



BACHELOR OF MEDICAL RADIOLOGY AND IMAGING TECHNOLOGY (BMRIT)

SYLLABUS – 1st Year

EFFECTIVE FROM
ACADEMIC SESSION: 2026 ONWARDS

DEPARTMENT OF ALLIED HEALTH
(सहबद्ध स्वास्थ्य विभाग)

Faculty of Health Sciences, Jharkhand Rai University, Ranchi

SEMESTER – I

Program: BMRIT
Semester: I
Subject: Human Anatomy
Code: BMRIT001

L	T	P	C
3	0	0	3

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Recall anatomical terminology, cell structure, tissues, and glands of the human body.

CO2: Explain the structure and functions of the musculoskeletal system.

CO3: Apply anatomical knowledge to identify structures of the cardiovascular and respiratory systems.

CO4: Analyze the organization and relationships of organs in the gastrointestinal system.

CO5: Evaluate the anatomical features of the urinary, reproductive, and endocrine systems for normal body function.

CO6: Develop anatomical interpretations of the nervous system, sensory organs, and embryological processes using radiological observations.

Course Content: Human Anatomy

Topics and contents	Hours
UNIT – I: Introduction: Human Body as a Whole	8
Definition of anatomy and its subdivisions, Terms of location, positions and planes, Cell and its organelles, Epithelium – definition, classification, describe with examples, functions, Glands – classification, describe serous and mucous glands with examples, Basic tissues – classification with examples, Concept of Sharira Rachana (Human Anatomy in Ayurveda) – comparison of body organization in Ayurveda and modern anatomy (Indian Knowledge System)	
UNIT – II: Locomotion and Support	8
Cartilage – types, examples and histology	
Bone – classification, examples and histology. Parts of long bone, names of all bones, vertebral column and intervertebral disc. Fontanel's of fetal skull.	
Joints – classification of joints with examples, typical synovial joint (in detail).	
Muscular system – classification of muscular tissue and histology Important muscles of the body- Sternocleidomastoid, Trapezius, Muscles of tongue, Deltoid, Biceps brachii, Intercostal muscles, Thoracic diaphragm, Rectus abdominis, External oblique, Internal oblique, Transversus abdominis, Pelvic diaphragm, Gluteus maximus, Gluteus medius, Gluteus Minimus, Quadriceps femoris, Soleus.	
UNIT – III: Cardiovascular System & Respiratory System	8
Heart – size, location, chambers, exterior and interior, Blood supply of heart, Pericardium, Systemic and pulmonary circulation, Branches of aorta - common carotid artery, subclavian artery, Axillary artery, brachial artery, radial artery, superficial palmar arch, femoral artery, popliteal artery, dorsalis pedis artery., Peripheral pulse, Inferior venacava, portal vein, portosystemic anastomosis, Great saphenous vein, median cubital vein, Dural venous sinuses, Lymphatic system – cisterna chyli and thoracic duct, Lymphatic tissues and its histology, Regional lymph nodes – cervical, axillary and inguinallymph nodes.	
Parts of RS – nose, nasal cavity, paranasal air sinuses, larynx, trachea, lungs, pleura, bronchopulmonary segments, Histology of trachea and lungs.	
UNIT – IV: Gastro-Intestinal System Theory & Peritoneum	8
Parts of GIT- oral cavity (lip, cheek, tongue, salivary glands, palate, dentition) pharynx (Waldeyer's ring) esophagus, stomach, small and large intestine and appendix, Liver, gall bladder, pancreas and spleen, Histology of esophagus, stomach, small and large intestine, liver, gall bladder and pancreas.	
Description of reflection, folds and pouches in brief.	
UNIT – V: Urinary System, Reproductive System and Endocrine Glands	8

Kidney, ureter, urinary bladder, male and female urethra, Histology of kidney, ureter and urinary bladder. Parts of male reproductive system- testis, vas deferens, epididymis, prostate, Parts of female reproductive system- uterus, fallopian tubes, ovary, mammary gland, Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tube and ovary. Names of all endocrine glands, describe in detail on pituitary gland, thyroid gland and parathyroid gland, suprarenal gland, Histology of pituitary, thyroid, parathyroid, suprarenal gland.	
UNIT – VI: Nervous System and Sensory Organs	
Neuron, Classification of nervous system, Cerebrum, cerebellum, brain stem, spinal cord & spinal nerve, Meninges, ventricles and cerebrospinal fluid, Blood supply of the brain, Cranial nerves (in brief), Nerve plexus (Brachial & lumbar) Skin and its appendages, Eye – parts of eye ball and lacrimal apparatus, Extraocular muscles, Histology of cornea and retina, Ear – parts of ear- external, middle and inner ear and contents Embryology Spermatogenesis and oogenesis, Ovulation, fertilization, Placenta	8

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Human Anatomy, Vol.1,2 &3, 5 th edition, 2010,	B.D. Chaurasia	CBS publishers & distributors Pvt. Ltd.
2	Physiology & Anatomy with Practical Considerations	Ester. M. Grishcimer	J.P. Lippincott. Philadelphia
3	Manipal Manual of Anatomy, 2nd edition, 2012	Sampath Madhyastha	CBS publishers & distributors Pvt. Ltd
4	Text Book of General Anatomy, 2 nd edition, 2013	Shobha Rawlani and Shivrani Rawlani	Jaypee brothers
5	Langman's Medical Embryology, 11th edition, 2009	T.W Sadler	Wolters Kluwer

Program: BMRIT
Semester: I
Subject: Physiology
Code: BMRIT002

L	T	P	C
3	0	0	3

Course Outcome:

On completion of the Course, the students will be able to:

- CO1:** Describe the concepts of homeostasis, cell physiology, blood, and neuromuscular functions.
CO2: Demonstrate the physiological principles of cardiovascular, respiratory, and renal systems.
CO3: Explain the functions of the digestive, endocrine, and nervous systems in maintaining homeostasis.
CO4: Analyze the mechanisms of renal regulation and endocrine–nervous system integration.
CO5: Differentiate and assess the physiological mechanisms of special senses and reproduction.

Course Content: Physiology

Topics and contents	Hours
UNIT – I: General physiology, Muscle nerve physiology and Blood	10
Introduction to Physiology, Concept of Homeostasis, cell – Morphology – Functions of organelles and Cell membrane, Transport mechanisms, Body fluid compartments.	
Neurons: Morphology, Action Potential, Neuroglia: Types & functions, Muscles: Types, structure of sarcomere. Neuromuscular junction, sliding filament mechanism of contraction.	
Composition, properties, functions. Plasma proteins: Concentrations and functions, RBC: Morphology, functions, count, physiological variations and life span Erythropoiesis – stages, essential factors, regulation of Erythropoiesis, Hemoglobin: Functions, concentration, physiological variations. Fate of Hemoglobin – Jaundice, types, Color index, MCH, MCV, MCHC, PCV – normal values, WBC: Morphology, functions of all types including T & B lymphocytes, total and differential counts, physiological variations, Platelets: Morphology, count, functions, thrombocytopenia & bleeding time, Blood groups: Basis of blood grouping. Landsteiner’s laws, ABO system, determination of blood groups, blood transfusion, complications of incompatible blood transfusion, Rh group, erythroblastosis foetalis, prevention and treatment, Blood bank.	
Haemostasis: Mechanisms. Clotting mechanism: factors, intrinsic and extrinsic pathways.	
Disorders of clotting – hemophilia, vitamin K deficiency. Anticoagulants – mechanism of action and their uses, Anemia: Classification – Morphological and Etiological, Blood volume: normal values.	
UNIT – II: Cardiovascular system	10
Organization of cardiovascular system, greater and lesser circulation, Physiological anatomy of the heart, nerve supply, Junctional tissues of heart (pacemaker), Cardiac cycle: Mechanical events, Heart sounds, causes, characteristics and significance, Normal ECG, clinical significance of ECG, Heart rate – Physiological variations, Cardiac output: Definitions, normal values, physiological variations, Arterial blood pressure: Definitions, normal values, physiological variations, factors maintaining blood pressure. Role of baroreceptors in regulation of blood pressure.	
UNIT – III: Respiratory system	8
Respiratory and Non-respiratory function of respiratory system. Physiological anatomy of respiratory system Functions of respiratory tract. Respiratory membrane. Respiratory muscles. Surfactant: functions, respiratory distress syndrome.	
Definitions of terms used in respiratory physiology: Eupnea, Hyperpnoea, Tachypnea, Apnea, Dyspnea. Mechanics of breathing – intrapulmonary and Intrapleural pressure changes during a respiratory cycle.	
Spirometry – Lung volumes and capacities. Vital capacity. Oxygen transport: Role of hemoglobin, factors affecting, oxygen carrying capacity. Carbon dioxide transport: forms, chloride shift	

(Hamburgers phenomenon). Respiratory centers. Role of chemo receptors in regulation of respiration. Pulmonary ventilation and alveolar ventilation. Partial pressure of gases, Calculation of partial pressure of gasses in mixture. Arterial and venous blood gas concentrations and contents. Hypoxia: Types and effects Cyanosis, Asphyxia, Periodic Breathing, Acclimatization. Hyperbaric O₂ therapy, Artificial respiration and Ventilators. Physiological anatomy of respiratory system Functions of respiratory	
UNIT – IV: Excretory system Functions of kidneys. Nephrons – Juxta glomerular apparatus – functions, Steps in Urine formation – Ultrafiltration, Tubular Reabsorption, Tubular Secretion, GFR. Definition, normal values, factors affecting GFR, measurement of GFR, Renal threshold for glucose, tubular load for glucose, Role of aldosterone and ADH in urine formation, Micturition, Innervation of bladder. Diuresis, Renal functions tests – Based on analysis of urine and analysis of blood, Skin: Functions of skin. Sweat glands.	4
UNIT – V: Digestive system Introduction, structure of alimentary canal, Saliva: Composition, functions, Stomach: Functions. Gastric Juice: composition, functions, Pancreatic Juice: Composition and functions, Liver: Functions, Bile: composition, functions, Gall bladder: functions, Succusentericus: Composition, functions. Functions of large intestine, Movements of small intestines, Deglutition.	4
UNIT – VI: Endocrine system and Nervous system Major endocrine glands- Hormone: Definition, Anterior pituitary: hormones and their functions, disorders – Gigantism, acromegaly, dwarfism, Posterior pituitary: Hormones – diabetes insipidus, Thyroid: Hormones, normal values, functions, role of TSH. Disorders: simple goitre, myxoedema, cretinism, Grave's disease, Adrenal cortex: hormones, functions of cortisol and aldosterone. Addison's disease, Cushing's syndrome, Adrenal medulla: actions of adrenaline and noradrenaline, Endocrine pancreas: Insulin & glucagon, functions, Regulation of blood glucose level, diabetes mellitus, Parathyroid: Functions of PTH. Synapse: Types, Transmission, Sensory receptors: Definition, Classification Organization of spinal cord, Functions of Dorsal column and Spinothalamic tract, Functions of Corticospinal tract, Reflex Action: Definition, reflex arc, Functions of Cerebellum, Basal ganglia, Thalamus, Hypothalamus, Cerebral cortex: Lobes & functions. EEG – Definition and uses, Autonomic nervous system: Organization & functions, Cerebrospinal fluid: Composition and function.	8
UNIT – VII: Special senses and Reproductive system Vision: Physiological anatomy of eye ball, rods & cones, Refractive errors: Myopia, hypermetropia, presbyopia & astigmatism, Audition: Functions of outer, middle & inner ear, cochlea, Deafness – types, Taste: Taste buds, primary taste sensation, Smell: Receptors, modalities of smell Male reproductive system: functions of testes, puberty, spermatogenesis functions of testosterone, semen, Female reproductive system: Ovarian hormones functions – Menstrual cycle, Hormonal basis of changes in menstrual cycle, Family Planning.	10

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Foundation of Anatomy and Physiology	Ross Wilson	Churchill Livingstone.
2	Physiology & Anatomy with Practical Considerations	Ester. M. Grishcimer	J.P. Lippincott. Philadelphia
3	Text Book of Physiology	A. P. Krishna	Suman Publication
4	Text Book of Physiology	A.K. Jain	Avichal Publishing Company;

Program: BMRIT
Semester: I
Subject: Basics of Radiation Physics
Code: BMRIT003

L	T	P	C
2	0	0	2

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Identify the basic concepts of atomic structure, radiation physics, electricity, and magnetism

CO2: Explain the principles of electromagnetic waves and X-ray production.

CO3: Apply electronic components and circuits used in radiological equipment.

CO4: Analyze the factors affecting X-ray output and heat transfer in radiological equipment.

CO5: Differentiate radiation interactions, attenuation, and radiation measurement in medical imaging.

Course Content: Basics of Radiation Physics

Topics and contents	Hours
UNIT – I: Basic concepts	5
Units and measurements-Force, work, power and energy- Temperature and heat-SI units of above parameters. Atomic structure-atom model-Nucleus-electronic configuration-periodic table-Isotopes-Ionizationexcitation- Binding energy-electron volt-Electromagnetic radiation-Quantum nature of radiation-mass energy equivalence-Fluorescence-electromagnetic spectrum. Ancient Indian Concepts of Light (Prakasha) and Optics in Vaisheshika Philosophy (Indian Knowledge System)	
UNIT – II: Electricity, magnetism and electromagnetic waves	6
Electric charges, Coulomb's law-Unit of charge- Electric potential, unit of potential-Electric induction, capacitance and Capacitors, series and parallel connection-electric current, unit, resistance, ohm's law, electric power, Joule's law. Varying currents-Growth and decay of current in LR circuit time constant, charge and discharge of a Capacitor through a resistance and inductance. Oscillations in an LC circuit. Alternating currents: Peak and RMS values and current and voltage, circuit containing LR, CR and LCR-Power factor, series and parallel LCR circuits, DC circuit, Ohm's law, resistivity, series and parallel combination, EMF, Kirchhoff's law, heating effect of current. Introduction, Maxwell's equation, electromagnetic waves, energy density and intensity, momentum, electromagnetic spectrum and radiation in Atmosphere.	
UNIT – III: Electronics	5
Semiconductors; Conduction in crystals, Energy bands. Intrinsic and Extrinsic semiconductors n-type and p-type semiconductors, majority and minority carriers. Semiconductor diodes: p-n junction-properties forward and reverse bias, characteristics of p-n junction Rectifiers-Half-wave and full wave, ripple factor, Efficiency of HW and FW rectifiers. Filter circuits; Zener diode, regulated power supply. Transistors-Symbols, Transistor connections and characteristics, Transistor as an amplifier, load line analysis, operating point, types of amplifiers-voltage and power amplifiers. Feedback-negative feedback in amplifiers.	
UNIT – IV: Discovery of x-rays-X-ray production and properties	5
Bremsstrahlung radiations-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 – V: Concept of Heat	4
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– VI: Interaction of ionizing radiation with matter	5
Types of interactions of X-and	

gamma radiation, Photoelectric & Compton, Pair production, annihilation radiation. Interaction of X and gamma rays: Transmission through matter, law of exponential attenuation, half value layer, and linear attenuation coefficient-coherent scatteringphotonuclear disintegration-Particle interactions. Interactions of X rays and Gamma rays in the body; fat-soft tissue-bone-contrast media-total attenuation coefficient-relative clinical importance.	
UNIT – VII: Exponential attenuation & Physical quantity, its unit and measurement	6
Exponential attenuation (linear/mass attenuation coefficients), Half Value Thickness (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 with X-Rays. Fundamental and derivedquantity, SI unit, various physical/radiation quantity used in Diagnostic Radiology and its unit (for example, KVp, mA, mAS, Heat unit.	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Basic radiological physics	K. Thayalan	Jaypee Brothers Medical Publishers (P) Limited, 2003
2	Christensen's physics of diagnostic radiology	Curry and Dowdey	Wolters Kluwer
3	X-Ray Equipment for Student	D.N. And M.O. Chesney	Blackwell Science Ltd
4	A Textbook Of Radiation Physics For Radiologic Technology	Surendra Maharjan, Suraj Sah	Samiksha Publications
5	A Concise Guide on Basic Radiographic Physics Darkroom Procedures, Radiographic Positioning & Techniques	Lalit Agarwal	JBD Publications

Program: BMRIT

Semester: I

Subject: Basics of Radiation Physics Lab.

Code: BMRIT003 (P)

L	T	P	C
0	0	6	3

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Define the basic concepts, units, and measurements in physics.

CO2: Interpret the principles of electricity, magnetism, and electromagnetic waves.

CO3: Demonstrate the application of basic electronics in healthcare technology.

CO4: Examine X-ray production, properties, and heat transfer in medical imaging.

CO5: Assess radiation interactions, attenuation, and measurement techniques in diagnostic imaging.

Course Content: Basics of Radiation Physics Lab.

Topics and contents	Hours
UNIT – I: Basic concept of general physics related to imaging	15
Physical quantities and measurements, Fundamental and derived units Scalars and vectors, Errors in measurement, Applications in healthcare	
UNIT – II: Electricity	15
Electric charge and current, Voltage and resistance, Ohm's law Series and parallel circuits, Medical applications of electricity	
UNIT– III: Magnetism and Electromagnetic Waves	16
Magnetic field and force Electromagnetic induction Electromagnetic spectrum Medical applications of electromagnetic waves	
UNIT– IV: Basic Electronics	15
Semiconductors Diodes and transistors Rectifiers and amplifiers Electronic components in healthcare devices.	
UNIT– V: X-rays and Their Properties	15
Discovery of X-rays X-ray production X-ray tube basics Properties and applications of X-rays	
UNIT– VI: Heat and Radiation Interaction	16
Heat and temperature Modes of heat transfer Interaction of ionizing radiation with matter Absorption and scattering of radiation	
UNIT– VII: Exponential attenuation	16
Exponential attenuation law & Half-value layer Radiation quantities and units & Radiation detection and measurement Diagnostic Radiology and its unit (for example, KVp, mA, mAS, Heat unit.	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Basic radiological physics	K. Thayalan	Jaypee Brothers Medical Publishers (P) Limited, 2003
2	A Textbook of Radiation Physics for Radiologic Technology	Surendra Maharjan, Suraj Sah	Samiksha Publications

Program: BMRIT
Semester: I
Subject: Introduction to Healthcare
Code: BMRIT004

L	T	P	C
1	0	0	1

Course Outcome:

On completion of the Course, the students will be able to:

- CO 1:** Describe the concepts of health, determinants of health, and national health programs.
CO 2: Demonstrate basic nursing principles, patient care techniques, and interpersonal skills.
CO 3: Examine public health practices, healthcare delivery systems, and basic medical procedures.
CO 4: Assess patient care practices, infection control measures, and first-aid interventions.

Course Content: Introduction to Healthcare

Topics and contents	Hours
UNIT – I: Introduction to Health	4
Definition of Health, Determinants of Health, Health indicators of India, Health team concept. National Health Policy, Ayurvedic Swasthavritta (Preventive Healthcare and Healthy Lifestyle) (Indian Knowledge System)	
UNIT– II: National Health Programs	4
National Health Programs (Brief objectives and scope) Family welfare programs in India	
UNIT – III: Nursing principles and Interpersonal relationship	5
Nursing and Nursing principles, Interpersonal relationships, Bandaging basic turns, Bandaging extremities, Triangular bandages and their applications Nursing position, bed making, prone, lateral, dorsal, dorsal re-cumbent, Fowler's position, comfort measures, Aids, rest and sleep Lifting and transporting patients, Transferring patients to wheel chair, transferring from bed to stretcher	
UNIT – IV: Public health, healthcare delivery, and basic medical terminology	5
Bedside Management: Proper usage of bed pan, Observation of stools, urine, sputum. Understand the use and care of catheters. Enema procedures Method of giving nourishment: Feeding, tube feeding, drips, transfusion Monitoring and recording of vitals Simple aseptic techniques, sterilization and disinfection Observation of surgical dressings Concepts of First Aid	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Principles and Practice of Nursing Management and Administration	Jogindra Vati	Jaypee Brothers Ltd
2	Textbook of Preventive and Social Medicine	K Park	Banarsidas Bhanot Publishers
3	Introduction to Healthcare	Dakota Mitchell and Lee Haroun	Delmar
4	Introduction to Healthcare and Careers	Roxann Delaet	Joanes and Bartlett Learning

Program: BMRIT

Semester: I

Subject: Medical Terminology and Record Keeping

Code: BMRIT005

L	T	P	C
1	0	0	1

Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Define word roots, prefixes, suffixes, and the derivation of medical terms.

CO 2: Construct medical terms using roots, prefixes, suffixes, and combining forms.

CO 3: Interpret common medical abbreviations, symbols, and basic terminology.

CO 4: Differentiate diagnostic, surgical, and procedural terminology related to major body systems.

CO 5: Assess medical records, reports, and electronic health record (EHR) documentation for accurate data management.

Course Content: Medical Terminology and Record Keeping

Topics and contents	Hours
UNIT– I: Medical Terminology Fundamentals	3
Derivation of medical terms. Define word roots, prefixes, and suffixes.	
UNIT – II: Word Formation & Basic Terminology	4
Conventions for combined morphemes and formation of plurals Basic medical terms Form medical terms utilizing roots, suffixes, prefixes, and combining roots	
UNIT – III: Medical Abbreviations & Symbols	3
Interpret basic medical abbreviations/symbols	
UNIT– IV: System-Based Medical Terminology	4
Diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system	
UNIT – V: Medical Documentation & Health Records	4
Interpret medical orders/reports Data entry and management on Electronic Health Record (EHR) systems	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Medical Terminology, Documentation, and Coding	Anne P. Stich	Routledge Publisher
2	Medical Terminology for Health Professions	Ann Ehrlich, Carol L. Schroeder	Cengage Learning
3	Medical Terminology	M. Mastenbjörk M.D. S. Meloni M.D. Medical Creation David Andersson	Medical Creations
4	Medical Records: Organization and Management	GD Mogli (Author)	Jaypee Brothers Medical Publishers

Program: BMRIT

Semester: I

Subject: Basic Computers and Information Science

Code: BMRIT006

L	T	P	C
1	0	0	1

Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Describe the fundamentals of computers, programming languages, and input/output devices.

CO 2: Identify computer hardware components, memory, and storage devices.

CO 3: Demonstrate the use of operating systems, MS Word, and Excel for routine applications.

CO 4: Examine networking concepts and Internet-based communication tools.

CO 5: Assess the applications of computers and clinical informatics in healthcare settings.

Course Content: Basic Computers and Information Science

Topics and contents	Hours
UNIT – I: Computer Fundamentals	4
Introduction to Computer: Introduction, characteristics, block diagram, generations of computers, computer languages. Input and Output Devices: Keyboard, pointing devices, scanners, digitizers, card readers, voice recognition devices, monitors, printers, plotters, projectors, voice response systems.	
UNIT – II: Computer Hardware and Storage	3
Processor and Memory: CPU and main memory. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.	
UNIT – III: Operating Systems and Windows Environment	3
Introduction to Windows: History, features, desktop, taskbar, icons, folders, shortcuts, window operations. Introduction to Operating System: Concepts, functions, and types of operating systems.	
UNIT – IV: Word Processing and Spreadsheet Applications	4
Introduction to MS-Word: Document creation, editing, formatting, tables, mail merge, and printing. Introduction to Excel: Worksheets, data entry, formatting, workbook management, graphs and charts.	
UNIT– V: Networking & Clinical Informatics	4
Introduction to PowerPoint: Creating and formatting presentations, views, slides, graphs. Computer Networks: LAN, MAN, WAN, Internet, Intranet, network topologies, network components. Internet and its Applications: E-mail, FTP, Telnet, WWW, browsers, uses of the Internet. Applications of Computers in Clinical Settings.	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Basic of Computer and Information Technology	Ashok Arora	Vikas
2	Computer and Information Science	Roger Lee (editor)	Springer
3	Computer and Information Sciences	Tadeusz Czachórski , Erol Gelenbe, Krzysztof Grochla, Ricardo Lent (Editor	Springer
4	Information science and computer basics: An introduction	Mitchell, Ruth K	Clive Bingley

Program: BMRIT
Semester: I
Subject: Medical Law and Ethics
Code: BMRIT007

L	T	P	C
1	0	0	1

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Describe the principles, scope, and code of conduct in medical ethics.

CO2: Explain patient rights, informed consent, euthanasia, and organ transplantation.

CO3: Interpret medico-legal records, documentation, and confidentiality requirements in healthcare.

CO4: Examine professional accountability measures, indemnity policies, and ethical protocols in clinical practice.

CO5: Assess ethical and legal issues involved in patient care and healthcare decision-making.

Course Content: Medical Law and Ethics

Topics and contents	Hours
UNIT – I: Medical Ethics Fundamentals	3
Medical Ethics – Definition, Goal, Scope, Introduction to Code of Conduct Basic Principles of Medical Ethics – Confidentiality Malpractice and Negligence – Rational and Irrational Drug Therapy	
UNIT – II: Patient Rights & Clinical Ethics	2
Autonomy and Informed Consent – Rights of Patients, Care of the Terminally Ill – Euthanasia Organ Transplantation	
UNIT– III: Medico-Legal Records & Documentation	4
Medico-Legal Aspects of Medical Records – Medico-Legal Cases and Types, Records and Documents related to MLC, Ownership of Medical Records, Confidentiality, Privileged Communication, Release of Medical Information, Unauthorized Disclosure, Retention of Medical Records and Other Related Aspects	
UNIT – IV: Professional Accountability & Ethics Review	4
Professional Indemnity Insurance Policy Development of Standardized Protocols to Avoid Near Miss or Sentinel Events Obtaining an Informed Consent, Medical Ethics – Definition, Goal, Scope Introduction to Code of Conduct, Basic Principles of Medical Ethics – Confidentiality	
UNIT– V: Advanced Ethical and Legal Issues	5
Malpractice and Negligence – Rational and Irrational Drug Therapy Autonomy and Informed Consent – Rights of Patients Care of the Terminally Ill – Euthanasia Organ Transplantation Medico-Legal Aspects of Medical Records – Medico-Legal Cases and Types, Records and Documents related to MLC, Ownership of Medical Records, Confidentiality, Privileged Communication, Release of Medical Information, Unauthorized Disclosure, Retention of Medical Records and Other Related Aspects Professional Indemnity Insurance Policy Development of Standardized Protocols to Avoid Near Miss or Sentinel Events Obtaining an Informed Consent	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Medical Law and Ethics	Bonnie F. Fremgen	Pearson
2	Medical Law and Ethics	Jonathan Herring	OUP UK
3	Medical Law and Ethics	Purosottam Behera	Mittal Publications

Program: BMRIT
Semester: I
Subject: Professionalism and Values
Code: BMRIT008

L	T	P	C
1	0	0	1

Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Describe professional values, ethical conduct, accountability, and responsibilities in healthcare practice.

CO 2: Assess the role of teamwork and cultural competence in maintaining effective professional relationships.

Course Content: Professionalism and Values

T Topics and contents	Hours
UNIT – I: Professional Ethics and Conduct	9
Professional Values – Integrity, Objectivity, Professional Competence and Due Care, Confidentiality	
Personal Values – Ethical or Moral Values	
Attitude and Behavior – Professional Behavior, Treating People Equally	
Code of Conduct, Professional Accountability and Responsibility, Misconduct, Guru–Shishya Tradition and Professional Values in Healthcare (Indian Knowledge System)	
UNIT – II: Professional Relationships and Cultural Competence	9
Differences Between Professions and Importance of Team Efforts	
Cultural Issues in the Healthcare Environment	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Textbook of Medical Ethics	Erich H Loewy	Springer
2	Professionalism, Professional Values and Ethics in Nursing	Suresh K Sharma, Asha P Shetty	Jaypee Brothers Medical Publishers
3	Essentials of Professionalism, Professional Values & Ethics for BSc Nursing Students	Varinder Kaur	CBS Publishers and Distributors Pvt. Ltd
4	Textbook of Professional Ethics and Human Values	R S Naagarazan	New age International Publishers

Program: BMRIT
Semester: I
Subject: Principal of Management
Code: BMRIT009

L	T	P	C
1	0	0	1

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Explain management, planning, and decision-making principles.

CO2: Assess leadership, teamwork, and innovation for organizational effectiveness.

Course Content: Principal of Management

T Topics and contents	Hours
UNIT – I:	9
Introduction to management Strategic Management Foundations of Planning Planning Tools and Techniques Decision Making, conflict and stress management	
UNIT – II:	9
Managing Change and Innovation Understanding Groups and Teams Leadership Time Management Cost and efficiency	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Essentials of Professionalism, Professional Values & Ethics for BSc Nursing Students	Varinder Kaur	CBS Publishers and Distributors Pvt. Ltd
2	Professionalism Professional Values and Ethics in Nursing	Suresh K Sharma	Jaypee Brothers
3	Professionalism, Professional Values & Ethics	Shama Lohumi and Rakesh Lohumi	CBS publishers and Distributors PVT Ltd

Program: BMRIT
Semester: I
Subject: English & Communication Skills
Code: BMRIT010

L	T	P	C
1	0	0	1

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Describe the basic rules of English grammar and vocabulary for effective communication.

CO2: Explain reading and comprehension techniques to understand written texts.

CO3: Apply writing skills for letters, reports, notices, and official correspondence.

CO4: Analyze spoken communication in formal and informal situations.

CO5: Evaluate information obtained through listening and demonstrate effective listening skills.

Course Content: English & Communication Skills

Topics and contents	Hours
UNIT – I: Grammar and Vocabulary Development	4
Review of basic grammar, Parts of speech, Tenses, number, and gender Vocabulary building, Correct usage of grammar	
UNIT – II: Reading and Comprehension Skills	4
Reading prescribed texts Reading comprehension, Summarizing passages Understanding main ideas and key points, Comprehension exercises	
UNIT – III: Writing Skills and Official Correspondence	3
Letter writing, Note taking and précis writing Diary writing, Report writing on health-related topics Official correspondence, notices, circulars, and summaries	
UNIT – IV: Spoken English and Communication Skills	3
Formal and informal conversation, Telephonic conversation Group discussion and debates, Interviews Public speaking and seminar presentation	
UNIT – V: Listening Skills	4
Definition and types of listening, Purpose and barriers of listening Listening in different contexts, Listening to lectures, speeches, audio and video content Identifying key points from spoken information	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Communicative English for General Nursing Students	Tom Koorkkakala	K.J. Publications
2	How to write and speak Better, Reader's	John Ellison Kahn	Reader's Digest Association
3	Communication Development and Soft Skill	Ashwini Deshpande	Career Publications

SEMESTER – II

Program: BMRIT
Semester: II
Subject: Basics of Microbiology
Code: BMRIT011

L	T	P	C
2	0	0	2

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Describe the morphology, physiology, cultivation, and control of microorganisms.

CO2: Identify sources, transmission, prevention of infections, and biomedical waste management practices.

CO3: Interpret the principles of immunity, antigens, antibodies, and hypersensitivity reactions.

CO4: Differentiate the characteristics of fungi and viruses based on morphology, classification, and reproduction.

CO5: Assess the microbiological basis of infectious diseases and their clinical significance.

Course Content: Basics of Microbiology

Topics and contents	Hours
UNIT – I: Bacteriology and Sterilization	9
Morphology of Bacteria: (Structure, size, shape, arrangement cell wall, flagella, spore, capsule, fimbria) Physiology of Bacteria: (Bacterial growth curve, Temp, O ₂ , CO ₂ , micro and macro nutrient growth requirements) Culture Media Culture Methods Antimicrobial sensitivity tests Sterilization and Disinfections: Definition, Dry heat Sterilization, Moist heat Sterilization, Chemical disinfectants, Gaseous disinfection, Test for disinfection / Sterilization control	
UNIT – II: Infection Control and Biomedical Waste Management	8
Infection: Classification, Sources of infection, Modes of transmission Nosocomial infection including biomedical waste management: Definition, Classification, Significance, Prevention and control Biomedical waste management	
UNIT – III: Basic Immunology	5
Immunology: Immunity, Antigen, Antibody, Hypersensitivity	
UNIT – IV: Mycology and Virology	7
General Properties of fungi. (General characters, classification, Morphology, Reproduction) General Properties of Viruses. (General character, classification based on Genome, Capsid, Envelope & replication and cultivation of virus).	
UNIT – V: Applied Microbiology and Infectious Diseases	7
Applied Microbiology: Pyrexia of unknown origin, Meningitis, Zoonotic infections, Hepatitis, HIV infection and AIDS, Food poisoning, Diarrhea, Urinary tract infections, Pulmonary Tuberculosis	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Text book of Microbiology	Ananthnarayana&Panikar	University Press
2	Text book of Microbiology	Baveja	Arya Publications
3	Text book of Microbiology	Sathish Gupte	JPB

Program: BMRIT
Semester: II
Subject: Basics of Biochemistry
Code: BMRIT012

L	T	P	C
2	0	0	2

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Explain the principles of nutrition, metabolism, and dietary requirements.

CO2: Interpret acid–base balance, electrolyte status, and blood gas parameters.

CO3: Analyze clinical chemistry investigations and laboratory findings for disease assessment.

CO4: Assess the applications of radioisotopes and biochemical markers in clinical diagnosis.

Course Content: Basics of Biochemistry

Topics and contents	Hours
UNIT – I: Nutrition	9
Calorific value Nitrogen Balance Respiratory quotient BMR Nutritional importance of carbohydrate, lipids, proteins, vitamins and minerals Emphasis on parenteral nutrition, Ayurvedic Nutrition (Pathya–Apathya) and Balanced Diet (Indian Knowledge System)	
UNIT – II: Acid–Base Balance, Water & Electrolyte balance	9
Henderson Hassel Bach equation Buffers of the body fluids Ph regulation Disturbance in acid base balance Anion gap Basic principles & estimation of blood gases and ph. Over view of water and electrolyte balance Basic principles in estimation of Electrolyte Normal values and interpretation	
UNIT – III: Clinical chemistry, normal values and interpretation of results	9
Renal function tests, Liver function tests, Tumor markers Cardiac markers, Diagnostic Enzymology, Lipid profile, Blood sugar and GTT Normal & Abnormal urine analysis	
UNIT – IV: Radioisotopes	9
Radioisotopes: Definition, Application & Hazards Normal and abnormal urine analysis Clinical charts on LFT, RFT, and diagnostic enzymology	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Text Book of biochemistry for dental students	Vasudevan, Sreekumari, Kannan Vaidyanathan	Jaypee Brothers
2	Biochemistry for Physiotherapy and allied health sciences students.	Nandini M, Beena V Shetty, Vinitha Ramanath Rai	Jaypee Brothers Medical Publisher (India)
3	Clinical chemistry	Varley	CBS Publishers & Distributors
4	Textbook of biochemistry for paramedical students	P Ramamoorthy	Jaypee Brothers Medical Publishers

Program: BMRIT

Semester: II

Subject: Conventional Radiography and Equipment

Code: BMRIT013

L	T	P	C
4	0	0	4

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Outline the principles of X-ray tubes and X-ray production.

CO2: Explain the operation of X-ray generators and exposure control systems.

CO3: Operate X-ray equipment and exposure timing devices.

CO4: Analyze scatter radiation control and grid performance.

CO5: Develop quality assurance practices for X-ray equipment.

Course Content: Conventional Radiography and Equipment

Topics and contents	Hours
UNIT – I: X-Ray Tube Fundamentals and X-Ray Production	10
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-line focus principle-space charge effect, tube cooling-Modern X-ray tubes-stationary anode, rotating anode, grid controlled Xray tubes, heel effect, off focus radiation, tube insert and housing-Tube rating-Quality and intensity of x-rays-factors influencing them. X-ray tube, gas filled x-ray tube, construction working and Limitations; stationary anode x - ray tube; construction, working, methods of cooling the anode, rating chart and cooling chart.	
UNIT – II: Advanced X-Ray Tubes and Tube Operation	10
Rotating anode x - ray tube: construction, working rating chart, speed of anode rotation, angle of anode inclination, dual focus and practical consideration in choice of focus, anode heel effect, grid controlled x - ray tube; effect of variation of anode voltage and filament temperature; continuous and characteristics spectrum of x - rays, inherent filter and added filter, their effect on quality of the spectrum. 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 and maintenance and Q.A procedures.	
UNIT – III: X-Ray Generator Circuits and Exposure Control	10
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-high frequency generators-falling load generators, Capacitors discharge and grid control systems. X-ray generator circuits: Vacuum tube diodes-semi-conductor diodetransistor-Rectification-half and full wave-self rectification-X-ray generator; filament circuit-kilo Voltage circuit-single phase generator-three phase generatorconstant potential generator-Fuses, switches and interlocks-Exposure switching and timers-HT cables-earthing.	
UNIT – IV: High Tension and Interlocking Circuits	10

High tension circuits: H.T. generator for x-ray machines, three phase rectifier circuits, three phase six rectifier circuit, three phase 12 rectifier circuit, high and medium frequency circuits; capacitance filter control and stabilizing equipment; mains voltage compensator, mains resistance compensator, compensation for frequency variation, control of tube voltage, kV compensator; high tension selector switch, filament circuit, control of tube current, space charge compensation	
Interlocking circuits: Relays: description and working, use of relays in diagnostic machines for over load protection, circuit diagram; simplified circuit and block diagrams illustrating sequence of events from mains supply to controlled emission of x-rays.	
UNIT – V: Meters and Exposure Timing Systems	10
Meters and exposure timers: Moving coil galvanometer: construction and working/conversion to millimeter, ammeter and voltmeter, meters commonly used in diagnostic x-ray machines, pre reading kV meter and millimeter, digital panel meters. Clockwork timers, synchronous motor timer, electronic timers, photo metric timers (fluorescent and photoelectric effect as applied in timers), ion chamber-based timers, integrated timer.	
UNIT – VI: Scatter Radiation Control and Grids	
Control of scattered radiation: Beam limiting devices: cones, diaphragms, light beam collimator, beam centering device, methods to verify beam centering and field alignment; Filters- inherent filters, added filters, heavy metal filters, grids; design and control of scattered radiation, grid ratio, grid cut-off, parallel grid, focused grid, crossed grid, grided cassettes, stationary and moving grid potter bucky diaphragms, various types of grid movements; single stroke movement, oscillatory movement and reciprocity movement.	8
UNIT – VII: Fluoroscopy and Image Intensification	
Fluoroscopy: Fluorescence and phosphorescence - description, fluorescent materials used in fluoroscopic screens, construction of fluoroscopic screen and related accessories, tilting table, dark adaptation. Image intensifier – Construction and working, advantages over fluoroscopic device, principles and methods of visualising intensified image, basic principles of closed circuit television camera and picture tube. Vidicon camera, CCD. Automatic brightness control, automatic exposure control, chamber selection during fluoroscopy. Serial radiography: Manual cassette changer, rapid automatic film changer, basic principles of cine-fluoroscopy and angiography use of grid controlled x-ray tube.	8
UNIT – VIII: Care, Maintenance and Quality Assurance of X-Ray Equipment	
General care; functional tests; testing the performance of exposure timers, assessing the MA settings, testing the available KV, measurement of focal spot of an x-ray tube, testing the light beam diaphragm, practical precautions pertaining to Brakes and locks, H.T. cables, meters and controls, tube stands and tracks as well as accessory equipment.	6

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Radiographic Imaging (Cbs) I.C.R.P.	D.N. Chesney & M.O Chesney	CBS Publishers & Distributors
2	An Introduction Of Physics to Diagnostic Radiography	Christensen, Curry & Dowdey	Lea & Febiger
3	Radiological Science for technologists	Stewart C Bushong	Mosby

Program: BMRIT

Semester: II

Subject: Conventional Radiography and Equipment Lab.

Code: BMRIT013 (P)

L	T	P	C
0	0	2	1

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Recognize the construction and components of X-ray tubes.

CO2 Summarize the principles of X-ray production and tube characteristics.

CO3: Demonstrate the application of generator circuits and exposure control systems.

CO4: Examine the functioning of high-tension circuits, timers, and radiation control methods.

CO5: Appraise fluoroscopy systems and maintenance procedures of X-ray equipment.

Course Content: Conventional Radiography and Equipment

Topics and contents	Hours
UNIT – I: Familiarization with X-ray Tube	5
Identification of X-ray tube components, Demonstration of tube housing and assembly Observation of tube structure and functions	
UNIT – II: Demonstration of X-ray Production	4
Demonstration of X-ray generation process, Observation of factors affecting X-ray production, Study of tube voltage and current effects	
UNIT – III: Study of Specialized X-ray Tubes	5
Demonstration of rotating anode X-ray tube Demonstration of grid-controlled tube, Observation of high-speed tube operation	
UNIT – IV: Demonstration of Tube Cooling and Heat Dissipation	5
Observation of heat generation in X-ray tubes, Demonstration of cooling systems Study of heat dissipation methods	
UNIT – V: Filament and Generator Circuit Demonstration	5
Measurement of filament current and voltage, Identification of generator circuit components Demonstration of generator controls	
UNIT – VI: High-Tension and Safety Circuit Demonstration	4
Demonstration of high-tension circuits, Observation of interlocking systems Demonstration of relays and safety devices	
UNIT – VII: Exposure Control Devices	4
Demonstration of meters Operation of exposure timers Observation of exposure parameter selection	
UNIT – VIII: Radiation Control and Equipment Maintenance	4
Demonstration of beam limiting devices Observation of fluoroscopic equipment Routine care and maintenance procedures of X-ray equipment	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Equipment for Diagnostic Radiography	E. Forster	Springer Dordrecht
2	The Physics Of Radiology And Imaging	K Thayalan	Jaypee

Program: BMRIT

Semester: II

Subject: Clinical Radiography Positioning - I

Code: BMRIT014

L	T	P	C
4	1	0	5

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Outline the principles of radiographic positioning, exposure factors, and radiation protection.

CO2: Perform routine radiographic techniques for the upper and lower limbs.

CO3: Execute radiographic procedures for the shoulder girdle and thorax.

CO4: Examine radiographic projections of the vertebral column and skull.

CO5: Design imaging protocols for the pelvis, hip region, and skeletal surveys.

Course Content: Clinical Radiography Positioning - I

Topics and contents	Hours
UNIT – I: Principles of Radiography Preparation of the Room, Apparatus and Instruments 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 of reducing radiation dose to the patient. Yoga-based Body Postures (Asanas) for Understanding Anatomical Positioning (Indian Knowledge System)	8
UNIT – II: 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	10
UNIT – III: Lower Limb Routine projections for the whole foot, toes, calcaneum, ankle joint, leg, kneejoint, 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.	10
UNIT – IV: 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, Coracoid process.	10
UNIT – V: Vertebral Column Routine projections for Atlanto -Occipital joint, cervical spine, Cervico- thoracic Junction, thoracic Spine, lumbar Spine, Lumbo Sacral Region, Sacrum and Coccyx. Supplementary projections for the intervertebral foramina, posterior arch of Atlas, Flexion and Extension of Cervical Spine, Scoliosis and Kyphosis, Sacro Iliac Joint.	12
UNIT – VI: Skull Routine projections for cranium and facial bones; Supplementary projections for trauma, Towne's method, Sellaturcica, 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.	12
UNIT – VII: Pelvic girdle and hip region Routine projections for the whole pelvis, Sacro-Iliac joints, hip joint and Neck of Femur. Supplementary projections for the greater and lesser trochanters of Femur. Frog leg projection,	10

Ischeum, Symphysis Pubis, Ileum, Acetabulum and Congenital Dislocation of Hip, Arthrodesis. Skeletal survey: Skeletal survey for metabolic bone disease, metastases, hormonal disorder, renal disorders.	
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REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Atlas of Radiographic Positioning and Radiological Procedures	Philip W Ballinger, <u>Eugene D. Frank</u>	Mosby
2	Clarks Positioning In Radiography	Ra Swallow, E Naylor	Lippincott Williams and Wilkins
3	Merrill's Atlas of Radiographic Positioning and Procedures	Bruce W. Long & Jeannean Hall Rollins & Barbara J. Smith	Mosby

Program: BMRIT

Semester: II

Subject: Clinical Radiography Positioning Lab. - I

Code: BMRIT014 (P)

L	T	P	C
0	0	3	3

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Recognize the principles of radiographic positioning and exposure techniques.

CO2: Interpret radiographic procedures for the upper and lower limbs.

CO3: Demonstrate radiographic techniques for the shoulder girdle and thorax.

CO4: Investigate radiographic procedures of the vertebral column and skull.

CO5: Formulate imaging approaches for the pelvic girdle, hip region, and skeletal survey.

Course Content: Clinical Radiography Positioning Lab. – I

Topics and contents	Hours
UNIT– I: Principles of Radiography	15
Demonstration of patient positioning, Use of positioning aids and accessories Selection of exposure factors, Radiation protection practices Identification of radiographic anatomy	
UNIT– II: Upper limb	17
Positioning and radiography of fingers, thumb, and hand, Positioning and radiography of wrist and forearm, Positioning and radiography of elbow and humerus	
UNIT – III: Lower Limb	17
Positioning and radiography of foot and ankle , Positioning and radiography of leg and knee Positioning and radiography of femur	
UNIT– IV: Shoulder Girdle and Thorax	14
Positioning and radiography of clavicle and scapula Positioning and radiography of shoulder joint Positioning and radiography of ribs and thorax	
UNIT – V: Vertebral Column	15
Positioning and radiography of cervical spine, Positioning and radiography of thoracic spine Positioning and radiography of lumbar spine	
UNIT – VI: Skull	15
Positioning and radiography of skull, Positioning and radiography of facial bones Positioning and radiography of paranasal sinuses	
UNIT – VII: Pelvic girdle and hip region	15
Positioning and radiography of pelvis, Positioning and radiography of hip joint Demonstration of skeletal survey procedures Identification of radiographic anatomy in skeletal survey Dislocation of Hip, Arthrodesis.	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Bontrager's Textbook of Radiographic Positioning and Related Anatomy	John Lampignano and Leslie E Kendrick	Elsevier Science
2	Radiology Of Positioning and Applied Anatomy for Students and Practitioners	Garkal G. S.	Jaypee Brothers Medical Publishers