B. Voc. (Medical Imaging Technology)
SEMESTER- V

S. No.	Component	Title of The Paper	Paper Code	Credits	Marks (Theory)		Marks (Practical)		Total
					External Assessment	Internal Assessment	External Assessment	Internal Assessment	
1.	Skill Paper - 1	Nuclear Medicine (Theory)	BVMI511CCT	04	70	30	---	---	100
		Nuclear Medicine (Lab.)	BVMI511CCP	02	---	---	35	15	50
2.	Skill Paper - 2	Advance Imaging (Theory)	BVMI512CCT	04	70	30	---	---	100
		Advance Imaging(Lab.)	BVMI512CCP	02	---	---	35	15	50
3.	Skill Paper - 3	Patient Care in Medical Imaging Department (Theory)	BVMI513CCT	04	70	30	---	---	100
		Patient Care in Medical Imaging Department(Lab.)	BVMI513CCP	02	---	---	35	15	50
4.	Non-Skill Paper - 4	Admin, Medico Legal and Interventional Procedure (Theory)	BVMI514CCT	04	70	30	---	---	100
		Admin, Medico Legal and Interventional Procedure(Lab.)	BVMI514CCP	02	---	---	35	15	50
5.	Non-Skill Paper - 5	Research Methodology and Biostatistics(Theory)	BVMI515CCT	04	70	30	---	---	100
		Research Methodology and Biostatistics(Lab.)	BVMI515CCP	02	---	---	35	15	50
		Total		**30**					**750**

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(Skill Paper - 1) Nuclear Medicine (Theory)

Credits – 04

Unit 1

History of nuclear medicine imaging
Isotopes and radioisotopes
Radioactivity
Radioactive transformation
Radio-pharmaceuticals
Half life
Production of Radiopharmaceutical
Specific activity

Unit 2 –

PET and its basic principle
Radioisotopes use in PET
Historical developmental, Physics and instrumentation in PET, tracer technique,Data acquisition in PET, Quantitative techniques in PET, Radiation Dosimetry and Protection in PET

Unit 3 –

SPECT, basic principle and instrumentation
Radioisotopes used in SPECT
Gamma Camera: Basic principles of gamma camera, collimators - parallel hole,pinhole,convergent and divergent. specifications and other aspects.

Unit 4

Resolution, spatial resolution and temporal resolution
Basic Introduction to co-registered/hybrid imaging
PET-CT, SPECT-CT
PET-MRI

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SEMESTER-V

(Skill Paper - 1) Nuclear Medicine (Lab/Practical)

Credits – 02

Demonstration of Working of Cycloton
Production of Radio-isotopes
Demonstration of Working of Tc-99m generator
Demonstration of working of gamma camerra
PET instrumentation

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SEMESTER-V

(Skill Paper - 2) Advanced Imaging (Theory)

Credits – 04

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1. Central Nervous System: Myelography, Cerebral studies, Ventriculography

2. Arthrography: Shoulder, Hip, Knee, Elbow

3. Angiography: Carotid Angiography (4 Vessel angiography), Thoracic and Arch Aortography, Selective studies: Renal, SMA, Coeliac axis, Vertebral angiography Femoral arteriography, Angiocardiography

4. Venography: Peripheral venography, Cerebral venography, Inferior and superior venocavography, Relevant visceral phlebography

5. Cardiac catheterization procedures: PTCA, BMV, CAG, Pacemaker, Electrophyiology

6. Gynaecology: Hysterosalpingography

7. Biliary system: Plain film radiography, Intravenous cholangiography, percutaneous cholangiography, Endoscopic retrograde cholangio - pancreatography. (ERCP), Operative cholangiography, Post-Operative cholangiograph (T-tube Cholangiography)

8. Gastrointestinal tract: Barium meal, Barium swallow, Small bowel enema, Barium enema.

9. Renal tract: Intravenous urography, retrograqe pyelography, micturating cystourethrography

10. Other : Sialography.

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SEMESTER-V

(Skill Paper - 2) Advanced Imaging (Lab/Practical)

Credits – 02

Demonstration of CNS studies on CT & MRI
Preparation of Barium sulphate solution
Demonstration of different types of catheters
Patient preparation for Cholangiography

B. Voc. (Medical Imaging Technology)

SEMESTER-V

(Skill Paper - 3) Patient Care in Medical Imaging Department (Theory)

Credits – 04

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1. Hospital procedure: Hospital staffing and organization; records relating to patients and departmental statistics; professional attitude of the technologist to patients and other members of the staff; medico- legal aspects; accidents in the departments, appointments, organization; minimizing waiting time; out-patient and follow-up clinics; stock-taking and stock keeping.

2. Care of the patient : FIRST contact with patients in the department; management of chair and stretcher patients and aids for this, management of the unconscious patient; elementary hygiene; personal cleanliness; hygiene in relation to patients (for example clean linen and receptacles , nursing care; temperature pulse and respiration; essential care of the patient who has a tracheostomy; essential care of the patient who has a colostomy; bedpans and urinals; simple application of a sterile dressing.

3. First aid: Aims and objectives of first aid; wounds and bleeding, dressing and bandages; pressure and splints, supports etc. Shock; insensibility; asphyxia; convulsions; resuscitation, use of suction apparatus, drug reactions; prophylactic measures; administration of oxygen; electric shock; burns; scalds; hemorrhage; pressure points; compression band. Fractures; splints, bandaging; dressing, foreign bodies; poisons.

4. Infection: Bacteria, their nature and appearance; spread of infections; auto-infection or cross-infection; the inflammatory process; local tissue reaction, general body reaction; ulceration; asepsis and antisepsis. Universal precautions, hospital acquired infections HIV, Hepatitis B, C, and MRSA etc.

5. Principles of asepsis: Sterilization - methods of sterilization; use of central sterile supply department; care of identification of instruments, surgical dressings in common use, including filamented swabs, elementary operating theatre procedure; setting of trays and trolleys in the radio imaging department (for study by radio imaging students only)

6. Departmental procedures: Department staffing and organizations; records relating to patients and departmental statistics; professional attitudes of the technologist to patients and other members of the staff, medico-legal aspects accidents in the department; appointments; organizations; minimizing waiting time; out-patient and follow-up clinics; stock taking and stock keeping.

7. Drugs in the department: Storage: classification; labeling and checking, regulations regarding dangerous and other drugs; units of measurement, special drugs, anti depressive, anti-hypertensive etc.

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SEMESTER-V

(Skill Paper - 3) Patient Care in Medical Imaging Department (Lab/Practical)

Credits – 02

FIRST AID :-

a) different types of dressing and bandages;
b) Management of Shock; insensibility; asphyxia;
c) Management of convulsions; resuscitation,
d) use of suction apparatus,
e) Management of drug reactions
f) Management of electric shock; burns; scalds; hemorrhage; pressure points; compression band.
g) Fractures; splints, bandaging; dressing, foreign bodies; poisons.
h) setting of trays and trolleys

B. Voc. (Medical Imaging Technology)

SEMESTER-V

(Skill Paper - 4) Admin, Medico Legal and Interventional Procedure (Theory)

Credits – 04

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1. **Principals of Management:** Introduction to management, Strategic Management, Foundations of Planning, Planning Tools and Techniques, Decision Making, conflict and stress management, Managing Change and Innovation, Understanding Groups and Teams, Leadership, Time Management, Cost and efficiency.

2. **Medical law and ethics:** Medical ethics; Definition, Goal, Scope; Introduction to Code of conduct; Basic principles of medical ethics – Confidentiality; Malpractice and negligence; Autonomy and informed consent - Right of patients; Care of the terminally ill-Euthanasia ; Organ transplantation; 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 - Unauthorized disclosure - 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

3. **Quality and patient safety:** Quality assurance; Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norms, Quality Improvement Tools, Introduction to NABH guidelines; AERB specifications, radiation safety (lead glass equivalence, lead lined doors), room size, type approval, registrations & licenses, selection of exposure parameter for various protocols, diagnostic reference levels.

4. **Basics of emergency care and life support skills:** Basic life support (BLS), sudden Cardiac Arrest (SCA), cardiopulmonary resuscitation (CPR), Automated External Defibrillator (AED).

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SEMESTER-V

(Skill Paper - 4) Admin, Medico Legal and Interventional Procedure (Lab/Practical)

Credits – 02

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1. Quality assurance and radiation safety survey in diagnostic X-ray installation
2. Community orientation and clinical visit
3. Clinical visit to their respective professional department with in the hospitals

B. Voc. (Medical Laboratory Technology)

SEMESTER-V

(Non - Skill Paper - 5) Research Methodology and Biostatistics (Theory)

Credits – 04

Unit	**Teaching Guidelines**	**Hours (65)**
1.Introducti on research methodology	Introduction to research methods,	10
	Variable in research	
	Reliability and validity in research	
	Conducting a literature review	
	Formulation of research problems and writing research questions	
	Hypothesis, Null and research Hypothesis, Type I and type	
	II errors in Hypothesis testing	
2.Data collection	Experimental and non experimental research designs,	5
	Sampling methods, data collection, observation method,	
	Interview method, questionnaires and schedules construction	
3.Research Frame work	Ethical issues in research Principles and concepts in research ethics-confidentiality and privacy informed consent Writing research proposals Development of conceptual framework in research	5
4.Introduction to statistics	Introduction to statistics	5
	Classification of data, source of data,	
	Method of scaling- nominal, ordinal, ratio and interval scale	
	Measuring reliability and validity of scales	
5.Data sampling	Measures of central tendency,	10
	Measures of dispersion, skewness and kurtosis, sampling, sample size determination.	
	Concept of probability and probality distributions- binomial probability distribution, poison probability distribution and normal probability distribution	
6.Data correlation	Correlation-Karl person, spearman's rank correlation methodsregression analysis, testing hypothesis-chi square test, student's test, NOVA	5

B. Voc. (Medical Laboratory Technology)

SEMESTER-V

(Non - Skill Paper - 5) Research Methodology and Biostatistics (Lab/Practical)

Credits – 02

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1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Basic Concepts of Bio statistics
6. Types of Data
7. Research tools and Data collection methods
8. Sampling methods
9. Developing a research proposal