Program Curriculum

School of Allied Health Sciences

Bachelor of Radiological Imaging Techniques (Radiology/CT/MRI)

Program CODE SAH0107

Batch 2020-2023

1. Standard Structure of the Program at University Level

1.1 Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. **Transformative educational experience**
2. **Enrichment by educational initiatives that encourage global outlook**
3. **Develop research, support disruptive innovations and accelerate entrepreneurship**
4. **Seeking beyond boundaries**

Core Values

- **Integrity**
- **Leadership**
- **Diversity**
- **Community**

1.2 Vision and Mission of the School

Vision of the School

To steer the School of Allied Health Sciences towards excellence in academics, innovation and entrepreneurship by constant endeavors

Mission of the School

1. To create the state of the art facility for quality teaching learning, research & innovation
2. To incorporate the contemporary standards in teaching & learning
3. To inculcate in the students values of integrity and compassion towards the care of patients and society.

Core Values

- **Skilled professional**
- **Multidimensional**
- **Compassion**
- **Management**

1.3 Programme Educational Objectives (PEO)

1.3.1 Writing Programme Educational Objectives (PEO)

PEO1: **Disciplinary knowledge and its appropriate application**:

This subject will facilitate students to gain relevant disciplinary understanding of the nature, practice and application of Medical Imaging Technology through lectures, Hans on training on imaging machines, computer practical, workshops and presentations. The material will be assessed in the test and the examination

PEO2 : **Professional skills and their appropriate application**

Provide Time management, personal organization and teamwork skills, and communication skills will be developed through the presentation projects.

PEO3 : **Engagement with the needs of society**

The subject will enhance the capacity of the students to respond to the needs and grapple with ethical concerns that accompany the practice of Medical Imaging (e.g. the balance between diagnostic accuracy and radiation dose to the patient, the staff and population as a whole).

PEO4 : **Clinical Care**

Using a patient/family-centered approach and best evidence, each student will organize and implement the prescribed preventive, investigative and management plans; and will offer appropriate follow-up services.

PEO5 : **Lifelong learning**

The student should be committed to continuous improvement in skills and knowledge while harnessing modern tools and technology. Program objectives will aim at making the students being able to: Perform objective self-assessments of their knowledge and skills; learn and refine existing skills; and acquire new skills

PEO6: **Social Accountability and Responsibility**

The students will recognize that allied and healthcare professionals need to be advocates within the health care system, to judiciously manage resources and to acknowledge their social accountability. They have a mandate to serve the community, region and the nation and will hence direct all research and service activities towards addressing their priority health concerns.

1.3.2 Map PEOs with Mission Statements:

PEO Statements	School Mission 1	School Mission 2
PEO1:	**3**	**3**
PEO2:	**3**	**2**
PEO3:	**2**	**3**
PEO4:	**3**	**3**
PEO5:	**3**	**2**
PEO6:	**3**	**3**

Enter correlation levels 1, 2, or 3 as defined below:

1. **Slight (Low)** **2. Moderate (Medium)** **3. Substantial (High)**

1.3.3 Program Outcomes (PO's)

PO1 : Apply the knowledge of clinical, diagnostic and Medical physics, Imaging technology, clinical sciences, as well as an understanding of health care delivery diagnostic imaging system.

PO2 : Find, analyze, evaluate and apply the information systematically and shall make a appropriate diagnosis to provide quality of image along with patient care.

PO3 : Demonstrate effective planning abilities including the prevention, detection, radiation protection, diagnosis, and management of patient without compromising image quality.

PO4 : Apply ethical principles like radiation protection and commit to professional ethics and responsibilities and norms of the Imaging techniques practice.

PO5 : Conduct and present research and clinical studies which will contribute to the advancement of Imaging techniques, quality, diagnosis and health sciences.

PO6 : Explain theory of technology, instrumentation and physics in Medical Imaging using discipline specific terminology.

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
PO1	3	2	1	3	3	3
PO2	3	3	3	3	2	2
PO3	2	1	2	3	2	2
PO4	2	2	3	2	3	3
PO5	2	3	3	2	3	2
PO6	3	3	2	1	3	2

1. Slight (Low) ***2. Moderate (Medium)*** ***3. Substantial (High)***

1.3.5 Program Outcome Vs Courses Mapping Table[1]:

Program Outcome Courses	Course Name	PO1	PO2	PO3	PO4	PO5	PO6
Sem-1							
BIT104.1	Human Anatomy as Applied to Radiology & Imaging –I	3	3	3	2	3	2
BIT105.2	Human Physiology –I	3	3	2	3	3	3
BIT106.3	Basics & Radiation Physics -I	3	3	3	3	3	2
BIT107.4	English –I	3	2	2	3	2	3
BIT160.5	Human Anatomy as Applied to Radiology & Imaging –I (P)	3	3	3	2	3	2
BIT161.6	Human Physiology –I (P)	3	3	2	3	3	3
BIT156.7	Basic & Radiation Physics –I (P)	3	3	3	3	3	2
BIT162.8	English-I	3	2	2	3	2	2
Sem-2							
BIT 109.1	Human Anatomy as Applied to Radiology & Imaging –II	3	3	3	2	3	2
BIT 110.2	Human Physiology –II	3	3	2	3	3	3
BIT 111.3	Basic & Radiation Physics -II	3	3	3	3	3	2
BIT 112.4	English –II	3	2	2	3	2	3
BIT 159.5	Human Anatomy as Applied to Radiology & Imaging –II (P)	3	3	3	2	3	2
BIT 150.6	Human Physiology –II (P)	3	3	2	3	3	3
BIT 151.7	Basic & Radiation Physics –II (P)	3	3	3	3	3	2
BIT 152.8	English –II (P)	3	2	2	3	2	2
Sem-3							
BIT-205.1	Dark Room Procedure I	3	3	3	3	2	3
BIT-206.2	Patient Care in Hospital and Radiology -I	3	2	3	3	3	2
BIT-207.3	Apparatus for Radiography & Imaging - I	3	3	3	3	3	2
BIT-208.4	Radiography of upper & lower extremities -I	2	3	3	2	3	2
BIT-255.5	Dark Room Procedure I (Lab)	3	3	3	3	2	3
BIT 001.6	Clinical Postings- I (Lab)	3	3	3	3	3	3
Sem-4							
BIT-209.1	Dark Room Procedure II	3	3	3	3	2	3
BIT-210.2	Patient Care in Hospital and Radiology -II	3	2	3	3	3	2
BIT-211.3	Apparatus for Radiography & Imaging - II	3	3	3	3	3	2
BIT-212.4	Radiography of upper & lower extremities -II	2	3	3	2	3	2
BIT-256.5	Dark Room Procedure II	3	3	3	3	2	3
BIT 004.6	Clinical Postings- II	3	3	3	3	3	3
Sem-5							

[1] Cel value will contain the correlation value of respective course with PO.

BIT-306	Radiographic Technique of Bone & Joints-I	3	3	3	3	3	2
BIT-307	Special Radiographic Techniques-I	3	3	3	3	3	2
BIT-308	Recent Advances in Imaging & Contrast Media-I	3	2	3	3	3	3
BIT-309	Radiation Hazards, Protection & Planning of the Department-I	3	3	3	2	3	2
BIT-310	Radiographic Technique of Bone & Joints-I	3	3	2	3	3	3
BIT-005	Clinical Postings- I	3	3	3	3	3	3
Sem-6							
BIT-311	Radiographic Technique of Bone & Joints-II	3	3	3	3	3	2
BIT-312	Special Radiographic Techniques-II	3	3	3	3	3	2
BIT-313	Recent Advances in Imaging & Contrast Media-II	3	2	3	3	3	3
BIT-314	Radiation Hazards, Protection & Planning of the Department-II	3	3	3	2	3	2
BIT-315	Radiographic Technique of Bone & Joints-II	3	3	2	3	3	3
BIT-006	Clinical Postings- II	3	3	3	3	3	3

1. Slight (Low) ***2. Moderate (Medium)*** ***3. Substantial (High)***

Credit Scheme
Allied Health Sciences
Bachelor of Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2020-2023
TERM: I

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[2]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1.	35011	BIT 104	Human Anatomy as Applied to Radiology & Imaging –I	3	1		4	Core	CC
2.	35012	BIT 105	Human Physiology –I	3	1		4	Core	CC
3.	35013	BIT 106	Basic & Radiation Physics -I	3	1		4	Core	CC
4.	35133	BIT 113	English –I	2	1		3		AECC
Practical/Viva-Voce/Jury									
5.	35134	BIT 160	Human Anatomy as Applied to Radiology & Imaging -I	-	-	4	2	Core	CC, SEC, AECC
6.	35135	BIT 161	Human Physiology -I	-	-	4	2	Core	CC, SEC, AECC
7.	35018	BIT 156	Basic & Radiation Physics –I (only viva)	-	-	4	2	Core	CC, SEC, AECC
8.	35136	BIT 162	English –I (Lab)	-	-	4	2		SEC,AECC

[2] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

TOTAL CREDITS				23	

Credit Scheme
Allied Health Sciences
Bachelor of Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2020-2023
TERM: II

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[3]: 5. CC 6. AECC 7. SEC 8. DSE
				L	T	P			
THEORY SUBJECTS									
9.	35057	BIT 109	Human Anatomy as Applied to Radiology & Imaging -II	3	1		4	Core	CC
10.	35058	BIT 110	Human Physiology -II	3	1		4	Core	CC
11.	35059	BIT 111	Basic & Radiation Physics -II	3	1		4	Core	CC
12.		BIT 112	English -II	2	1		3		AECC
Practical/Viva-Voce/Jury									
13.	35060	BIT 159	Human Anatomy as Applied to Radiology & Imaging -II	-	-	4	2	Core	CC, **AECC**
14.	35061	BIT 150	Human Physiology -II	-	-	4	2	Core	CC, **AECC**
15.	35062	BIT 151	Basic & Radiation Physics -II	-	-	4	2	Core	CC, **AECC**
16.		BIT 152	English –II (Lab)	-	-	4	2		AECC, **AECC**

[3] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

TOTAL CREDITS	23		

Credit Scheme
Allied Health Sciences
Bachelor of Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2020-2023
TERM: III

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[4]: 9. CC 10. AECC 11. SEC 12. DSE
				L	T	P			
THEORY SUBJECTS									
17.	35112	BIT-205	Dark Room Procedure I Patient Care in Hospital and Radiology -I	4	1		5	Core	CC
18.	35113	BIT-206		2	1	-	3	Core	CC
19.	35114	BIT-207	Apparatus for Radiography & Imaging - I	4	2	-	6	Core	CC
20.	35115	BIT-208	Radiography of upper & lower extremities -I	4	2	-	6	Core	CC
Practical/Viva-Voce/Jury									
21.		BIT-255	Dark Room Procedure I	-	-	2	1	Core	CC, AECC
22.		BIT-001	Clinical Postings- I	-	-	4	2	Core	CEC, AECC
TOTAL CREDITS							**23**		

[4] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Credit Scheme
Allied Health Sciences
Bachelor of Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2020-2023
TERM: IV

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[5]: 13. CC 14. AECC 15. SEC 16. DSE
				L	T	P			
THEORY SUBJECTS									
23.	35189	BIT-209	Dark Room Procedure II	4	1		5	Core	CC
24.	35190	BIT-210	Patient Care in Hospital and Radiology -II	2	1	-	3	Core	CC
25.	35191	BIT-211	Apparatus for Radiography & Imaging - II	4	2	-	6	Core	CC
26.	35192	BIT-212	Radiography of upper & lower extremities -II	4	2	-	6		CC
Practical/Viva-Voce/Jury									
27.		BIT-256	Dark Room Procedure II	-	-	2	1	Core	CC, **AECC**
28.		BIT 004	Clinical Postings- II	-	-	4	2	Core	SEC, **AECC**
TOTAL CREDITS							**23**		

[5] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Credit Scheme
Allied Health Sciences
Bachelor of Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2020-2023
TERM: V

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[6]: 17. CC 18. AECC 19. SEC 20. DSE
				L	T	P			
THEORY SUBJECTS									
29.	35227	BIT-306	Radiographic Technique of Bone & Joints -I	2	1	-	3	Core	CC
30.	35228	BIT-307	Special Radiographic Techniques -I	3	3	-	6	Core	CC
31.	35229	BIT-308	Recent Advances in Imaging & Contrast Media- I	5	1	-	6	Core	CC
32.	35230	BIT-309	Radiation Hazards, Protection & Planning of the Department- I	3	1	-	4	Core	CC
Practical/Viva-Voce/Jury									
33.		BIT-310	Radiographic Technique of Bone & Joints -I	-	-	6	3	Core	CC, **AECC**
34.		BIT-005	Clinical Postings- I	-	-	6	3	Core	CC, **AECC**

[6] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

TOTAL CREDITS	25		

Credit Scheme
Allied Health Sciences
Bachelor of Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2020-2023

TERM: VI

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[7]: 21. CC 22. AECC 23. SEC 24. DSE
				L	T	P			
THEORY SUBJECTS									
35.	35350	BIT-311	Radiographic Technique of Bone & Joints –II	2	1	-	3	Core	CC
36.	35351	BIT-312	Special Radiographic Techniques –II	3	3	-	6	Core	CC
37.	35352	BIT-313	Recent Advances in Imaging & Contrast Media- II	5	1	-	6	Core	CC
38.	35353	BIT-314	Radiation Hazards, Protection & Planning of the Department- II	3	1	-	4	Core	CC
Practical/Viva-Voce/Jury									
39.		BIT-315	Radiographic Technique of Bone & Joints –II	-	-	6	3	Core	CC, **AECC**
40.		BIT-006	Clinical Postings- II	-	-	6	3	Core	SEC, **AECC**

[7] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

TOTAL CREDITS							**25**		

SHARDA UNIVERSITY, GREATER NOIDA
SCHOOL OF ALLIED HEALTH SCIENCES
EVALUATION SCHEME (BATCH- 2020-2023)

Program: -B.Sc. (Radiological Imaging Techniques (Radiology/CT/MRI)

SEMESTER:-First Semester **Session: -2020-21**

S.No	Paper ID	Course Code	Course/Subject Name	CA	MTE	ETE	TOTAL MARKS
1	35011	BIT 104	Human Anatomy as Applied to Radiology & Imaging -I	30	20	50	100
2	35012	BIT 105	Human Physiology -I	30	20	50	100
3	35013	BIT 106	Basics & Radiation Physics -I	30	20	50	100
4	35133	BIT 113	English -I	50	-	-	
			PRACTICALS				
1	35057	BIT 160	Human Anatomy as Applied to Radiology & Imaging –I (LAB)	60	-	40	100
2	35058	BIT 161	Human Physiology –I (LAB)	60	-	40	100
3	35059	BIT 156	Basic & Radiation Physics –I (LAB)	60	-	40	100
4		BIT 162	English-I (LAB)	50	-	-	
			TOTAL				**600**

Paper ID and Subject Code (For new Subject) will be allotted by the Controller of Examination Sharda University.

SHARDA UNIVERSITY, GREATER NOIDA
SCHOOL OF ALLIED HEALTH SCIENCES
EVALUATION SCHEME (BATCH- 2020-2023)
Program: -B.Sc. (Radiological Imaging Techniques (Radiology/CT/MRI)

SEMESTER:-Second Semester

S.No	Paper ID	Subject Code	Subject Name	CA	MTE	ETE	TOTAL MARKS
1	35057	BIT 109	Human Anatomy as Applied to Radiology & Imaging -II	30	20	50	100
2	35058	BIT 110	Human Physiology -II	30	20	50	100
3	35059	BIT 111	Basic & Radiation Physics -II	30	20	50	100
4		BIT 112	English -II	50	-	-	-
PRACTICALS							
1	35060	BIT 159	Human Anatomy as Applied to Radiology & Imaging -II	60	-	40	100
2	35061	BIT 150	Human Physiology -II	60	-	40	100
3	35062	BIT 151	Basic & Radiation Physics -II	60	-	40	100
4		BIT 152	English –II (Lab)	-	-	-	-
			TOTAL				**600**

SHARDA UNIVERSITY,
SCHOOL OF ALLIED HEALTH SCIENCES
EVALUATION SCHEME (BATCH- 2020-2023)
Program: -B.Sc. (Radiological Imaging Techniques (Radiology/CT/MRI)

SEMESTER: THIRD

S.No	Paper ID	Course Code	Course/Subject Name	EVALUATION SCHEME (Distribution of Marks)			
				CA	MTE	ETE	TOTAL MARKS
THEORY SUBJECTS							
1	35112	BIT-205	Dark Room Procedure I	30	20	50	100
2	35113	BIT-206	Patient Care in Hospital and Radiology -I	30	20	50	100
3	35114	BIT-207	Apparatus for Radiography & Imaging - I	30	20	50	100
4	35115	BIT-208	Radiography of upper & lower extremities -I	30	20	50	100
PRACTICAL SUBJECTS							
1		BIT-255	Dark Room Procedure I	60	-	40	100
						TOTAL	**500**

Paper ID and Subject Code (For new Subject) will be allotted by the Controller of Examination Sharda University.

SHARDA UNIVERSITY,
SCHOOL OF ALLIED HEALTH SCIENCES
EVALUATION SCHEME (BATCH- 2020-2023)
Program: -B.Sc. (Radiological Imaging Techniques (Radiology/CT/MRI)

SEMESTER: THIRD

S.No	Paper ID	Subject Code	Subject Name	EVALUATION SCHEME (Distribution of Marks)			
				CA	MTE	ETE	TOTAL MARKS
THEORY SUBJECTS							
1	35189	**BIT-209**	Dark Room Procedure II	30	20	50	100
2	35190	**BIT-210**	Patient Care in Hospital and Radiology -II	30	20	50	100
3	35191	**BIT-211**	Apparatus for Radiography & Imaging - II	30	20	50	100
4	35192	**BIT-212**	Radiography of upper & lower extremities - II	30	20	50	100
PRACTICAL SUBJECTS							
1		**BIT-256**	Dark Room Procedure II	60	-	40	100
						TOTAL	**500**

SHARDA UNIVERSITY, GREATER NOIDA
SCHOOL OF ALLIED HEALTH SCIENCES
EVALUATION SCHEME (BATCH- 2020-2023)

Program: -B.Sc. (Radiological Imaging Techniques (Radiology/CT/MRI)

SEMESTER:FIFTH SEMSTER **Session: -2020-21**

S.No	Paper ID	Subject Code	Subject Name	EVALUATION SCHEME (Distribution of Marks)			
				CA	MTE	ETE	TOTAL MARKS
THEORY SUBJECTS							
1	35227	BIT-306	Radiographic Technique of Bone & Joints -I	30	20	50	100
2	35228	BIT-307	Special Radiographic Techniques -I	30	20	50	100
3	35229	BIT-308	Recent Advances in Imaging & Contrast Media - I	30	20	50	100
4	35230	BIT-309	Radiation Hazards, Protection & Planning of the Department- I	30	20	50	100
PRACTICAL SUBJECTS							
1		BIT-310	Radiographic Technique of Bone & Joints -I	60	-	40	100
						Total	**500**

Paper ID and Subject Code (For new Subject) will be allotted by the Controller of Examination Sharda University.

SHARDA UNIVERSITY, GREATER NOIDA
SCHOOL OF ALLIED HEALTH SCIENCES
EVALUATION SCHEME (BATCH- 2020-2023)

Program: -B.Sc. (Radiological Imaging Techniques (Radiology/CT/MRI)

SEMESTER:SIXTH SEMSTER

S.No	Paper ID	Subject Code	Subject Name	EVALUATION SCHEME (Distribution of Marks)			
				CA	MTE	ETE	TOTAL MARKS
THEORY SUBJECTS							
1	35350	BIT-311	Radiographic Technique of Bone & Joints -I	30	20	50	100
2	35351	BIT-312	Special Radiographic Techniques -I	30	20	50	100
3	35352	BIT-313	Recent Advances in Imaging & Contrast Media - I	30	20	50	100
4	35353	BIT-314	Radiation Hazards, Protection & Planning of the Department- I	30	20	50	100
PRACTICAL SUBJECTS							
1		BIT-315	Radiographic Technique of Bone & Joints -I	60	-	40	100
						Total	**500**

Paper ID and Subject Code (For new Subject) will be allotted by the Controller of Examination Sharda University.

C. Course Templates

SYLLABUS OF BRIT

School: SAHS		**Batch : 2020-23**	
Program: BMIT		**Current Academic Year: 2020-2021**	
Branch: All		**SEMESTER: FIRST**	
1	Course Code	BIT-104	
2	Course Title	**Human Anatomy as Applied to Radiology & Imaging - I**	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1	
	Course Status	**Compulsory**	
5	Course Objective	1**:** Defining, listing and understanding basic anatomy of Human Body in reference to bone,joints, and blood . 2. Understanding, characterizing & explaining the anatomical details of the systems of human body with special emphasis on skelton system , CVS , Respiratory & digestive system . 3. Performing, demonstrating & implementing the concept of anatomy principles in the practice of imaging and radiation technology.	
6	Course Outcomes	**CO1**: Demonstrate the general and anatomical aspects to make the fundamental concepts of anatomy. **CO2**: Describe the composition , functions and applied related to bones and skelton system in human body . **CO3**: Demonstrate an understanding of Cardio Vascular System, its structure , functioning and related applied aspects . **CO4:** Discuss the basic principles of structure, functions and applied of respiratory system . **CO5** Discuss the structure , functions and applied of Gastro Intestinal Tract in human body	
8	Outline syllabus		CO Mapping
	UNIT 1	**Anatomical introduction**	
	A	Introduction - human body as a whole, Definitions and terms of anatomy	CO1,CO2
	B	Positions and planes	CO1,CO2
	C	Types of muscle and difference between them	CO1,CO2
	UNIT 2	**Bones and joints**	CO1,CO2
	A	Classification of bones according to shape, development, regional, structural (macroscopically – compact bone and spongy bone) Parts of young and adult long bone	CO2
	B	**CARTILAGE** 1.Different types of cartilage (hyaline, fibro and elastic cartilage)	CO2

		(C)JOINTS **1.Classification of joints** Fibrous joints with example, cartilaginous joints with example Synovial joint – types with example, diagram of typical synovial joint and its characteristic features	
	C	Lymphatic system Glands – difference between endocrine and exocrine glands	CO2
	UNIT 3	**Circulatory system**	**CO3**
	A	Heart - structure and function Blood supply of heart	CO3,.CO1
	B	Systemic and pulmonary circulation	CO1,CO3
	C	Difference between artery and vein	CO3
	UNIT 4	**Respiratory system**	CO1,CO4
	A	Parts of respiratory system – (nose, nasal cavity, pharynx, larynx, trachea, lung, alveoli)	CO4
	B	Bronchopulmonary segments	CO4
	C	Lung and pleura Names of paranasal air sinuses	CO4
	UNIT 5	**GIT**	CO1,CO5
	A	Parts of GIT- gross anatomy and functions (oesophagus, stomach, small intestine and large intestine and liver)	CO5
	B	Difference between small and large intestine Functions of liver and gall bladder	CO5
	C	Oral cavity Names of main salivary glands	CO5
	Mode of examination	Theory/Practical/Viva	
	Weightage Distribution	CA: 30% / MTE: 20 % / ETA: 50%	
	Text book/s*	1.Textbook Of Anatomy & Physiology For Nurses	
	Other References	General anatomy B D Chaursia	

POs Cos	PO1	PO2	PO3	PO4	PO5
CO105.1	2	1	2	2	3
CO105.2	2	2	1	2	2
CO105.3	3	2	3	2	3
CO105.4	2	3	2	2	2
CO105.5	1	3	3	2	3

1. Slight (Low) ***2. Moderate (Medium)*** ***3. Substantial (High)***

BIT 104:Human Anatomy as Applied to Radiology & Imaging - I

Course outcome: The completion of this course will help in –
defining, listing and recognizing the anatomical structure of the human body.
Comprehension: understanding, characterizing, explaining, identifying and locating the anatomical structure of the human body.
Application: performing, demonstrating, implementing and applying the concept of general anatomy in better understanding the relevance Radiographic Anatomy.
Analysis: analyzing, categorizing, comparing and differentiating the anatomical structure of the human body and applying on imaging technology as radiographic anatomy

UNIT – I Introduction ***- human body as a whole***

(A) Definitions and terms of anatomy
(B) Positions and planes
(C) Types of muscle and difference between them

UNIT – II: Bones and joints
(A).Classification of bones according to shape, development, regional, structural (macroscopically – compact bone and spongy bone)
2.Parts of young and adult long bone

(B)CARTILAGE
1.Different types of cartilage (hyaline, fibro and elastic cartilage)

(C)JOINTS
1. Classification of joints
a) Fibrous joints with example, cartilaginous joints with example
b) Synovial joint – types with example, diagram of typical synovial joint and its characteristic features

(D) Lymphatic system

(E) Glands – difference between endocrine and exocrine glands

UNIT – III :Circulatory system

a) Heart - structure and function
b) Blood supply of heart
c) Systemic and pulmonary circulation
d) Difference between artery and vein

UNIT – IV

Respiratory system

a)Parts of respiratory system – (nose, nasal cavity, pharynx, larynx, trachea, lung, alveoli)
b)Bronchopulmonary segments
c) Lung and pleura
d) Names of paranasal air sinuses

UNIT – V

GIT

a)Parts of GIT- gross anatomy and functions (esophagus, stomach, small intestine and large intestine and liver)
b) Difference between small and large intestine
c)Functions of liver and gall bladder
d)Oral cavity
e) Names of main salivary glands

ANATOMY PRACTICALS:

Demonstration of all bones
Demonstration of heart and vessels in the body
Demonstration of parts of respiratory system
Demonstration of abdominal viscera
Radiographs of normal bones

1	Course Code	BIT-105	
2	Course Title	**Human Physiology –I**	
3	Credits	5	
.	Contact Hours (L-T-P)	3-1-1	
	Course Status	**Compulsory**	
5	Course Objective	1**:** Defining, listing and understanding basic Physiology of Human Body in reference to Nerve & Muscle, and blood . 2. Understanding, characterizing & explaining the physiological functions of the systems of human body with special emphasis on Heart , CVS , Respiratory & digestive system . 3. Performing, demonstrating & implementing the concept of Physiological principles in the practice of imaging and radiation technology.	
6	Course Outcomes	**CO1**: Demonstrate the general and nerve muscle physiology aspects to make the fundamental concepts of physiology. **CO2**: Describe the composition , functions and applied related to blood in human body . **CO3**: Demonstrate an understanding of Cardio Vascular System, its structure , functioning and related applied aspects . **CO4:** Discuss the basic principles of structure, functions and applied of respiratory system . **CO5** Discuss the structure , functions and applied of Gastro Intestinal Tract in human body .	
8	Outline syllabus		CO Mapping
	UNIT 1	**GENERAL & NERVE MUSCLE PHYSIOLOGY**	**CO1**
	A	Components of cell, functions of cell organelles, transport across cell membrane, intercellular communication and body fluids , homeostasis & membrane potential.	CO1
	B	Structure , functions &classification of nerve tissues, physiological properties of nerve and nerve impulse & neuroglia.	CO1, CO2
	C	neuromuscular junction, Difference between skeletal muscle, smooth muscle & cardiac muscle.	CO1, CO3,CO4,CO5
	UNIT 2	***BLOOD***	**CO2**
	A	Composition & functions of blood, plasma proteins, blood volume & haemoglobin.	CO2
	B	Erythrocytes, jaundice, leucocytes & platelets	CO2,
	C	blood coagulation, blood groups, blood transfusion, Rh factor, Hematocrit value, ESR, Lymph , RE system & immunity	CO2& CO3
	UNIT 3	***CARDIO VASCULAR SYSTEM***	**CO3**
	A	Cardiac Muscle, physiological anatomy of the heart & blood vessels, cardiac cycle.	CO1&CO3
	B	Conducting system of heart, Heart sounds & ECG.	CO3
	C	Heart Rate, Cardiac Output, Blood Pressure & Pulse.	CO3
	UNIT 4	***RESPIRATORY SYSTEM***	CO4
	A	Physiological anatomy & functions of respiratory system	CO1& CO4

		, airways, dead space, graph of lung volume & capacities .			
	B	Transport of Gases.			CO2, CO3 & CO4
	C	Regulation of respiration & Hypoxia			CO1& CO4
	UNIT 5	***DIGESTIVE SYSTEM***			CO5
	A	Physiological anatomy and functions of GIT, Saliva , Mouth & Oesophagus.			CO1& CO5
	B	Stomach, Pancreas, Liver & Gall Bladder. digestive juices and their functions.			CO1& CO5
	C	Small Intestine , Large Intestine , Digestion and Absorption in GIT.			CO1, CO3& .CO5
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETA	
		30%	20 %	50%	
	Text book/s*	Text & Practical Physiology for MLT by DR A.K.Jain			
	Other References	• Guyton & Hall Textbook of Medical Physiology . • Ganong's Review of Medical Physiology			

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO105.1	3	1	1	1	1
CO105.2	3	2	1	1	1
CO105.3	3	3	3	1	2
CO105.4	3	3	3	1	2
CO105.5	3	3	3	1	3

1. Slight (Low) ***2. Moderate (Medium)*** ***3. Substantial (High)***

School: SAHS	**Batch : 2020-23**
Program: BMIT	**Current Academic Year: 2020-21**

Branch: All		SEMESTER: FIRST	
1	Course Code	BIT-106	
2	Course Title	**Basics and Radiation Physics-I**	
3	Credits	6	
4	Contact Hours (L-T-P)	3-1-2	
	Course Status	**Compulsory**	
5	Course Objective	1 **:** Defining, listing and understanding basic physics. 2. Understanding, characterizing, explaining, identifying and applying on machines. 3. performing, demonstrating, implementing and applying the concept of general physics in better understanding the relevance to imaging technology	
6	Course Outcomes	**CO1**: Describe the physics principles underlying the operation of medical imaging equipment; **CO2**: Demonstrate an understanding of and apply mathematical methods of image construction and processing; **CO3**: Demonstrate an understanding of aspects of clinical applications of imaging methods; **CO4:** Discuss basic principle of imaging machines and how to used with it **CO5** Discuss issues in the operation of medical imaging equipments.	
8	Outline syllabus		CO Mapping
	UNIT 1	***Basic physics***	**CO1, CO2**
	A	Revision of mathematics related to radiography measurements and unit of C.G.S and M.K.S. system .Radiation units .	CO1, CO2
	B	Electrical charges, potential differences, current and resistance.	CO1, CO2
	C	Ohms low for electrical circuits, Direct current	CO1, CO2
	UNIT 2	***EMI (Electromagnetic inductions)***	
	A	Conductor, insulator and semi- conductor	CO1, CO3,
	B	Electrical power ammeters and voltmeters	CO1, CO2,
	C	Electromagnetism, Electromagnetic induction self and mutual Induction.	CO, CO2
	UNIT 3	***Generators and transformers***	
	A	Production of A.C. Generators High Frequency generators (Construction, working and Uses).	CO2
	B	The diode as rectifier and as an X-Ray tube components (target material, filament, tube housing,).	CO2
	C	Types of rectification and methods used in diagnosis of X-Rays,	CO1,CO2
	UNIT 4	***X RAY Transformer***	
	A	Transformers, Transformers losses (hysteresis loss, eddy correct, copper loss)	CO3
	B	construction regulations of transformers	CO3
	C	Types of transformers and its used in X-Ray apparatus .	CO3
	UNIT 5	***Production of X ray***	
	A	Thermionic emission and its application in x ray production, (bhrehmstralung,charecterstic, binding energy, auger electron,), Vacuum, diode- variation of tubes current and anode ,cathode	CO4

		voltage.			
	B	Interaction of X-Ray with matter (Compton, photoelectric, coherent, photodisintegration ,pair production)			CO4
	C	Application in diagnostic radiology, Advantages and Disadvantages of Each modality			CO5.CO6
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETA	
		30%	20 %	50%	
	Text book/s*	**-Physics of diagnostic radiology (christensen), -The essential physics of medical imaging (by bushberg 3rd edition) - Text book of radiology for residents and technicians 5th Edition by Prof S.K Bahrgava.**			
	Other References	AERB website ,Radiopedia			

POs COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO106.1	3	3	2	3	2
CO106.2	3	3	3	3	3
CO106.3	3	2	3	3	3
CO106.4	3	3	3	3	3
CO106.5	2	3	2	2	2

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2020-2021**
Branch: All		**SEMESTER:FIRST**
1	Course Code	BIT-107
2	Course Title	**English-I**
3	Credits	6
4	Contact Hours (L-T-P)	2-1-2
	Course Status	**Compulsory**
5	Course Objective	1. To equip students to minimize the linguistic barriers emerging in a different environment. 2. Help students to understand different accents and standardise their existing English

		3. Guide the students to hone the basic communication skills, listening, speaking and reading.			
6	Course Outcomes	CO1: Develop writing skills CO2: Learn to use correct sentence structure and punctuation CO3: Develop Impressive Speaking Skills. CO4:Recognise stress patterns in pronunciation of the English sentences CO5: To be able to speak confidently in the English language CO6: Listen and interpret main ideas to differentiate between opinions and facts CO7: Cultivate and develop reading habits			
8	Outline syllabus				CO Mapping
	Unit 1	**Basic elements of grammar**			**CO1, CO2**
	A	Parts of speech			CO1, CO2
	B	Articles: A, An , The			CO1, CO2
	C	Tenses			CO1, CO2
	Unit 2	**Vocabulary enhancement**			
	A	Antonyms & Synonyms			CO1, CO2, CO3
	B	Homophones			CO1, CO2, CO3
	C	Homonyms			CO1, CO2, CO3
	Unit 3	**Reading comprehension**			
	A	Reading comprehension passage 1			CO7
	B	The Thief by Ruskin Bond			CO7
	C	Discussions Based on the text			CO7
	Mode of examination	Theory/Practical			
	Weightage Distribution	CA	MTE	50 Marks	
		30 Marks (2 Best CTs out of 3)	20 Marks (2 Best Assignments out of 3)	100% CA	
	Text book/s*	Workbook for Beginners			
	Other References	• Kumar, Sanjay and PushpLata. *Communication Skills*, Oxford University Press: New Delhi. • Comfort, Jeremy(et.al). *Speaking Effectively*. Cambridge University Press			
		•			
		•			

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO107.1	1	1	1	2	1
CO107.2	1	2	1	1	2

CO107.3	1	2	1	1	1
CO107.4	1	1	1	1	1
CO107.5	1	2	1	1	1

BIT: 109 Human Anatomy as applied to radiology and Imaging -II

Course outcome: The completion of this course will help in –
Knowledge: defining, listing and recognizing the anatomical structure of the human body.
Comprehension: understanding, characterizing, explaining, identifying and locating the anatomical structure of the human body.
Application: performing, demonstrating, implementing and applying the concept of general anatomy in better understanding the relevance Radiographic Anatomy.
Analysis: analyzing, categorizing, comparing and differentiating the anatomical structure of the human body and applying on imaging technology as radiographic anatomy

UNIT I –

FRACTURE

Fracture (Types of fractures) and dislocation (Types, Appearance, and practical assessment), (TO **BE COVERED UNDER RADIOLOGY)**

UNIT II –

Disease

Various diseases of the bones and joints, and its assessment.(**TO BE COVERED UNDER RADIOLOGY)**

UNIT III-

RADIOLOGICAL ANATOMY/ SURFACE ANATOMY.

Surface landmarks of all bones, organs viscera, Joints in relating to organs on the body for radiographic positioning-

UNIT IV-

Anatomical terminology with regard to location of bones and organs. (**COVERED IN 1ST SEMESTER)**

UNIT V –

General introduction to anatomy of excretory system

UNIT VI –

General introduction to anatomy of Reproductive system

UNIT VII-

General introduction to anatomy of nervous system.

Anatomy Practical

Demonstration of parts of urinary system .
Demonstration of section of male and female pelvis with organs in situ
Demonstration of parts of head & neck region.

Demonstration of brain and spinal cord.
Surface marking.
Histology of cartilage and bone.

School: SAHS		**Batch : 2020-23**	
Program: BMIT		**Current Academic Year: 2020-2021**	
Branch: All		**SEMESTER: 2ND**	
1	Course Code	BIT-109	
2	Course Title	**Human Anatomy as Applied to Radiology & Imaging - II**	
3	Credits	5	
4	Contact Hours (L-T-P)	3-1-1	
	Course Status	**Compulsory**	
5	Course Objective	1**:** Defining, listing and understanding basic anatomy of Human Body in reference to bone,joints, and blood . 2. Understanding, characterizing & explaining the anatomical details of the systems of human body with special emphasis on skelton system , CVS , Respiratory & digestive system . 3. Performing, demonstrating & implementing the concept of anatomy principles in the practice of imaging and radiation technology.	
6	Course Outcomes	**CO1**: Demonstrate the types and function of joints and fracture **CO2**: Demonstrate the anatomy of reproductive system **CO3**:. Demonstrate the radiological anatomy and surface anatomy **CO4:** Demonstrate the excretory system anatomy **CO5** : Demonstrate the nervous system anatomy	
8	Outline syllabus		CO Mapping
	UNIT 1	**FRACTURE**	**CO1**
	A	Joints and fracture	CO1
	B	Dislocation (Types, Appearance, and practical assessment),	CO1,CO3
	C	Types of fracture and special view for fracture	CO1
	UNIT 2	**Reproductive system**	**CO2**
	A	General introduction to anatomy of Reproductive system	CO1,CO2
	B	Anatomical function of reproductive system	CO2
	C	Reproductive organs radiographic landmarks	CO2
	UNIT 3	**RADIOLOGICAL ANATOMY/ SURFACE ANATOMY.**	**CO1,CO3**
	A	Surface landmarks of all organs viscera	CO3
	B	Surface landmarks of all bones,	CO3
	C	Joints in relating to organs on the body for radiographic	CO3

		positioning-			
	UNIT 4	**Radiological anatomy and locations**			CO1,C03
	A	Anatomical terminology with regard to location of bones and organs.			CO3
	B	Anatomical sutures and skull			CO3
	C	Anatomical landmarks			CO3
	UNIT 5	**Excretory system and nervous system**			CO4,CO5
	A	General introduction to anatomy of excretory system			CO4,CO5
	B	Function and anatomy of excretory system			CO4,CO5
	C	General introduction to anatomy of nervous system			CO4,CO5
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETA	
		30%	20 %	50%	
	Text book/s*	1.Textbook Of Anatomy & Physiology For Nurses			
	Other References	General anatomy B D Chaursia			

POs COs	PO1	PO2	PO3	PO4	PO5
CO105.1	1	2	1	2	3
CO105.2	3	2	3	2	3
CO105.3	2	3	2	2	31
CO105.4	1	2	3	1	2
CO105.5	3	2	3	2	1

1. Slight (Low) ***2. Moderate (Medium)*** ***3. Substantial (High)***

School: SAHS	**Batch : 2020-23**
Program: BMIT	**Current Academic Year: 2020-2021**
Branch: All	**SEMESTER: SECOND**

1	Course Code	BIT-110	
2	Course Title	**Human Physiology –II**	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1	
	Course Status	**Compulsory**	
5	Course Objective	**1:** Defining, listing and understanding basic Physiology of Human Body in reference to Excretory system, Endocrine & Reproductive system . . 2. Understanding, characterizing & explaining the physiological functions of the systems of human body with special emphasis on nervous system and special senses. 3. performing, demonstrating & implementing the concept of Physiological principles in the practice of imaging and radiation technology.	
6	Course Outcomes	**CO1**: Demonstrate the Excretory system physiology in aspects to make the fundamental concepts of physiology. **CO2**: Describe the Endocrinology ,various hormone functions, regulation and applied related to it in human body . **CO3**: Demonstrate an understanding of male and female reproductive system , its structure , functioning and related applied aspects . **CO4:** Discuss the basic principles of structure, functions and applied of Central Nervous System . **CO5** :Discuss the structure , functions and applied of special senses.	
8	Outline syllabus		CO Mapping
	UNIT 1	**THE EXCRETORY SYSTEM**	**CO1**
	A	Physiological anatomy of kidney, structure and functions of excretory system, structure of nephron & JG Apparatus	CO1
	B	Mechanism of formation of Urine. & mechanism of concentration and dilution of urine--- The Counter Current System .	CO1, CO4
	C	Physiology of micturition and Regulation of Body Temperature in Humans.	CO1, CO4
	UNIT 2	***ENDOCRINE SYSTEM***	**CO2**
	A	General principles of endocrinology, The pituitary Gland.	CO2& CO4
	B	The Thyroid Gland , The parathyroids , Calcitonin and Vitamin D.	CO2& CO4
	C	The Adrenal Cortex & Pancreas.	CO2& CO4
	UNIT 3	***REPRODUCTIVE SYSTEM***	**CO3**
	A	Changes during Puberty, Classification of Male sex hormones and their functions, Spermatogenesis & semen.	CO2, CO3&CO4
	B	Changes during Puberty, Classification and Functions of female sex hormones, mensturation, ovulation and contraception.	CO2, CO3 & CO4
	C	Physiological changes during pregnancy, functions of placenta and physiology of lactation.	CO2, CO3 & CO4
	UNIT 4	***THE NERVOUS SYSTEM***	CO4
	A	Organisation of Nervous system, The Synapse ,	CO4

		Physiology of receptor organs for special and general sensation, physiology of reflex action, classification and properties of reflexes .			
	B	Intro to Sensory and motor system. Functions of hypothalamus, thalamus, basal ganglia, cerebrum & cerebellum .			CO4
	C	Autonomic nervous system, Cerebrospinal Fluid and Blood Brain Barrier.			CO4
	UNIT 5	***SPECIAL SENSES***			CO5
	A	Taste and Smell.			CO4& CO5
	B	Vision—structure and function of eye, errors of refraction & their correction. colour blindness.			CO4& CO5
	C	Hearing—structure and function of ear, general outline of mechanism of hearing and perception of sound.			CO4 & CO5
	Mode of examination				
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Text & Practical Physiology for MLT by DR A.K.Jain			
	Other References	• Guyton & Hall Textbook of Medical Physiology . • Ganong's Review of Medical Physiology			

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO105.1	3	3	3	2	2
CO105.2	3	3	3	3	3
CO105.3	2	3	3	2	3
CO105.4	3	3	3	3	3
CO105.5	1	1	1	1	1

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2020-2021**
Branch: All		**SEMESTER: SECOND**
1	Course Code	BIT-111
2	Course Title	**Basics and Radiation Physics-II**

3	Credits	6	
4	Contact Hours (L-T-P)	3-1-2	
	Course Status	**Compulsory**	
5	Course Objective	1 **:** Defining, listing and understanding basic physics. 2. Understanding, characterizing, explaining, identifying and applying on machines. 3. performing, demonstrating, implementing and applying the concept of general physics in better understanding the relevance to imaging technology	
6	Course Outcomes	**CO1**: Study about x ray tube components and its working,types **CO2**: Learn about protection of x ray tube and its methods **CO3**: Demonstrate an understanding of aspects Grids and filters, its types and uses **CO4:** Discuss basic principle of Ultrasound, production, applications uses in imaging technology **CO5** Discuss basics principles, components of medical imaging equipments.	
8	Outline syllabus		CO Mapping
	UNIT 1	***X-Ray tube***	**CO1, CO2**
	A	Construction, types (coolige, crooks,),	CO1, CO2
	B	working and new advancements in x ray tubes(rotation anode, stationary anode, Micro focus, heavy duty, grid controlled x ray	CO1, CO2
	C	Mammography X RAY tube, super rotalix x ray tube, angiography x ray tube, carbon nano x ray tube).	CO1, CO2
	UNIT 2	***Protection of x ray tube***	
	A	Diagnostic type method of heat dissipation,(conduction, convection, radiation ,fan AC ,OIL cooling) Failure measurement in Radiation exposure.	CO1, CO3,
	B	Scattered Radiation (primary, secondary, Tertiary) leakage, and its protection	CO1, CO2,
	C	Method to reduce scattered radiation (lead apron, lead goggles etc). Inverse square law	CO, CO2
	UNIT 3	***Grid and filters***	
	A	Grid and its types, moving , stationary, parallel, focused, cross grid, grid ratio, grid frequency, characterization of grid. Problems with grid like grid cut off	CO2
	B	Filters.(inherent, added, total ,wedge filters uses, composition, advantages, disadvantages),Beam limiting devices,(cones ,collimators, cylinders, diaphragm etc)	CO2
	C	Radioactivity,(types like particle or radiation) alpha, beta, gamma radiation, half life, decay constant, decay law ,isotopes	CO1,CO2
	UNIT 4	***Ultrasound/CT***	
	A	Basic Principles of ultrasound, and its types and uses, Production, piezoelectric affect ,Transducers , types of transducers	CO3

	B	**Colour Doppler**-principle and its applications in imaging technology			CO3
	C	Basic principle, generations of CT,CT Numbers (HU unit) HU Scale			CO3
	UNIT 5	***Fluoroscopy/Mammography/MRI***			
	A	Fluoroscopy Definition, Basic principle types (Direct, indirect)			CO4
	B	Mammography Principle, machine components and its working			CO4
	C	Nuclear magnetic resonance, magnetic resonance imaging. Basic principle, basic machine Components			CO4.CO5
	Mode of examination	Theory/Viva			
	Weightage Distribution	CA	MTE	ETA	
		30%	20%	50%	
	Text book/s*	**-Physics of diagnostic radiology (christensen), -The essential physics of medical imaging (by bushberg 3rd edition) - Text book of radiology for residents and technicians 5th Edition by Prof S.K Bahrgava.**			
	Other References	AERB website ,Radiopedia			

POs COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO111.1	3	3	3	3	2
CO111.2	3	3	2	3	3
CO111.3	3	3	2	3	3
CO111.4	3	3	3	3	3
CO111.5	3	3	2	3	3

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2020-2021**
Branch: All		**SEMESTER: SECOND**
1	Course Code	BIT-112
2	Course Title	**English II**

3	Credits	5			
4	Contact Hours (L-T-P)	2-1-2			
	Course Status	**Compulsory**			
5	Course Objective	1. To equip students to minimize the linguistic barriers emerging in a different environment. 2. Help students to understand different accents and standardise their existing English 3. Guide the students to hone the basic communication skills, listening, speaking and reading.			
6	Course Outcomes	CO1: Develop writing skills CO2: Learn to use correct sentence structure and punctuation CO3: Develop Impressive Speaking Skills. CO4:Recognise stress patterns in pronunciation of the English sentences CO5: To be able to speak confidently in the English language CO6: Listen and interpret main ideas to differentiate between opinions and facts CO7: Cultivate and develop reading habits			
8	Outline syllabus				CO Mapping
	Unit 1	**Basic elements of grammar**			**CO1, CO2**
	A	Subject verb agreement			CO1, CO2
	B	Active and passive voice			CO1, CO2
	C	Question Tags			CO1, CO2
	Unit 2	**Vocabulary enhancement**			
	A	One word substitutes			CO1, CO2, CO3
	B	Phrasal verbs			CO1, CO2, CO3
	C	Formation of words: suffixes and prefixes			CO1, CO2, CO3
	Unit 3	**Reading comprehension**			
	A	The Last Leaf by O Henry : Reading text and discussions			CO7
	B	Where the mind is without fear by Rabindranath Tagore : Critical appreciation and discussions			CO7
	C	Comprehension and vocabulary based exercise			CO7
	Mode of examination	Theory/Parctical			
	Weightage Distribution	CA		50 Marks	
		30 Marks (2 Best CTs out of 3)	20 Marks (2 Best Assignments out of 3)	100% CA	
	Text book/s*	Workbook for Beginners			
	Other References	• Kumar, Sanjay and PushpLata. *Communication Skills*, Oxford University Press: New Delhi. • Comfort, Jeremy (et.al). *Speaking Effectively*.			

		Cambridge University Press	

POs COs	PO1	PO2	PO3	PO4	PO5
CO112.1	1	1	1	2	1
CO112.2	1	2	1	1	2
CO112.3	1	2	1	1	1
CO112.4	1	1	1	1	1
CO112.5	1	2	1	1	1

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2021-2022**
Branch: All		**SEMESTER: THIRD**
1	Course Code	BIT-205
2	Course Title	**Dark Room Procedure- I**
3	Credits	6
4	Contact Hours (L-T-P)	4-1-2
	Course Status	**Compulsory**
5	Course Objective	1. Defining, listing and recognizing the x ray films and identify image artefacts and improve it.. 2. Understanding, characterizing, explaining, identifying problems with x ray films and remove it from x ray film and improve image quality. 3. Performing, demonstrating, implementing and applying the concept of darkroom related in better understanding the relevance Radiographic image.
6	Course Outcomes	**CO1**: To learn about the photographic process: Introduction, visible light, images produced by radiation, light sensitive photographic materials **CO2**: To learn about the Film processing: Development. The nature of development-manual or automatic. The PH scale **CO3**: To learn about the construction of x-ray film & its cross over effect **CO4:** To learn about the Intensifying screens and cassettes. Luminescence:

		fluorescence and phosphorescence **CO5** : To learn about the Image characteristic: Real and mental images, reflected, transmitted and emitted light images Photographic emulsions	
8	Outline syllabus		CO Mapping
	UNIT 1	**Basic Principle of radiographic film**	**CO1, CO3**
	A	Fundamental of photographic emulsion, light sensitive materials, construction and emulsion formation.	CO1, CO2
	B	Formation of latent image. Chemical development of the latent image.	CO1, CO2
	C	Storage of X-Ray films and its transportation.	CO3, CO2
	UNIT 2	**Grain Technology**	
	A	Type of photography emulsion size of grain	CO2, CO4
	B	Advances in film grain technology	CO3, CO4,
	C	Speed of the films	CO3, CO4
	UNIT 3	**Sensitometry**	
	A	Evaluation of emulsion characteristic – density. Contrast and latitude – basic fog- characteristic curve.	CO3
	B	Mechanism of Lumiscence – fluorescence and phosphorescence. Fluorescent screens .	CO4
	C	Cassettes. Intensification factor. Size of crystals	CO4
	UNIT 4	**X RAY films**	
	A	(Construction,all types and its uses)(X-rays, material etc.)	CO4
	B	Cassettes- principle, Construction & types.	CO4
	C	CR Cassette (principle, Construction, function, working and uses), medical imaging films, laser imager, day light processing, dry processing.	CO4
	UNIT 5	**Dark room Processing**	
	A	Dark room Processing agents, Developing Agents	CO2
	B	Function and construction of the developer – standardization by time and temperature	CO2
	C	Process of development- latitude- exhaustion of developer – regeneration by replacement.	CO2,CO3
	Mode of examination	Theory/Practical/Viva	
	Weightage Distribution	CA: 30% / MTE: 20% / ETE: 50%	
	Text book/s*	• **Dark room procedures (chesney's)** • **Text book of radiology for residents and technicians 5th Edition by Prof S.K Bahrgava**	

	Other References	• Articles,internet	

Pos/COs	PO1	PO2	PO3	PO4	PO5
CO205.1	3	3	3	3	3
CO205.2	3	3	3	3	3
CO205.3	2	2	2	2	2
CO205.4	3	3	3	3	3
CO205.5	2	2	2	2	2

School: SAHS		**Batch : 2020-23**	
Program: BMIT		**Current Academic Year: 2021-2022**	
Branch: All		**SEMESTER: THIRD**	
1	Course Code	BIT-206	
2	Course Title	**Patient Care In Hospital and Radiology-I**	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	**Compulsory**	
5	Course Objective	1. Defining, listing and recognizing the patient care related issues and resolve it. 2. performing, demonstrating, implementing 3. Applying the concept of general patient care principle in better understanding the relevance Radiographic procedure.	
6	Course Outcomes	**CO1**: Understand sensitivities involved in patient's right and responsibilities **CO2**: To understand the radiological diagnostic needs for patients **CO3**: Learn planning and organization of work **CO4:** Able to handle effective Communication with Peers/ colleagues using medical terminology in communication **CO5** : Learn Radiology Technician's role in maintaining patient's rights	
8	Outline syllabus		CO Mapping
	UNIT 1	**Hospital staffing and administration**	**CO1, CO2**
	A	Hospital staffing and administration- records-	CO1, CO3

		professional ethics in attitudes to patients	
	B	Cooperation with other staff and departments	CO1, CO3
	C	Departmental organization.	CO1
	UNIT 2	**Patient handling and vital signs**	
	A	Handling of the patients- moving of injured patient	CO1, CO2
	B	Normal pulse, temperature and respiration	CO2, CO3
	C	Introduction of contrast media and its type	CO3, CO4
	UNIT 3	**Patient protection**	
	A	Protection of the patients for general examination	CO2
	B	Protection of the patients in special case	CO2,CO4
	C	Special examinations	CO3
	UNIT 4	**Patient preparation in special examination**	
	A	Supervision of patients	CO2
	B	Patient preparation undergoing routine examination	CO3
	C	Patient preparation special examinations	CO3
	UNIT 5	**Contrast Media**	
	A	Administration of contrast media	CO3
	B	Aseptic and sterile procedures	CO4
	C	Use of opaque media.	CO3,CO4
	Mode of examination	Theory/Practical/Viva	
	Weightage Distribution	CA: 30% / MTE: 20% / ETE: 50%	
	Text book/s*	• **Care of the patient in diagnostic radiography by (D.NOREEN AND MURIEL O.CHESNEY) 5TH OR 6TH EDITION.** • **Text book of radiology for residents and technicians 5th Edition by Prof S.K Bahrgava**	
	Other References	• Articles,internet	

POs COs	PO1	PO2	PO3	PO4	PO5
CO206.1	1	1	2	3	1
CO206.2	3	3	3	3	3
CO206.3	3	3	3	3	3
CO206.4	3	3	3	3	3
CO206.5	2	2	2	2	2

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2021-2022**
Branch: All		**SEMESTER: THIRD**
1	Course Code	BIT-207
2	Course Title	**Apparatus of Radiography and Imaging-I**
3	Credits	6
4	Contact Hours (L-T-P)	4-2-0
	Course Status	**Compulsory**
5	Course Objective	1. Defining, listing and recognizing the imaging instruments and makes practices. 2. Understanding, characterizing, explaining, identifying parts of imaging equipments and how to use it. 3. Performing, demonstrating, implementing and applying the concept and physics of machines in better understanding the relevance Radiographic equipments.
6	Course Outcomes	**CO1**: To learn about its Principles and about related Equipment **CO2**: To know about CT scan, Historical development,its principle and applications **CO3**: To know about conventional, spiral (helical), Multislice, Historical development, its principle and applications **CO4:** To know about Computerized Radiography-: Principle, application, advantage & technique

		CO5 : To know about the reconstruction techniques of computed tomography.			
8	Outline syllabus				CO Mapping
	UNIT 1	**Introduction**			**CO1, CO2**
	A	Basic circuits of X-Ray machine, .			CO1, CO2
	B	Construction and functioning of each part,			CO1, CO2
	C	Component of x ray machine.			CO1
	UNIT 2	**Tomography**			
	A	Tomography- Advantages of various movement, linear, circular elliptical, hypocycloidal- Basic of Topographic principles-			CO2, CO1
	B	Effects of operational angle, F.F.D., vibration blur, magnification- Estimation of relevant layer thickness and localization of required area by plain films and fluoroscopy-			CO2, CO1
	C	Sequential tomography- Horizontal tomography- simultaneous multisession tomography			CO1, CO2
	UNIT 3	**Basics of CT**			
	A	Computed Tomography equipment working, principle			CO2
	B	Slip Ring Technology			CO2,CO3
	C	Detectors and its types,			CO3
	UNIT 4	**Generations Of CT**			
	A	Generations of CT			CO3
	B	Axial CT			CO4
	C	Helical CT, Multi detectors technology (MDCT)			CO4
	UNIT 5	**Reconstruction Techniques**			
	A	All protocols in CT Imaging			CO3
	B	Image reconstruction principle, mathematical, analog methods,			CO5
	C	2D and 3D, RECON image reconstructions.			CO4,CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**-Physics of diagnostic radiology (christensen),** **-The essential physics of medical imaging (by bushberg 3rd edition)** **- Text book of radiology for residents and technicians 5th Edition by Prof S.K Bahrgava.**			
	Other References	AERB website , Radiopedia			

POs COs	PO1	PO2	PO3	PO4	PO5
CO207.1	3	3	3	3	3
CO207.2	2	2	2	3	3
CO207.3	2	2	2	2	3
CO207.4	3	3	3	3	3
CO207.5	2	3	3	2	2

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2021-2022**
Branch: All		**SEMESTER: THIRD**
1	Course Code	BIT-208
2	Course Title	**RADIOGRAPHY OF UPPER AND LOWER EXTREMITIES-I**
3	Credits	6
4	Contact Hours (L-T-P)	4-2-0
	Course Status	Compulsory
5	Course Objective	1. Defining, listing and recognizing the anatomical structure of the human body in relevant to radiographic teqniques. 2. Understanding, characterizing, explaining, identifying and locating the anatomical structure of the human body irrespective to radiographic anatomy.. 3. Performing, demonstrating, implementing and applying the concept of general radiography in better understanding the relevance Radiographic Anatomy and understand diagnostic image. 4. Analyzing, categorizing, comparing and differentiating the anatomical structure of the human body by radiographic image and applying on imaging technology as radiographic anatomy

6	Course Outcomes	**CO1:** To know regarding anatomical terminology and Positioning terminology **CO2:** To develop understanding about positioning of the upper limb **CO3:** To learn about Chest & Thorax Bones **CO4:** To learn to ensure availability of medical and diagnostic supplies **CO5:** To develop understanding about Selecting and performing basic views (projections) and conventional contrast	
8			CO Mapping
	UNIT 1	**Introduction of skeleton system**	**CO1,CO2**
	A	Individual bones of skeleton system of human body	CO1, CO2
	B	Different projections of bones.	CO1, CO2
	C	Different movements of joints	CO1
	UNIT 2	**Radiographic terminology**	
	A	Special projection, all radiographic projections	CO2
	B	Terminology and special projections.	CO2,
	C	With radiographic anatomy.	CO1, CO2
	UNIT 3	**Joints and movement**	
	A	Movement of all joints	CO1,C02
	B	Including flexion, extension, inversion, eversion	CO2,CO1
	C	Internal, external rotation, etc	CO1
	UNIT 4	**Upper limb projections**	
	A	All radiographic projections of upper limbs	CO2,C03
	B	Different views for fingers AP/LAT/Oblique ,thumb AP/Lat. oblique all special projection of thumb, Views for scaphoid bone	CO2
	C	Wrist, and, forearm, elbow s all special views, Clavicle .sterno-clavicular joint etc.	CO3
	UNIT 5	**Thorax projections**	
	A	Projection for shoulder joint,	CO3,C04
	B	Sternum.ac joint ,SC joint, clavicle,	CO4,C05
	C	Scapula and its views	CO4,CO5

	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5
CO208.1	1	3	3	3	3
CO208.2	2	3	3	2	2
CO208.3	3	3	3	3	3
CO208.4	3	3	3	3	3
CO208.5	3	2	2	2	3

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2021-2022**
Branch: All		**SEMESTER: FOURTH**
1	Course Code	BIT-209
2	Course Title	**Dark Room Procedure – II**
3	Credits	6
4	Contact Hours (L-T-P)	4-2-0
	Course Status	Compulsory
5	Course Objective	1. Acquire skills necessary for safe and effective darkroom practice, 2. Mix and store chemicals to perform at their optimum. 3. Choose materials suitable for the range of work to be undertaken 4. Describe the necessity for separate wet and dry areas 5. Develop an appreciation of print tonality on final interpretation of images.
6	Course Outcomes	**CO1:** To know about constitution of developing solutions both in manual and automatic processing and properties of developing chemicals. To learn about the Film processing: Development. The nature of development-manual or automatic. The PH scale. **CO2:** To learn about film processing: Fixing and role of a fixing solution. Constitution of the fixing solutions and properties of the

		constituents. Factors affecting the quality of fixer. **CO3:** To understand about Location To understand about Layout, To understand Illumination, To understand about related, Accessories & apparatus required **CO4:** To learn about the GRIDS types and cassettes **CO5:** To learn about factors and its affects in radiographic film.	
8			CO Mapping
	UNIT 1	**Developing**	
	A	Types of **developer** used in radiography powder and liquid concentrates- standard high contrast and high energy developers-	CO1
	B	Ultra rapid development methods- increased temperature.	CO1
	C	Used of replenisher, Special ultra rapid developer combined developer/ fixer solutions.	CO1,CO2
	UNIT 2	**Fixation**	**CO2**
	A	- fixing agents- constituents of radiographic fixer and function of the chemicals fixation time exhaustion of fixer-	CO2
	B	Silver recovery combined with generation of fixer (electrolysis)- other silver recovery methods- rapid fixer.	CO2
	C	Film rinse- acid stop bath- washing of films static bath- water flow and rate of change- test for washing- film during methods	CO2
	UNIT 3	**Film Processing**	
	A	Practical processing- preparation of solutions- water supply mixing vessels- Order of mixing chemicals- stock, solutions and storage- storage of dry chemicals and liquid, concentrates.	CO2,CO3
	B	Processing apparatus – temperature control- immersion heaters- thermostat – ice cooling and refrigeration cooling. Type and care of hangers. Technical and processing faults	CO3
	C	Fog, static pressure, screen artifacts	CO3
	UNIT 4	**Dark Room Lay out**	
	A	The X-Ray dark room- minimum dimensions- planned circulation and layout – light proofing- ventilation- radiation protection- radiation and chemical proof materials.	CO3
	B	Bench design, film hoppers, film makers, hanger location- Location of processing unit- Pass box, fixer or wash tank	CO3,CO4
	C	Wet of dry viewing rooms following manual of automatic processing rapid	CO3

		drying apparatus- effects of circulation and layout planning of efficiency			
	UNIT 5	**Factors affecting radiographic film**			
	A	The radiographic image- effects of exposure factors on contrast details and image sharpness. Relationship between kilo voltage and exposure time and tube current (mAs), effects of distance, filtration, collimation, screens, Grids, film speed developers and processing techniques			CO4,CO5
	B	Presentation of the radiograph- identification – orientation- technical information- techniques for film making action markers using radiation source, use of lead letters and numbers, accessories- viewing boxes- magnifier- high intensity localized viewers- projectors.			CO5
	C	Dental mounts, films, films envelopes- filling system and units- stores viewers, Fluorescent screen photography- photofluorography,Cineradiography and cineradiography, Cassettes types- film magazines – manual and automatic operation.			CO5
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	• Physics of diagnostic radiology (by christensen). • Principles of radiographic imaging by Richard R.Carlton (5^{th} or 6^{th} Edition) • DN,MO Chesney			
	Other References	• Articles/Internet			

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO209.1	1	2	1	2	1
CO209.2	2	2	3	1	1
CO209.3	2	3	2	3	3
CO209.4	3	3	3	2	2
CO209.5	3	3	3	3	3

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2021-2022**
Branch: All		**SEMESTER: FOURTH**
1	**Course Code**	BIT-210
2	**Course Title**	**Hospital Practice, Care and radiation protection of the Patients -II**
3	Credits	6
4	ContactHours (L-T-P)	4-2-0
	Course Status	Compulsory
5	Course Objective	1.To develop understanding about Explanation of diagnosis and report to patient , if required 2.To develop understanding about Documentation of patient records: 3. To develop understanding about Procedure to patients - Explaining Do's and Don'ts to the patient
6	Course Outcomes	**CO1:** To develop understanding about Drugs in the x-ray department **CO2:** To learn How to handle: Children, Adult etc **CO3:** Learn how handle patient in special conditions **CO4:** To develop understanding about Preparation of the patient for special radiological procedure **CO5:** To develop understanding about Side effect and reaction of contrast media, classification of reactions of contrast media and treatment of contrast reactions
8			CO Mapping
	UNIT 1	**Emergency Trolley**	
	A	Trolley setting for special X-Ray examinations, like barium study, IVP study, HSG study,	
	B	Emergency trolley and drugs and	

	C	all type needle, syringe, Catheters, cannula.			
	UNIT 2	**S**afety			
	A	Safety of patient			
	B	Patient on traction, wheel chair, stretcher, infusion, blood transfusion, tracheostomy			
	C	anesthesia patient, Oxygen therapy.etc			
	UNIT 3	**Patient care**:-			
	A	Child patient care ,accidental patient ,MLC patient,			
	B	Anesthetized patient,patient on trolley traction etc.			
	C	Patient preparation of diabetes patient , preparation of infants			
	UNIT 4	**Patient shifting**			
	A	work with mobile x ray set			
	B	patient having oxygen therapy,			
	C	patient having intravenous infusion of fluid.			
	UNIT 5	**Reactions**			
	A	**Contrast reactions**			
	B	**CM reaction management** its managements			
	C	Drugs using management of contrast reaction in radiology department			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**Care of the patient in diagnostic radiography by (D.NOREEN AND MURIEL O.CHESNEY) 5TH OR 6TH EDITION**			
	Other References				

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO210.1	1	2	3	2	2
CO210.2	2	1	2	3	2
CO210.3	3	2	1	1	3
CO210.4	3	3	3	2	1
CO210.5	1	1	3	1	1

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2021-2022**
Branch: All		**SEMESTER: FOURTH**
1	Course Code	BIT-211
2	Course Title	**Apparatus of Radiography& Imaging -II**
3	Credits	6
4	Contact Hours (L-T-P)	4-2-0
	Course Status	Compulsory
5	Course Objective	1. It is used to diagnose or treat patients by recording images of the internal structure of the body to assess the presence or absence of disease, foreign objects, and structural damage or anomaly 2. Understand standard positions for diagnostic imaging examinations. 3. Learn normal anatomy as seen on plain radiographs, magnetic resonance imaging (MRI), and X-ray computed tomography (CT). 4. Expand his/her knowledge of anatomy in all organ systems and its appearance on various imaging modalities (CT, MRI, ultrasound, etc). 5. Demonstrate the ability to use information technology and feedback to improve their fund of knowledge and skills.
6	Course Outcomes	**CO1:** To learn and understand to prepare the patient and the fluroscopy machine and room for the procedure

		CO2: To develop understanding regarding Ultrasound Scanning principal Display of images, modes Doppler ultrasound **CO3:** To know about Magnetic Resonance Imaging (MRI)-: Principle, application, its advantage over computed tomography or ultra sonography. Its limitations, uses & cross sectional anatomy. **CO4:** To develop understanding about Mammography, Equipment, Positioning and projections **CO5:** To learn about portable and mobile radiography and its uses,advantages,Disadvantages	
8			CO Mapping
	UNIT 1	**Fluoroscopy-**	
	A	Equipments, Image intensifier, IITV	CO1
	B	Dose measurements, dose hazards- limitation of K.V., mA. Focus – skin distance. Fluoroscopic timer	CO1
	C	Radiation protection to staff during fluoroscopy and associated examinations.	CO1
	UNIT 2	**Ultrasound**	
	A	**Construction and function of Imaging equipment like** Ultrasound,Transducer,construction,fuction	CO2
	B	Doppler Ultrasound	CO2
	C	Applications of Doppler ultrasound	CO2
	UNIT 3	**MRI**	
	A	MRI principle instrumentation,Magnetization,gradients,fuction of gradients	CO3
	B	Basic pulse sequence, spin echo, gradient echo and all its application as pulse sequences all,	CO3
	C	all using in MR Imaging protocols.	CO3
	UNIT 4	**Soft Tissue radiogragraphy**	
	A	Soft tissue techniques-(Mammography) Equipments,working,applications	CO4
	B	non-screen techniques- simultaneous screen and non-screen technique-	CO4
	C	Digital Mammography	CO4
	UNIT 5	**Portable X rays**	
	A	Portable x ray equipments,	CO5
	B	mobile x ray equipments, ward radiography equipments,	CO5
	C	C ARM equipment**.**	CO5
	Mode of examination	Theory/Practical/Viva	
	Weightage Distribution	CA / MTE / ETE 30% / 20% / 50%	
	Text book/s*	**-Physics of diagnostic radiology (christensen),** **-The essential physics of medical imaging (by bushberg 3rd edition)** **- Text book of radiology for residents and technicians**	

		5th Edition by Prof S.K Bahrgava.	
	Other References	AERB website , Radiopedia	

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO211.1	3	3	3	3	2
CO211.2	3	2	3	3	3
CO211.3	3	3	3	3	3
CO211.4	2	2	3	3	3
CO211.5	3	3	2	3	2

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2021-2022**
Branch: All		**SEMESTER: FOURTH**
1	Course Code	BIT-212
2	Course Title	**Radiographic Technique of Extremities -II**
3	Credits	6
4	Contact Hours(L-T-P)	4-2-0
	Course Status	Compulsory
5	Course Objective	1. This course will introduce to and familiarize the student with the basic routine of radiographic positioning, shielding techniques, and related terminology. 2. Describe student positioning terms, Demonstrate proper use of positioning skills, Cite the structures demonstrated on routine radiographic procedures, 3. Evaluate images for positioning, centering , appropriate anatomy and overall image quality, 4. Discuss equipment and supplies necessary to complete radiographic procedures 5. Apply general radiation safety and protection practices associated with radiologic examinations.
6	Course	**CO1:** To know regarding anatomical terminology

	Outcomes	**CO2:** To know regarding Exposure factors : Millie ampere, Kilovolt age **CO3:** Understand clinical observation of radiology department , radiographic procedures and x-ray equipment. **CO4:** Ability to define radiographic positioning terms , manipulate equipment properly, **CO5:** position and align anatomical structure and equipment, evaluate images for proper demonstration of anatomy and pathology.			
8					CO Mapping
	UNIT 1	**Introduction**			
	A	Terminology of positioning,			CO1
	B	Projections,			CO1
	C	Movements of lower limb			CO1
	UNIT 2	**Radiography of foot**			
	A	Radiography of toes ,foot, ankle joint, (special view of ankle joint), tibia, fibula			CO1,CO2,CO4
	B	Radiography of Knee joints and its all special view			CO2,CO4
	C	Sky line and its methods			CO2,CO4
	UNIT 3	**Radiography of thigh bone**			
	A	Radiography of femur bone and its view			CO4,CO5
	B	Special view and techniques of femur			CO4,CO5
	C	View for pelvic and techniques			CO4,CO5
	UNIT 4	**Radiography of thigh Pelvice**			
	A	Radiography hip joint single and both ,pelvic			CO3,CO4
	B	special views of pelvice			CO4,CO5
	C	Radiography in Emergency situations.			CO4,CO5
	UNIT 5	**Mescellaneous**			
	A	Leg length basement			CO5,CO3
	B	Bone age			CO4
	C	Child Radiography for (upper and lower limbs)			CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETA	
		30%	20%	50%	
	Text book/s*	**-Radiographic positioning by Ronald L.Eisenberg MD -K,C Clark**			
	Other References	• Radiopedia			

POs	PO1	PO2	PO3	PO4	PO5

COs					
CO212.1	1	1	1	1	2
CO212.2	2	3	3	3	3
CO212.3	3	2	3	3	3
CO212.4	3	3	2	3	3
CO212.5	1	1	1	2	1

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2022-2023**
Branch: All		**SEMESTER: FIFTH**
1	Course Code	BIT-306
2	Course Title	**Radiography Technique of Bone and Joints-I**
3	Credits	3
4	Contact Hours(L-T-P)	2-1-2
	Course Status	Compulsory
5	Course Objective	1. Defining, listing and recognizing the anatomical structure of the human body in relevant to radiographic techniques. 2. Understanding, characterizing, explaining, identifying and locating the anatomical structure of the human body irrespective to radiographic anatomy. 3. Performing, demonstrating, implementing and applying the concept of general radiography in better understanding the relevance Radiographic Anatomy and understand diagnostic image. 4. Understand clinical observation of radiology department ,

		radiographic procedures and x-ray equipment.	
6	Course Outcomes	**CO1:** To know regarding anatomical terminology and Positioning terminology of skull **CO2:** To develop understanding about positioning of the skul **CO3:** To learn about dental radiographic positioning **CO4:** To learn about lung & Thorax Bones **CO5:** To develop understanding about Selecting and performing basic views (projections) and conventional contrast.	
8			CO Mapping
	UNIT 1	**Unit 1: Introduction of Skeleton system**	**CO1, CO2**
	A	Individual bones of skeleton system of human body and its different projections	CO1, CO2
	B	Revision of all bones, joints, movements.	CO1, CO2
	C	All Radiographic terminology related projections.	CO1
	UNIT 2	**Unit 2: Skull Radiography**	
	A	Skull related radiographic terminology	CO2
	B	Routine projections like AP, Lateral, facial bones, nasal bone	CO2
	C	Special projection, whenever required and indicated as in skull including petrous, oral, mastoids, accessory nasal arches, nasal bone, maxilla, mandible, T.M. Joint, optic foramina,	CO2
	UNIT 3	**Unit 3: Dental radiography/Projections**	
	A	Dental views	CO3
	B	Intra oral and extra oral projection	CO2,CO3
	C	Occlusal view.(manual/Digital) ,OPG & CBCT	CO3
	UNIT 4	**Unit 4: Radiography Lungs**	
	A	Routine projection- evaluation of unilateral density	CO4
	B	Exposure on inspiration and expiration	CO4
	C	Valsalva and Muller manoeuvres- Pleura Techniques to demonstrate fluid levels, effusions and adhesions – oblique., lordotic and decubitous A.P. and Lateral projections- pneumothorax, expiation and inspiration	CO4
	UNIT 5	**Unit 5: Radiography of Diaphragram**	
	A	Diaphragmatic excretion	CO4,CO5
	B	Double exposure technique	CO5
	C	Mediastinum – routine projections	CO4,CO5
	Mode of examination	Theory/viva/Practical	

	Weightage Distribution	CA	MTE	ETE	Total
		30	20	50	100
	Text book/s*	K. C. Clerk Radiographic positioning **Radiographic positioning by Ronald L.Eisenberg MD** **Special procedures (BY whitehouse)**			
	Other References	• Radiopedia			

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO306.1	3	3	3	3	2
CO306.2	3	3	3	3	3
CO306.3	3	3	3	2	3
CO306.4	3	2	3	3	3
CO306.5	1	2	3	2	1

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2022-2023**
Branch: All		**SEMESTER: FIFTH**
1	Course Code	BIT-307
2	Course Title	**Special Radiographic Techniques-I**
3	Credits	6
4	Contact Hours (L-T-P)	3-3-0
	Course Status	Compulsory
5	Course Objective	1. Defining, listing and recognizing the anatomical structure of the human body by radiographic procedures and helps to diagnose problem with patient. 2. Understanding, characterizing, explaining, identifying and locating the anatomical structure of the human body by radiographic images and explain procedures by read of image. 3. Performing, demonstrating, implementing and applying the concept of radiographic anatomy in better understanding the relevance 4. Radiographic procedure and makes accurate diagnosis problem of patient. 5. Understand clinical observation of radiology department , radiographic procedures and x-ray equipment.

6	Course Outcomes	C01:Learn and understand to prepare the patient and the room for the procedure CO2: To develop understanding anatomy of salivary gland and sialography CO3: To develop understanding anatomy of respiration system and special procedure of respiration system and arterio-graphy and venography CO4: To develop understanding of special procedure of genito-urinary tract CO5: To develop understanding of special procedure of fistulography	
8			CO Mapping
	UNIT 1	**Unit 1: Salivary Glands**	**CO1, CO2**
	A	Anatomy of Salivary glands	CO1, CO2
	B	Routine projection for calculi	CO1, CO2
	C	Sialography with opaque media ,Macro radiography	CO1
	UNIT 2	**Angiography**	**C01,CO3**
	A	General and selective abdominal angiography, Peripheral angiography	CO1, CO3
	B	Cerebral angiography	CO3
	C	Venograms with valsalva manoeuvre.	CO3
	UNIT 3	**Respiratory system**	
	A	Overview of Respiratory system Study Upper respiratory tract- Naso- pharynx- larynx- Trachea, Barium swallow with valsalva manoeuvre	CO3
	B	Thyroid and parathyroid glands, Bronchography –methods of introduction of opaque media- positioning and technique during the introduction of media,	CO1,CO3
	C	CT Virtual brochography	CO3
	UNIT 4	**Genito- Urinary system**	
	A	Plain film examination K.U.B,Lateral, double exposure on inspiration and expiration, Pyelography – intravenous pyelography (I.V.P) pyelography – pyelography in children.	CO4
	B	Use or non- use of compression- Trendelenberg position, High doss technique-	CO4
	C	Supplementary techniques- Retrograde pyelography- position and identification of ureteric catheters. MCU,RGU	CO4
	UNIT 5	**Cystography**	
	A	Fistulography (Demonstration of fistulae,) ,Central nervous system- Routine projections for skull and spine-	CO5
	B	Ventriculography and encephography- Injection of contrast media- film series to cover all ventricular outlines- Central angiography,	CO5
	C	Myelography – metrhods of contrast injection.	CO1,CO5
	Mode of		

	examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**Special procedures (BY whitehouse).** **Radiographic positioning by Ronald L.Eisenberg MD**			
	Other References	• Radiopedia			

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO307.1	3	3	3	2	3
CO307.2	3	3	3	3	3
CO307.3	3	3	3	3	3
CO307.4	2	2	3	3	2
CO307.5	2	2	2	2	2

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2022-2023**
Branch: All		**SEMESTER: FIFTH**
1	Course Code	BIT-308
2	Course Title	**Recent Advances In Imaging And Contrast Media-I**
3	Credits	6
4	Contact Hours (L-T-P)	5-1-0
	Course Status	Compulsory
5	Course Objective	1. Defining, hands on practice and recognizing the imaging instruments and makes practices. 2. Understanding, characterizing, explaining, identifying parts of imaging equipments and how to use it.. 3. Performing, demonstrating, implementing and applying the concept and physics of machines in better understanding the relevance Radiographic equipments.
6	Course Outcomes	**CO1:** To know about radionuclide and their half life **CO2:** To know about PET-CT , Gamma camera imaging and instrumentation **CO3:** To know about recent advances in imaging technology-: Detailed knowledge of ultrasound, colour Doppler, different types of transducers, their principles, applications & role in medicine & cross sectional anatomy. •

		CO4: To know about CT scan, conventional, spiral (helical), Multislice-: Historical development, its principle and applications, various generations& definition of terms and cross sectional anatomy& use of diagnostic methods. **CO5:** To know about Magnetic Resonance Imaging (MRI)-: Principle, application, its advantage over computed tomography or ultra sonography. Its limitations, uses & cross sectional anatomy. • To know about Spectroscopy-: Principle, application and uses.			
8					CO Mapping
	UNIT 1	**Radio Nuclide Imaging:**			**CO1, CO2**
	A	Basic principles of Nuclear medicine			CO1, CO2
	B	Instrumentations (Scintillation and detectors) of Radio Nuclide Imaging			CO1, CO2
	C	Radionuclide and their half life			CO1
	UNIT 2	**Nuclear medicine instrumentation**			
	A	Gamma camera, SPECT , PET scanner			CO1, CO2
	B	Production of radionuclide medicines, PET CT,PET MRI			CO1, CO2
	C	Bone radionuclide imaging			CO1, CO2
	UNIT 3	**Advancement in MRI**			
	A	MRI, spectroscopy, Functional MRI			CO5
	B	MR perfusion, diffusion			CO5
	C	MR angiography ,dynamic study, CSF Flow metry			CO5
	UNIT 4	**Advancement in USG**			
	A	Advancements in Ultrasound,			CO3
	B	Doppler ultrasound			CO3
	C	Advance application in Doppler US			CO3
	UNIT 5	**Advancement in CT**			
	A	CT advancement, Advancement on detector technology			CO4
	B	X ray tube			CO4
	C	CT applications like, dual source CT, Portable CT,			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**-Physics of diagnostic radiology (christensen),** **-The essential physics of medical imaging (by bushberg 3rd edition)** **- Text book of radiology for residents and technicians 5th Edition by Prof S.K Bahrgava.** **Advance Imaging (AIIMS)**			
	Other	AERB website , Radiopedia			

	References		

POs COs	PO1	PO2	PO3	PO4	PO5
CO308.1	2	2	3	3	3
CO308.2	2	2	3	3	3
CO308.3	3	3	2	3	2
CO308.4	3	3	3	2	3
CO308.5	3	1	2	1	1

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2022-2023**
Branch: All		**SEMESTER: FIFTH**
1	Course Code	BIT-309
2	Course Title	**Radiation Hazards, Protection And Planning of The Department-I**
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Status	Compulsory
5	Course Objective	1. Defining, hands on practice and recognizing the imaging instruments and makes practices. 2. Understanding, characterizing, explaining, identifying parts of imaging equipments and how to use it.. 3. Performing, demonstrating, implementing and applying the concept and physics of machines in better understanding the relevance Radiographic equipments.
6	Course Outcomes	**CO1:** Introduction to Radiation Hazards, To develop understanding for biological effect of radiation and Orientation to Radiation Protection **CO2:** Introduction to various radiation units – Roentgen, rad, rem, etc **C03:** TO develop understanding for Dosimetry, various radiation measuring instruments

		CO3: To develop understanding for Principles and Methods of Radiation **CO4:** To know about AERB related guidelines, , ICRP recommendations, measurement of X-ray and other radiation, rules of AERB	
8			CO Mapping
	UNIT 1	**Introduction of radiation hazards**	**CO1, CO2**
	A	Hazards and objectives	CO1, CO2
	B	Direct and indirect effects of radiation	CO1
	C	Principles of radiation protection and Methods of radiation protection	CO1
	UNIT 2	**Types of Radiation hazards on human body**	
	A	Somatic Effects And Genetic Effects	CO1
	B	stochastic effect	CO1
	C	Deterministic effects	CO1, CO2
	UNIT 3	**Radiation effect**	
	A	Radiation effects & hazards on pregnant women (tartogenic effect)	CO2
	B	Radiations units	CO2
	C	Radiation effect on DNA , RNA,,Radiation protection of female during radiographic examination	CO1,CO2,CO3
	UNIT 4	**Devices**	
	A	Radiation detection devices	CO3
	B	Measurement devices	CO3
	C	Radiation Doses MPD (Maximum permissible	CO3,CO4
	UNIT 5	**Radiation protection**	
	A	Radiation protective equipment	CO4
	B	Storage , handling and maintenance of radiation protective equipment/devices	CO4,C05
	C	Role of different regulatory bodies regarding radiation protection in india	CO4,CO5
	Mode of examination	Theory	
	Weightage Distribution	CA: 30% / MTE: 20% / ETE: 50%	
	Text book/s*	**Radiation Protection by Euclid Seeram.** **The essential physics of medical imaging (by bushberg 3rd edition)**	
	Other References	AERB Webcontent	

POs COs	PO1	PO2	PO3	PO4	PO5
CO309.1	3	3	3	3	3
CO309.2	3	3	3	3	3
CO309.3	3	3	3	3	3
CO309.4	2	2	2	3	2
CO309.5	3	2	3	2	3

School: SAHS		**Batch : 2020-23**	
Program: BMIT		**Current Academic Year: 2022-2023**	
Branch: All		**SEMESTER: SIXTH**	
1	Course Code	BIT 311	
2	Course Title	**Recent Advances In Imaging System and Contrast Media –II**	
3	Credits	5	
4	Contact Hours (L-T-P)	4-1-2	
	Course Status	**Compulsory**	
5	Course Objective	1. Defining, listing and recognizing the x ray films and identify image artefacts and improve it.. 2. Understanding, characterizing, explaining, identifying problems with x ray films and remove it from x ray film and improve image quality. 3. Performing, demonstrating, implementing and applying the concept of darkroom related in better understanding the relevance Radiographic image	
6	Course Outcomes	**CO1**: To learn about the Nuclear medicine and radionuclides **CO2**: To learn about the production of Radio-nuclide **CO3**: To learn about the cyclotron , SPECT,PET CT **CO4:** To learn about the Gamma camera **CO5** : To learn about the OPG, Dental radiography	
8	Outline syllabus		CO Mapping

	Unit 1	**Basics of Nuclear medicine**			**CO1, CO2**
	A	Basic principles of Radioactivity			CO1, CO2
	B	Radionuclides and their different roles in Nuclear medicine department			CO1, CO2
	C	Instrumentations (Scintillation and detectors) of Radio Nuclide Imaging Production of Radionuclides			CO3, CO2
	UNIT 2	**PRODUCTION OF RADIONUCLIDE**			
	A	Cyclotron			CO2, CO3
	B	Fusion, radionuclide example and their half life originated from fusion			CO2, CO3,
	C	Fission, radionuclide example and their half life originated from fission			CO2, CO3
	Unit 2	**Gamma camera**			
	A	Basic principle of gamma camera			CO4
	B	Construction of gamma camera			CO4
	C	Radionuclides used in gamma camera and role of gamma camera $Tc_{99}m$ generator			CO4
	Unit 3:	**SPECT, PET CT**			
	A	Basic principle of SPECT CT, PET CT Construction of SPECT and PET CT			CO4
	B	FDG_{18} and Role of FDG_{18}			CO4
	C	Clinical role of SPECT CT and PET CT			CO4
	Unit 4	**Diagnostic radiology modalitites and techniques**			
	A	DEXA , principle and working of DEXA			CO5
	B	Digital OPG and Digital dental radiography			CO5
	C	SONO CT, CT angiography, CT perfusion, MRI perfusion. Mammography, Digital Mammography, different view of mammography			CO5,CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**-Physics of diagnostic radiology (christensen),** **-The essential physics of medical imaging (by bushberg 3rd edition)** **- Text book of radiology for residents and technicians 5th Edition by Prof S.K Bahrgava.**			

		Advance Imaging (AIIMS)	
	Other References	AERB website , Radiopedia	

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO311.1	2	2	3	2	2
CO311.2	2	3	2	3	3
CO311.3	2	2	2	2	2
CO311.4	3	3	2	3	2
CO311.5	3	2	3	2	2

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2022-2023**
Branch: All		**SEMESTER: SIXTH**
1	Course Code	BIT-312
2	Course Title	**Radiation Hazards And Its Protections And Planning Of The Department. II**
3	Credits	5
4	Contact Hours (L-T-P)	4-1-0
	Course Status	**Compulsory**
5	Course Objective	1. Defining, listing and recognizing the patient care related issues and resolve it. 2. performing, demonstrating, implementing 3. Applying the concept of general patient care principle in better understanding the relevance Radiographic procedure.
6	Course Outcomes	**CO1**: To develop knowledge **CO2**: To understand the radiological diagnostic needs for patients **CO3**: Learn planning and organization of work **CO4:** Able to handle effective Communication with Peers/ colleagues using medical terminology in communication **CO5** : Learn Radiology Technician's role in maintaining patient's rights

8	Outline syllabus				CO Mapping
	Unit 1:	**Diagnostic X-Ray room**			**CO1, CO2**
	A	Construction, Design Locations, Layout, Room Size			CO1, CO3
	B	Shielding, Illumination, Control Panels, Waiting Area, Choice Of Equipment			CO1, CO3
	C	Radiation Dosimetry In All Modalities			CO1
	Unit 2:	**Radiation Protection In Hospital**			
	A	Radiation protection in Cath lab			CO1, CO2
	B	Radiation protection in operation theatre			CO2, CO3
	C	Radiation protection in Wards, Radiation protection in emergency radiography			CO3, CO4
	Unit 3:	**Radiation measurement devices**			
		TLD Badge , principle and working of TLD			CO2
		OSLD , principle and working of OSLD			CO2,CO4
		Film Badge , principle and working of Film badge			CO3
	Unit 4:	**Quality Control and Quality Assurance**			
	A	Quality Control and Quality Assurance of x-ray			CO2
	B	Quality Control and Quality Assurance of CT			CO3
	C	Quality Control and Quality Assurance of fluoroscopy, Quality Control and Quality Assurance MRI			CO3
	Unit 5	**Area monitoring devices**			
	A	GM Counter, principle and working of GM counter			CO3
	B	Ionization chamber , principle and working of ionization chamber			CO4
	C	Pocket dosimeter, principle and working of ionization chamber			CO3,CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**-Radiation Protection by Euclid Seeram.** **-The essential physics of medical imaging (by bushberg 3rd edition).** **-Quality Assurance in diagnostic radiology and imaging BY prof S.K Bhargava.**			
	Other References	• Articles,journals			

POs COs	PO1	PO2	PO3	PO4	PO5
CO312.1	1	2	2	3	3
CO312.2	3	3	3	3	3
CO312.3	3	3	2	3	3
CO312.4	1	2	3	2	2
CO312.5	1	2	2	2	2

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2022-2023**
Branch: All		**SEMESTER: SIXTH**
1	Course Code	BIT-313
2	Course Title	**Radiographic Techniques for Special procedures-II**
3	Credits	6
4	Contact Hours (L-T-P)	4-2-0
	Course Status	**Compulsory**
5	Course Objective	4. Defining, listing and recognizing the imaging instruments and makes practices. 5. Understanding, characterizing, explaining, identifying parts of imaging equipments and how to use it. 6. Performing, demonstrating, implementing and applying the concept and physics of machines in better understanding the relevance Radiographic equipments.
6	Course Outcomes	**CO1**: To learn about central nervous system and procedures **CO2**: To know about alimentary system and barium procedures **CO3**: To know about biliary system and techniques for biliary system procedures

		CO4: To know about liver and spleen radiography procedures **CO5** : To know about the lymphatic system procedure
8	Outline syllabus	CO Mapping
	Unit 1:	**Central Nervous System**	**CO1,**
	A	Routine projections for skull and spine- ventriculography and encephography	CO1
	B	Injection of contrast media- film series to cover all ventricular outlines	CO1
	C	Central angiography, Myelography – metrhods of contrast injection.	CO1
	Unit 2:	**Alimentary System**	
	A	Barium swallow , Pharynx and oesophagus contrast technique with valsalva manoeuvre – fistula	CO2
	B	Barium meal procedure for fluoroscopic examination of stomach, jejunum and colon appropriate timing- Diaphragmatic hernia- Post – operative examinations	CO2
	C	Barium meal follow through – plain film, erect, P.A., decubitus for abdominal , Barium enema- preparation of the patient- Administration of opaque medium- routine projections under fluoroscopic control, special techniques in colsstomy, Hirschoprung's disease- double contrast enema with insufficiton technique Insuffiception. CT Colonoscopy	CO2
	Unit 3:	**Billary system**	
	A	Routine projections for plain films differentiation of opacities in right hypochondrium (See genitor – urinary system) Respiratory movements.	CO3
	B	Oral cholecystography – preparation of the patient- advice on taking of oral opaque medium- reasons for non-appearance of opaque medium in system	CO3
	C	Intravenous cholecystography (I.V.C) Action of fatty meal- direct and indirect cholangiography- Demonstration of hepatic ducts. PTC – indication , patient preparation and technique	CO3
	UNIT 4:	**Liver and spleen**	
	A	**Peumoperitoneum**- fluoroscopy and radiography of diaphragmatic excursion – selective Aortogram – splenohepatic enography.	CO4
	B	**Arthography** – media for visualizing joint space- asepsie, special projections.	CO4
	C	**Sinography**- tracing of fistulae and inflammatory conditions by opaque media and fluoroscopic control.	CO4
	UNIT 5	**Lymphatic system**	
	A	soft tissue differentiation for regions concerned- calcification of glands-.	CO5
	B	technique for lymphography with colour tracer and opaque media	CO5

	C	Techniques for intraocular F.B. Technique for swallowed bones and obstructions to barium swallow- Techniques to locate non- opaque F.B- Technique for inhaled F.B.			CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**Special procedures (BY whitehouse). Radiographic positioning by Ronald L.Eisenberg MD**			
	Other References	• Radiopedia			

POs COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO313.1	1	2	3	3	3
CO313.2	2	3	3	3	2
CO313.3	3	3	3	3	3
CO313.4	3	3	2	2	2
CO313.5	1	2	1	1	2

School: SAHS		**Batch : 2020-23**
Program: BMIT		**Current Academic Year: 2022-2023**
Branch: All		**SEMESTER: SIXTH**
1	Course Code	BIT-314
2	Course Title	**Radiographic Techniques-II**
3	Credits	6
4	Contact Hours (L-T-P)	4-2-2
	Course Status	Compulsory
5	Course Objective	1. Defining, listing and recognizing the anatomical structure of the human body in relevant to radiographic teqniques. 2. Understanding, characterizing, explaining, identifying and locating the anatomical structure of the human body irrespective to radiographic anatomy.. 3. Performing, demonstrating, implementing and applying the concept of general radiography in better understanding the relevance Radiographic Anatomy and understand diagnostic image. 4. Analyzing, categorizing, comparing and differentiating the anatomical structure of the human body by radiographic image and applying on

		imaging technology as radiographic anatomy	
6	Course Outcomes	**CO1:** To know regarding anatomical terminology and Positioning terminology **CO2:** To develop understanding about positioning of the Thorax and sternum **CO3:** To learn about ct basic protocols **CO4:** To learn to about MRI protocols , angiography **CO5:** To learn about foetal radiography, dental and HSG radiography	
8			CO Mapping
	Unit 1:	**Basic Projection**	**CO1,CO2**
	A	Projection of shoulder joint,sternum.	CO1, CO2
	B	S.I. Joint, Hip joint,	CO1, CO2
	C	patella, calcaneum , lordoic view chest, Apicogram.	CO1
	Unit 2.	**CT basic Protocol**	
	A	All different CT brain protocol HRCT temporal bone and 3d reconstruction	CO3
	B	All CT thorax(NCCT, CECT, HRCT) and abdomen protocol	CO3
	C	CT extremities protocols, VRT, SSD , MPR, MIP	CO3
	UNIT 3:	**MRI Protocols**	
	A	All different MRI brain protocol	CO4
	B	All different MRI MSK (musko-skeltal) protocol (knee, shoulder, wrist, ankle, elbow, pelvis, bony pelvis etc.)	CO4
	C	Multiparametric MRI studies (prostate gland , breast MRI), MRI Dynamic studies	CO4
	UNIT 4:	**CT and MRI Angiography and special investigation**	
	A	CT carotid angiography , head and neck angiography, peripheral angiography, coronary angiography, pulmonary angiography , abdominal aorta angiography, triple phase live	CO5
	B	MRI Brain angiography, Head and neck angiography, MRI epilepsy protocol , MRI pituitary dynamic study etc.	CO5
	C	CT and MRI enterography, CT renal angiography	CO5
	Unit 5	**Procedures for feotal and female infertility**	
	A	Techniques for evaluation of foetal development, maturity, abnormality, position and multiplicity – placentogtaphy - use of compensating filters-–	CO5
	B	contrast media and soft tissue techniques – cystography and arteriography – pelvimerry - consolidation of radiation hazard – Cephalometry	CO5
	C	Hystero- saipingography – preparation of patient- Alternative injection procedures – Radiation Hazards in Obstetric and Gynecological radiography. Dental radiography and OPG.	CO5

	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**-Radiographic positioning by Ronald L.Eisenberg MD** **-K.C Clark**			
	Other References	• Radiopedia			

POs COs	PO1	PO2	PO3	PO4	PO5
CO314.1	3	3	3	3	3
CO314.2	3	3	3	3	2
CO314.3	2	2	2	2	2
CO314.4	1	1	2	1	2
CO314.5	3	2	1	2	3

DEPARTMENT OF RADIOLOGY

SCHOOL OF ALLIED HEALTH SCIENCES,

SHARDA UNIVERSITY, GREATER NOIDA

Rules for Internship Training Programme

1) For the Degree of Bachelor of Imaging Technology, the students after passing the professional examinations as per the syllabi prescribed by the Sharda University, students shall undergo Six Months compulsory rotatory internship training Programme to develop skill and acquire Technical & clinical knowledge with efficiently handle the imaging machines independently.

2) These rules shall be implemented by Department of Radiology, School of Allied Health Sciences, Sharda University, Greater Noida, The evaluation of the interns shall be done very carefully by the In- charge, Internship Training Programme and the Head of the concerned department on the basis of the technical skill, knowledge and ability to handle the imaging machnines and cases independently. The Dean of the college shall have to monitor Internship

Training Programme in collaboration with Heads of the Department and Program coordinators.

3) The Coordinator, Heads of the Program shall be responsible for the maintenance of standard and records of the interns.

General -

Internship is a phase of training where in a candidate is expected to learn technical skill , with fair independence in technical , where as to work under supervision at high risk areas; so that at the end of Internship he/ she is capable to handle the imaging machines independently.

The Rules & Regulations recommended by the Department of Radiology & , School of Allied Health Sciences,

1) The Dean of SAHS & HOD of radiology shall be authorized for implementation of Internship Programme & also for the issue of Internship completion certificate.
2) Internship shall commence not later than One week from the day of declaration of results of 3rd yr BRIT. Examination.
3) It shall be binding on the candidate to follow strictly, the code of conduct prescribed by the Department of Radiology,& School of Allied Health Sciences.
4) Compulsory Internship shall include rotational clinical assignments, Administrative skills over a period of 26 weeks.

On successful completion of Internship, to the satisfaction of the Programm coordinator,Head of Radiology Dept. & the Dean of SAHS, the Internship completion certificate shall be issued by the institution; and it will be forwarded to the Sharda University for the award of B.R.I.T. Degree.

OBJECTIVES -

Radiological imaging encompasses different imaging modalities and processes to image the human body for diagnostic and treatment purposes and therefore plays an important role in initiatives to improve public health for all population groups. Furthermore, Radiological imaging is frequently justified in the follow-up of a disease already diagnosed and/or treated.

At the end of Internship Programme, the candidate shall be able to-

1) Handle all imaging machines independently.

2) Understand the rationale & basic investigative approach to the Medical system & produced images with minimization of radiation dose without compromising diagnostic e quality effectively or make a timely decision for referral to appropriate specialty.

3) Demonstrate skill of managing patients attending duration imaging procedures, by developing skills to use appropriate manipulative techniques and methods

4) Develop ability to understand radiation hazard concepts and its protections & use of appropriate devices as per required investigations.

INTERNSHIP SCHEDULE -

Candidate shall be posted to four Rotational Technical assignments of total 26 weeks,

Modalities	Department/Place	Duration
CT Scan	Radiology Dept	5 weeks
MRI	Radiology dept	5 weeks
Digital/CR x ray/Special inv/Mammography	Radiology dept	4 weeks
Dental	School of Dental Sciences(Radiology dept)	4 weeks
OT (Ortho)/Cath Lab	Ortho Dept	4 weeks
Casualty	Casualty	4 weeks

EVALUATION-

During the rotational posting, student shall handle the imaging machines learn technical parameters and superficial clinical diagnosis on different modalities and handle the patients & also undertake skills of maintaining administrative records & Maintenance of equipment. The candidate shall maintain a **log book & record** all the events of the respective posting He /She shall be closely monitored by the Program coordinator and senior Technical staff in charge throughout the posting & the same shall also sign in the Log book on completion of the assignment.

There shall be Formative & summative assessment at the end of each of the 4 postings given in the schedules.

LEAVE FOR INTERNS -

An internee shall be entitled for maximum 6 days leave (not more than 3 days at a time) during six Months period of internship posting.

An internee will not be permitted to avail more than 2 days leave in any department. The leave other than C.L. will not be admissible.

Any leave in excess of above rule or absence from the work on any ground should be treated, as absence and the intern shall have to complete the required attendance as a repeat day.

Internees cannot avail casual leave without prior permission to Dean \Principal\HOD/Programm coordnator of the college, in emergency interns should intimate within 24 hours, with supporting reasons to the Dean\ Principal \ HOD. Any student taking Leave without prior permission will be compensated for 2 days.

Working hours for interns are to be not less than 7 hours per day.

He\She can avail weekly off\ Sunday and national \Govt. holidays permissible to hospital with prior permission of Hospital Authority.

Issue of Internship completion certificate

Internee will be issued internship completion certificate by the Dean only after completion of internship training Programme satisfactorily.

Active verbs developed based on Bloom's Taxonomy

Knowledge	Understand	Apply	Analyze	Evaluate	Create
define	explain	solve	analyze	reframe	design
identify	describe	apply	compare	criticize	compose
describe	interpret	illustrate	classify	evaluate	create
label	paraphrase	modify	contrast	order	plan
list	summarize	use	distinguish	appraise	combine
name	classify	calculate	infer	judge	formulate
state	compare	change	separate	support	invent
match	differentiate	choose	explain	compare	hypothesize
recognize	discuss	demonstrate	select	decide	substitute
select	distinguish	discover	categorize	discriminate	write
examine	extend	experiment	connect	recommend	compile
locate	predict	relate	differentiate	summarize	construct
memorize	associate	show	discriminate	assess	develop
quote	contrast	sketch	divide	choose	generalize
recall	convert	complete	order	convince	integrate
reproduce	demonstrate	construct	point out	defend	modify
tabulate	estimate	dramatize	prioritize	estimate	organize
tell	express	interpret	subdivide	find errors	prepare
copy	Identify	Manipulate	survey	grade	produce
discover	indicate	Paint	advertise	measure	rearrange
duplicate	Infer	Prepare	appraise	predict	rewrite
enumerate	relate	produce	Break down	rank	role-play

Signature of HOD