nervous system from models.
- Structure of eye and ear
- Structural differences between skeletal, smooth and cardiac muscles.
- Various bones
- Various joints
- Various parts of male & female reproductive system from models

Human Physiology- II (Practical)

- To perform total platelet count.
- To perform bleeding time.
- To perform clotting time.
- To study about CSF examination.
- To study about intrauterine contraceptive devices.
- To demonstrate microscopic structure of bones with permanent slides.
- To demonstrate microscopic structure of muscles with permanent slides.

BVRMITP-202-Practical Patient positioning & clinical Radiography

X ray of Upper & Lower Extremities

- Hand
- Forearm
- Arm
- Thigh
- Leg
- Foot
- Shoulder Joints
- Basic & special projection

- Related radiological Pathology

Pelvis Griddle

- Basic & special projection
- Related radiological Pathology

Whole Spine Positioning

- Cervical spine
- Thoracic spine
- Lumbar spine, sacrum and coccyx

Paediatric Radiography

- Special Positioning Views for all the X-Rays.

Skull

- Cranial bones and facial bone
- Basic & special projections
- Related radiological Pathology

Neck, Thorax &Abdomen

- Basic & special projection
- Related radiological Pathology

KUB

- Basic & special projection
- Related radiological Pathology

BVRMITP-203 Practical Special Radiographic Procedure

- Radiography of Special radiological procedures,
- Using contrast media as per syllabus.

- Positioning, Patient preparation
- Assistance while performing procedures.

BVRMITP-204 Practical Dark room techniques

- X-ray Film / Image processing Techniques (including Dark Room Techniques)
- X-ray cassettes
- Intensifying screens
- X-ray films types – basic film structure, quality, choosing films for different studies
- dry & wet processing – Fixer –Developer –film processing, Methods, manual and automatic processing, conventional & modern image
- processing rooms, image processing equipments – types & maintenance
- day light systems
- Intensifying screen, Fluorescence -structure of Intensifying screens
- screen unsharpness etc.

BVRMITP-205 Practical Radiation Physics

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

Magnetics demonstration by charts and ppt

YEAR ll

ADVANCE DIPLOMA

SEMESTER III

BVRMIT-301 PRINCIPLES OF CT AND MAMMOGRAPHY

UNIT-1

Description of CT, its Working Mechanism & Physical Principles,Limitations of radiography and conventional tomography, Lambert-Beer's law, Homogenous and a heterogenous beam of radiation, Data acquisition geometry and data processing, CT numbers and the linear attenuation coefficient. High kVp CT

UNIT 2

CT numbers and the gray scale of the CT image.
Window Width (WW)
Window Level (WL)
Format of the CT image.
Field of view (FOV), pixel size and matrix size.
Identify the equipment components that make up a CT

UNIT-3

Physics and Basic Principle of Mammography,Generations Of Mammography,Alternative modalities and pathological indications of mammography,Pathologic Indications for Mammography,Clinical applications for Mammography,ScreeningMammography,DiagnosticMammography,Advantages and Disadvantage of Mammography

BVRMIT-302 COMPONENT OF CT AND MAMMOGRAPHY

UNIT 1

Types of CT scan Equipment, Conventional CT Scanning (CCT),Spiral/Helical CT Multi Slice CT, Electron Beam Computed Tomography,Mobile Computed Tomography,Importance of various types of CT, Differences between various types,Indication of a particular type

UNIT-2

Major systems of a CT scanner,Instrumentation, Image Display, Room Layout for CT Equipment,CT gantry (including the x-ray tube and generator, as well as the data acquisitions system), and thebasic features of the patient table., CT computer and image processing system,Image display, storage, and recording in CT, Main components of a CT control console, Several hardware and software options for CT, Accessories for use in CT, Modular Design Concept, Operating Modes of the Scanner, Typical Room Layout for a CT Scanner Major technical specifications and features of a CT scanner.

UNIT -3

Details of Mammography Equipment., Room Layout Mammography equipment.

BVRMIT 303 CT PROCEDURES AND IMAGING PROCESS.

UNIT -1

Patient Preparation for CT,Patient Positioning for CT

Various CT protocols in plain and contrast for different areas of interest, Spiral CT protocol in plain and contrast for Head,Spiral CT protocol in plain and contrast for Neck,Spiral CT protocol in plain and contrast for Chest,Spiral CT protocol in plain and contrast for Abdomen/Pelvis,Spiral CT protocol in plain and contrast for Vascular System, Spiral CT protocol in plain and contrast for Bone,Importance of positioning, Precautions to be taken for preparing & positioning the patient.

UNIT-2

Data Acquiring Concepts,Basic concept of data acquisition. Data acquisition geometrics, Slip-Ring Technology, Design and Power Supply of a CT Room.,Advantages of Slip-Ring Technology,CT Detector Technology,Characteristics of the Detector,List and describe the Types of Detectors, Explain Plug-in Detector Modules., Describe Multi-Slice Detectors, Detector Electronics, Functions of Detectors, Components of Detectors,Data Acquisition and Sampling.

UNIT 3

CT Scan of Brain (Plain)

CT Scan of Brain (Plain + Contrast)

CT Scan of Orbit (Plain)

CT Scan of Temporal Bones (Axial)

CT Scan of Paranasal Sinus (Coronal)

CT Scan of Neck (Plain)

CT Scan of Chest (Plain)

CT Scan of H R C T Chest

CT Scan of Abdomen and Pelvis (Plain)

UNIT-4

Sequence of events after the signals leave the CT detectors, State the Algorithm, Explain the Fourier transform,Explain the Convolution, Explain the End Interpolation, Trace the History of Reconstruction Techniques.,Identify the problems in CT,filter back projection,IterativeAlgorithms.,FourierReconstruction.,Image Reconstruction in Single and Multiple Slice Spiral/Helical CT,Types of data in Image Reconstruction,Comparison of Reconstruction Algorithms, 3D Algorithm,CT artifact.

BMRVIT-304 ADVANCED CT AND MAMMOGRAPHY

UNIT -1

ducal energy ct scan

Dual-spin scanners

Fast kVp switching

Dual-source scanners

Dual-layer detectors

Photon-counting detector

UNIT -2

cone beam ct scan

poratable ct scan

Phase contrast ct scan

UNIT -3

Full field digital mammography

Contrast enhanced digital mammography

Breast tomosysthesis

UNIT-4

Ct laser mammography

Scientimammography

Optical mammography

PET mammography

BVRMIT-305-ADVANCE COMPUTING SKILL

Unit-1

Advance Word Processing Tools

Setting the layout of Table and documents, Mail merge techniques. Letter envelopes etc,

Using spell check and Thesaurus, Foot note nad Endnotes, Using Charts , shapes and pictures in

word .

Unit-2

Basics of Spreadsheet

Functions of Spreadsheet , Applications , Elements of Electronic Spread sheet ,creating

document saving and printing the worksheet, manipulation of cells ,Functions and charts, using

formulas , Functions and charts

UNIT-3

Advance Spreadsheet Tools

Manipulations with charts and its types, Sorting, Filtering of data ,Pivot table, data validation techniques. Grouping and subtotaling of data. Text to column option . Printing of customized worksheet.

UNIT-4

Presentation Software

Using Powerpoint, Opening an powerpoint presentation, Saving a presentation , Entering and editing text, inserting and deleting slides in a presentations , preparation of slides , adding clip arts, charts etc., Providing Aesthetics , Enhancing text presentation ,working with color lines styles and movie and sound ,adding header and footer, presentation.

BVRMIT-306-HUMAN VALUE AND PROFESSIONAL ETHICS

UNIT-1

Need, Basic Guidelines, Content and Process for

Value Education

Understanding the need, basic guidelines, content and process for Value Education

Self-Exploration its content and process, Natural Acceptance’ and Experiential Validation- as the

mechanism for self-exploration

Continuous Happiness and Prosperity- A look at basic Human Aspirations

Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of

aspirations of every human being with their correct priority

Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario

Method to fulfil the above human aspirations: understanding and living in harmony at various levels

UNIT 2:

Understanding Harmony in the Human BeingUnderstanding human being

Understanding the Body as an instrument

Understanding the harmony of Body, correct appraisal of Physical needs, meaning of Prosperity in detail

UNIT 3:

Understanding Harmony in the Family and Society-

Harmony in Human Relationship

Understanding Harmony in the family – the basic unit of human interaction

Understanding values in human-human relationship

Trust and Respect as the foundational values of relationship

Understanding the meaning of trust

Difference between intention and competence. Understanding the meaning of respect

Understanding the harmony in the society (society being an extension of family)

UNIT-4

Natural acceptance of human values

Definitiveness of Ethical Human Conduct

Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

Competence in professional ethics:

a) Ability to utilize the professional competence for augmenting universal human order

b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,

c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems

Strategy for transition from the present state to Universal Human Order:

a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers

b) At the level of society: as mutually enriching institutions and organizations

PRACTICALS:

BVRMITP-301 Practical Principles of CT and Mammography

- Patient preparation, patient positioning,
- Radiation protection and care of patient during procedures including contrast media Management in CT.
- Demonstration of CT numbers and the grey scale of the CT image by ppt and charts
- Demonstration of Window Width (WW) by ppt and charts
- Demonstration of Window Level (WL) by ppt and charts
- Demonstration of Format of the CT image by ppt and charts
- Demonstration of mammography equipment
- Indication and contraindication of mammography

BVRMITP-302 Practical Component of CT and Mammography

Demonstration of:

- CT scan Equipment
- Conventional CT Scanning (CCT),
- Spiral/Helical CT Multi Slice CT,
- Electron Beam Computed Tomography
- Mobile Computed Tomography
- CT scanner
- CT control console
- Mammography Equipment
- Room Layout Mammography equipment

BVRMITP-303 Practical CT procedure and Imaging Process

Demonstration of:

- CT Scan of Brain (Plain)
- CT Scan of Brain (Plain + Contrast)
- CT Scan of Orbit (Plain)
- CT Scan of Temporal Bones (Axial)
- CT Scan of Paranasal Sinus (Coronal)
- CT Scan of Neck (Plain)
- CT Scan of Chest (Plain)
- CT Scan of H R C T Chest
- CT Scan of Abdomen and Pelvis (Plain)
- Data Acquiring Concepts
- Reconstruction Techniques
- 3D Algorithm

BVRMITP-304 Practical Advanced CT and Mammography

Demonstration of all of the following:

- Ct laser mammography
- Scientimammography
- Optical mammography
- PET mammography
- Dual energy CT
- Cone beam CT
- Full field digital mammography
- Contrast enhanced digital mammography

305-BVRMITP- Practical Advance Computing skills

Word Processing

Mail merge techniques

Using Charts , shapes and pictures in word .

Basics of Spreadsheet

document saving and printing the worksheet

formulas , Functions and charts

Advance Spreadsheet Tools

worksheet.

Presentation Software

Using Powerpoint working with color lines

styles and movie and sound ,presentations.

SEMESTER 4

BVRMIT 401 MRI PRINCIPLE AND PHYSICS

UNIT-1

Basic Principles of MRI,Atomic Structure, Motion in the atom,MR Active Nuclei,Alignment,Precession,Larmor Equation, Resonance and Result of Resonance,MRsignal,Free Induction Decay Signal (FID), Relaxation, T 1 Recovery and T 2 Decay, Pulse Timing Parameters,Instrumentation and Equipment of MRI Introduction,Magnetism,PermanentMagnets,Electromagnets,SuperconductingElectromagnets ,FringeFields,ShimCoils,GradientCoils,Radio Frequency (RF Patient Transportation System, MR Computer Systems and the User Interface, MRI safety and Site Planning

UNIT-2

Government Guidelines

Safety Terminology

Hardware and Magnetic Field Considerations

Radio Frequency Fields

Gradient Magnetic Fields

The Main Magnetic Field

Projectiles

Siting Considerations

MRI Facility Zones

Safety Education

UNIT 3

Protection of General Public from the Fringe Field

Implants and Prostheses

Pacemakers

Patient Conditions

Safety Policy

Image weighting and Contrast in MRI

Introduction

Image Contrast

Contrast Mechanisms

Relaxation in Different Tissues

T1 Contrast & T2 Contrast

Proton Density Contrast Weighting

UNIT 4

Introduction to Pulse Sequences

The spin echo pulse sequence

Timing parameters in spin echo

The gradient echo pulse sequence

Gradients

The advantages of gradient echo pulse sequences

The disadvantages of gradient echo pulse

Timing parameters in gradient echo

Weighting and contrast in gradient echo

BVRMIT-402 MRI COMPONENT AND PROCEDURE

UNIT 1

MRI Systems and Components, Encoding, Data Collection & Image Formation,Image Quality, Signal to Noise Ratio (SNR) Contrast to Noise Ratio (CNR),Spatial Resolution,ScanTime,Trade – Offs, Decision Making,Volume Imaging Uses,Volume Imaging Resolution, Pulse Sequences, Spin Echo Pulse Sequences, Gradient Echo Pulse Sequences, Parallel Imaging Techniques, Mechanism of Flow Phenomena,Various Artifacts and their Compensation

UNIT-2

MRI of Head and Neck

1.MRI of Body

2.MRI of Extremities

UNIT-3

3.Vascular and Cardiac Imaging

4. Functional Imaging Techniques

5. Contrast Agents in MRI

BVRMIT 403 ULTRASOUND IMAGING

UNIT-1

Basics of Ultrasound

1. Ultrasound Imaging Artifacts

2. Transducer and Machines

3. Ultrasound Physics

UNIT-2

1. Doppler

2. The Ultrasound Scanning Room

UNIT-3

Indications, Technique, Preparation, Scanning Techniques of -

Abdomen

Abdominal Aorta

Inferior Vena Cava

Liver

Gall Bladder and Biliary Duct

Pancreas

Spleen

Peritoneal Cavity and Gastrointestinal Tract

UNIT -4

Scrotum and Testis

Urinary Bladder

Kidneys and Ureter

Neonates`

Neck

Ultrasound Guided Needle Puncture

BVRMIT 404 ORGANIZATIONAND MANAGEMENT OF IMAGING DEPARTMENT

Unit-1

1. Outline of Radiological Department , X-ray department, Ultrasonography department as well as CT and MRI Scans

2. Details of Basic Design Considerations of Radiological Department

3. Details of the role of radiology departments in infections.

Unit -2

1. Details of Special requirements of Radiological Department

2. Details of Patient Facilities in Radiological Department

3.Details of Film Handling in Radiological Department

Unit-3

1. Radiation Protection - 1

2. Radiation Protection - 2

3. Nuclear Medicine used in Radiological Department

BVRMIT-405-HEALTH AND FITNESS

Unit 1:

Personal Health, Nutrition, and Fitness

Your Lifestyle and Your Health

Your Role in Maintaining Your Health

Guidelines for a Healthy Diet

Dietary Guidelines and Nutritional Facts

Nutrition and Chronic Diseases

Individual Caloric and Nutritional Needs

Benefits of Physical Activity

Unit 2

Preventing Disease and Injury

Immunity and Preventing Disease

Lifesaving and Emergency Care Procedures

Strategies for Preventing Accidents

Unit 3

Growth, Development, and Sexuality

Human Reproduction and Development

Benefits of Healthy Sexual Practices

Peer Pressure and Sexual Activity

Family Planning Strategies

Unit 4

Substance Abuse

Health Effects of Using Alcohol, Tobacco, and Other Drugs

Harmful Effects of Dietary Supplements and Anabolic Steroids

Effects of Medicines and Illegal Substances

Peer Pressure Substance Abuse

BVRMIT-406-Advance communication and soft skill

UNIT-1

Functional Grammar-II

a) Application writing

b) Paragraph writing, essay writing and précis writing

c) Pre-testing of oral and writing skills

UNIT-2

Professional Skills

a) Biodata, CV and resume writing

b) Joining letter, cover letter and resignation letter

c) Inter- office memo, formal Business letter, informal notes

d) Minutes of the meeting, reporting events, summary writing

UNIT-3

Presentation skills

a) Power-point presentations and presenting techniques

b) Body language

c) Describing people, places and events

d) Extempore, speech and just- a minute sessions

UNIT-4

Interview skills

a) Developing skills to- debate, discussion, basics of GD and styles of GD

b) Discussion in groups and group discussion on current issues

c) Steps to prepare for an interview and mock interviews

Public speaking

a) Art of public speaking

b) Welcome speech

c) Farewell speech

d) Votes of thanks

Oral practice

a) Debate

b) Just-a-minute

c) Group discussion

d) Mock interviews

PRACTICALS:

BVRMITP-401 Practical MRI Principle and Physics

Demonstration off:

- MR Active Nuclei
- T 1 Recovery and T 2 Decay
- Coils
- Safety Policy
- MR Computer Systems and the User Interface
- MRI safety and Site Planning
- Safety Terminology
- Protection of General Public from the Fringe Field
- Contrast Mechanisms
- Pulse Sequences

BVMITP- 402 Practical MRI Component and Procedure

Demonstration of:

- MRI Components
- Signal to Noise Ratio (SNR)
- Contrast to Noise Ratio (CNR),
- Spatial Resolution,
- MRI of Head and Neck
- MRI of Body
- MRI of Extremities
- Vascular and Cardiac Imaging
- Functional Imaging Techniques
- Contrast Agents in MRI
- Various post processing techniques and evaluation of image quality and clinical findings.
- Post procedural care of the patient

BVRMITP-403-Practical Ultrasound imaging

Demonstration of:

- Transducer and Machines
- Ultrasound Imaging artifacts
- Ultrasound Scanning Room
- Indications, Technique, Preparation,

Scanning Techniques of **-**

- Abdomen
- Abdominal Aorta
- Inferior Vena Cava
- Liver
- Gall Bladder and Biliary Duct
- Pancreas
- Spleen
- Peritoneal Cavity and Gastrointestinal Tract
- Scrotum and Testis
- Urinary Bladder

- Kidneys and Ureter
- Neonates`
- Neck
- Ultrasound Guided Needle Puncture

BVRMITP--404 Organization and Management of imaging department

Demonstration of:

- Outline of Radiological Department
- X-ray department,
- Ultrasonography department as well as CT and MRI Scans
- Details of the role of radiology departments in infections.
- Radiation Protection

BVRMITP-405- PRACTICAL HEALTH AND FITNESS

DEMOSTRATION OF:

- Personal Health
- Dietary Guidelines
- Substance Abuse
- Health Effects of Using Alcohol, Tobacco, and Other Drugs
- Effects of Medicines and Illegal Substances

SEMESTER- 5

BVMIT-501 Dental Radiography and BMD

UNIT 1

Details of Working Mechanism (Physics) of Orthopantography,Details of the History of Orthopantomography (OPG), Details of the Basic Principle and Working Mechanism for Orthopantomography,Details of Orthopantomography Equipment Details of the Generations of OPG, Details of Artifacts in OPG,Clinical Application of Orthopantography, Details of Clinical Applications of OPG with respect to Impacted Teeth, Periodontal bone loss and Periapical Involvement, Dental Implants

UNIT 2

Pre and Post-operative Orthodontic Assessment, Diagnosis of developmental anomalies,Temporomandibular Joint (TMJ) Disorders,DentalBridge,Salivary Stones (Sialolithiasis), Details of Positioning and Radiation Safety in OPGDetails of patient preparation in OPG, Details of the technique used in OPG, Details of Positioning in Cephalometry, Details of Radiation Safety in OPG with reference to following points:-

Licensed Dentist and X-ray Machine Registrant Responsibilities

Patient Protection

Responsibilities of Dental Personnel Operating X-ray Equipmen

UNIT 3

Details of Working Mechanism (Physics) of Bone Densitometry, Details of History of Bone Densitometry, Indications for BMD Testing, Details of Bone Physiology and Remodelling,Details of Basic Principle of BMD,Details of the following Types of Bone Densitometry Equipment's,Single Photon Absorptiometry (SPA), Dual Photon Absorptiometry (DPA), Dual-Energy X-ray Absorptiometry (DXA or DEXA) Dual X-ray Absorptiometry and Laser (DXL), Single Energy X-ray absorptiometry (SEXA), Quantitative Computed Tomography (QCT), Quantitative Ultrasound (QUS),Digital X-ray Radiogrammetry (DXR), Details of Artifacts

UNIT 4

Details of Limitations of BMD, Details of Interpretation and Clinical Application of Bone Densitometry,Identify the Clinical Application of Bone Densitometry Demonstrate the Image Analysis and Interpretation of BMD Study, Discuss What is Osteopenia, Discuss What is Osteoporosis,Demonstrate different Positioning of the patient, Demonstrate the protocol for Radiation Safety in Bone Densitometry Demonstrate Patient Preparation in Bone Densitometry, Demonstrate DEXA/DXA Positioning with reference to following points,Routine Positioning, Additional Positioning, Peripheral Measurements, Demonstrate the protocol for Radiation Safety with reference to following points,PatientDose,Radiation

Protection for the Patient, Radiation Protection for the Technologist, Radiation Protection to Public

BVMIT- 502 QUALITY CONTROL AND SAFETY MEASURE

Unit 1

Quality control

Unit 2

Safety measure

Unt 3

TLD Badges

BVMIT 503 RADIATION HAZARD AND SAFETY

UNIT 1

Somatic and genetic effect of ionising radiation

need for protection, principle of radiation protection

ALARA

UNIT 2

radiation monitoring devices (film badge and TLD)

radiation shielding devices available for protecting staff

patient and public and how to use them

UNIT 3

(Methods ofRadiation Protection of patients, radiation workers and public).

Natural and background radiation (cosmic, terrestrial)

Principles of radiation protection, time - distance and shielding, shielding calculation and radiation survey

UNIT 4

personnel dosimeters (TLD and film batches), occupational exposure, radiation protection of self and patient, ICRP, NRPB, NCRP and WHO guidelines for radiation protection, pregnancy and radiation protection.

BVMIT-504 Angiography

UNIT 1

Details of Different Types of Cardiac Diseases

Cardiac Catheterization /Angiography Procedure

Angioplasty / PTCA Procedure

Coronary Artery Bypass Graft (CABG) Procedure

UNIT-2

Catheters

Instruments

Sterilization Techniques of catheters and instruments

UNIT -3

Various Cardiac Cath Lab Equipment

Physics Test Procedures for Cardiac Cath Labs

Radiation MeasurementsDetails of Angiography examination techniques

Coronary Angiography examination techniques

Micro - Angiography examination techniques

Peripheral Angiography examination techniquesDetails of Neuro - vascular Angiography examination techniques

Renal Angiography examination techniques

Angiography Equipment and its components

Desired accessories

Consumables

Layout installation plan

Prerequisites

UNIT-4

Broad Goals of Preventive Cardiology

Preventive Cardiology

Cardiac RehabilitationECG machine

Abnormal ECGs, Stress test, 2D Echo

BVRMIT-505-Digital literacy & ACCOUNT LITERACY

Unit 1:

Review of MS office

Advance options in MS excel

Power point

Introduction to internet learning platform

Using internet-based learning platform

Using google and you tube for learning

Using smart phone to become smart

UNIT-2

Benefits of digital learning

Using internet for personal requirement

Online payments method

Use of social media for advisement

Digital security and privacy

Various cybercrime and their safety guideline

Best practice for securing online and network transaction

Managing privacy and security and social media accounts

UNIT-3

Introduction and basic of financial planning

Concept of time and value of money

Risk and return

Myths about easy money

Financial planning with examples

Introduction to financial market and institution investment option in post office

Sources of finance

Capital market basics

Basic of money market

Mutual funds

UNIT-4

Life insurance

General insurance

Types of banks

KYC

Function of commercial banks and RBI and its function

Deposit accounts-understanding of operation

Retail finance

Personal loan

Corporate banking

Cheque collecting services

Payments modes in banking system

BVRMIT-506-introduction to natonal haelthcare system

UNIT-1

1. Introduction to healthcare delivery system

a. Healthcare delivery system in India at primary, secondary and tertiary care

b. Community participation in healthcare delivery system

c. Health system in developed countries.

d. Private Sector

e. National Health Mission

f. National Health Policy

g. Issues in Health Care Delivery System in India

UNIT-2

2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.

UNIT-3

3. Introduction to AYUSH system of medicine

a. Introduction to Ayurveda.

b. Yoga and Naturopathy

c. Unani

d. Siddha

e. Homeopathy

f. Need for integration of various system of medicine

UNIT-4

4. Health scenario of India- past, present and future

Demography & Vital Statistics-

a. Demography – its concept

b. Vital events of life & its impact on demography

c. Significance and recording of vital statistics

d. Census & its impact on health policy

6. Epidemiology

a. Principles of Epidemiology

b. Natural History of disease

c. Methods of Epidemiological studies

d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

PRACTICALS

BVRMITP-501 Practical Dental radiography and BMD

- Orthopantography
- Clinical Applications of OPG
- Artifacts in OPG
- different Positioning of the patient
- Routine Positioning
- Radiation Protection for the Patient, Radiation Protection for the Technologist, Radiation Protection to Public
- Working of Bone Densitometry
- Indications for BMD Testing
- Limitations of BMD
- Clinical Application of Bone Densitometry

BVRMITP-502-Quality Control and Safety Measure

- Demonstration of TLD Badges
- Safety measure of radiology department for patient
- Quality control of all radiographic machine

BVRMITP-503- Practical Radiation hazard and safety

Demonstration of:

- protection, principle of radiation protection
- personnel dosimeters film badge and TLD how to use them
- shielding

- radiation survey

BVMRITP-504 – Practical Angiography

Demonstration of:

- Cardiac Catheterization
- Angiography Procedure
- Angioplasty / PTCA Procedure
- Coronary Artery Bypass Graft (CABG) Procedure
- Catheters
- Sterilization Techniques of catheters and instruments
- Various Cardiac Cath Lab Equipment
- Various Coronary Angiography examination techniques
- Micro - Angiography examination techniques
- Layout installation plan
- Peripheral Angiography examination techniques
- Details of Neuro - vascular Angiography examination techniques
- Renal Angiography examination techniques

505-BVRMITP-Practical digital litracy and financial litracy

Uses Advance options in MS excel

Excel

Power point

Using internet-based learning platform

Using google and you tube for learning

Using smart phone to become smart

Using internet for personal requirement

Online payments method

Use of social media for advisement

SEMESTER-6

BMVIT-601 ADVANCEMENT IN IMAGING MODALITIES

UNIT-1

Film archieving systems:

Image recording devices Laser imager/camera-functioning. Multiformatter Automatic film handling systems Picture archieving and communications systems (PACS) Systems designs, transfer restrictions. Optical Disc. System (ODS)

UNIT-2

Digital radiography systems

Image acquisition Digital Spot Imaging DSI

Unit-3

Digital chest radiography

Future developments

UNIT-4

fluoroscopy and flurography

Equipment for mobile radiography

Equipment for MMR radiography

BVMIT-602 INTERVENTIONAL RADIOGRAPHY

UNIT-1

1. Interventional Radiology

Definition of Interventional Radiology

Indication for various Interventional procedures

Clinical Application : Disease diagnosis, Severity interpretation

Name of different type of procedure

UNIT-2

1.Equipment used in various interventional procedures

C-arm equipment: Instrumentation and working procedure

Catheters: Classification, Catheters used for different studies, Balloon angioplasty catheters, Sterilization of catheters, Guide wires

2. Angiography (Cerebral, Peripheral, Visceral

a) Anatomy of blood vessels

b) Definition, Indication and Contraindication , Patient preparation and Contraindication

b) Direct needle puncture , Catheter angiography

UNIT-3

1. ANAESTHESIA AND EMERGENCY DRUGS USED IN DIAGNOSTIC RADIOLOGY

Facilities regarding general Anaesthesia in the X-ray Department

2. Anaesthetic Problems associated with specific technique

a)Vascular Studies

b) Carotid Angiography c) Venography

UNIT-4

Sterile Techniques in angiography procedures

PRACTICALS:

BVMRITP-601-Practical Advancement In imaging Modalities

- Demonstration of PACS
- Demonstration of CR/ DR
- Demonstration of all CR/DR procedure
- Demonstration of fluoroscopy
- Demonstration of fluoroscopy procedure
- Demonstration of MMR radiography

BVMRITP-602- Practical Interventional Radiography

Demonstration of:

- Indication for various Interventional procedures
- C-arm equipment
- Indication and Contraindication
- Patient preparation
- Facilities regarding general Anaesthesia in the X-ray Department
- Sterile Techniques in angiography procedures