Programme Structure

Sharda School of Allied Health Sciences

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

Programme CODE SAH0107

Batch: 2023-2026

Sharda School Allied Health Sciences
Bachelor of Science in Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2023-2026
SEMESTER: FIRST

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[1]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1.		HAN101	Human Anatomy as Applied to Radiology & Imaging –I	4	-	-	4	Core	CC
2.		HYP101	Human Physiology –I	4	-	-	4	Core	CC
3.		BIT106	Basics & Radiation Physics –I	4	-	-	4	Core	CC
4.		ARP101	Commutative English –I	2	-	-	2	SEC	SEC
5.		PAT101	Pathology-I	4	-	-	4	Core	
Practical/Viva-Voce/Jury									
6.		VAM	VAC	0			0		
7.		HAN151	Human Anatomy as Applied to Radiology & Imaging –I (LAB)	-	-	2	1	Core	CC
8.		HPY151	Human Physiology –I (LAB)	-	-	2	1	Core	CC
9.		BIT168	Basic & Radiation Physics –I (LAB)	-	-	2	1	Core	CC
10		PAT151	Pathology-I (LAB)	-	-	2	1	CC	CC
TOTAL CREDITS							**22**		

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

Sharda School Allied Health Sciences

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

Batch: 2023-2026

SEMESTER: SECOND

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[2]: 5. CC 6. AECC 7. SEC 8. DSE
				L	T	P			
THEORY SUBJECTS									
1.		HAN201	Human Anatomy as Applied to Radiology & Imaging –II	4	-		4	Core	CC
2.		HPY201	Human Physiology –II	4	-		4	Core	CC
3.		BIT111	Basic & Radiation Physics – II	4	-		4	Core	CC
4.		ARP102	English –II	2	-		2	SEC	SEC
5.		PAT201	Pathology as Applied to Radiology - II	4	-	-	4	Core	CC
Practical/Viva-Voce/Jury									
6.		OPE	OPE (Open Elective)	2	-	-	2	OPE	OPE
7.		HAN251	Human Anatomy as Applied to Radiology & Imaging –II (PR)	-	-	2	1	Core	CC
8.		HPY251	Human Physiology –II (LAB)	-	-	2	1	Core	CC
9.		BIT173	Basic & Radiation Physics – II (LAB)	-	-	2	1	Core	CC
10		PAT251	Pathology as Applied to Radiology - II (LAB)	-	-	2	1	Core	CC
TOTAL CREDITS							**24**		

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

Sharda School Allied Health Sciences
Allied Health Sciences
Bachelor of Science in Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2023-2026
SEMESTER: THIRD

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[3]: 9. CC 10. AECC 11. SEC 12. DSE
				L	T	P			
THEORY SUBJECTS									
11.		BIT216	Dark Room Techniques– I	4	-		4	Core	CC
12.		BIT217	Patient Care & Medical Ethics of Radiology –I	4	-	-	4	Core	CC
13.		BIT218	Instrumentation for Radiography & Imaging Machines– I	4	-	-	4	Core	CC
14.		BIT219	Radiographic Introductions of extremities –I	4	-	-	4	Core	CC
15.		RMS001	Research Methodology and Statistics	3	-	-	3	Core	CC
16.		BIT215	Introduction of Biochemistry	3	-	-	3	Core	CC
17.		RBL001	RBL (Research Based Learning)	0	0	4	0	Project	Project
18.		VAC	VAC	0	0	0	0		
Practical/Viva-Voce									
19.		BIT221	Dark Room Techniques– I (LAB)	-	-	2	1	Core	CC
20.		BIT001	Clinical Postings- I (LAB)	-	-	2	1	SEC	SEC
TOTAL CREDITS							**24**		

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

Sharda School Allied Health Sciences
Allied Health Sciences
Bachelor of Science in Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2023-2026
SEMESTER: FOURTH

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[4] : 13. CC 14. AEC C 15. SEC 16. DSE
				L	T	P			
THEORY SUBJECTS									
1.		BIT222	Dark Room Techniques– I	4	-	-	4	Core	CC
2.		BIT223	Patient Care & Medical Ethics of Radiology –I	4	-	-	4	Core	CC
3.		BIT224	Instrumentation for Radiography & Imaging Machines– I	4	-	-	4	Core	CC
4.		BIT225	Radiographic Introductions of extremities –I	4	-	-	4	core	CC
5.		OPE	OPE (Open Elective)	2	-	-	2	OPE	OPE
Practical/Viva-Voce									
6.		RBL002	RBL (Research Based Learning)	0	0	4	0	PROJECT	PROJECT
7.		BIT-226	Dark Room Procedure II (LAB)	-	-	2	1	Core	CC
8.		BIT 004	Clinical Postings- II	-	-	2	1	Core	SEC
9.		CCU108	Community Connect	0	4	0	2	SEC	SEC
TOTAL CREDITS							**22**		

[4]

Sharda School Allied Health Sciences
Allied Health Sciences
Bachelor of Science in Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2023-2026
SEMESTER: FIFTH

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[5]: 17. CC 18. AECC 19. SEC 20. DSE
				L	T	P			
THEORY SUBJECTS									
1.		BIT320	Radiographic Technique & parameters -I	4	-	-	4	Core	CC
2.		BIT321	Special Radiographic Techniques& Procedures-I	4	-	-	4	Core	CC
3.		BIT322	Advancements in Imaging Technologies-I	4	-	-	4	Core	CC
4.		BIT323	Radiation Protection & Planning of Radiology Department-I	4	-	-	4	Core	CC
5.		BIT319	Biomedical Waste	2	-		2		SEC
6.		INC001	FSIC (Faculty Student Industry Connect)	2	-		2		CC
Practical/Viva-Voce/Jury									
7.		RBL003	RBL (Research Based Learning)	0	0	4	2		
8.		BIT324	Radiographic Technique & parameters –I (LAB)	-	-	2	1	Core	CC
9.		VAC	VAC	0	0	0	0		
10.		BIT007	Clinical Postings- I(LAB)	-	-	4	2	SEC	SEC
TOTAL CREDITS							**25**		

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

Sharda School Allied Health Sciences
Allied Health Sciences
Bachelor of Science in Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2023-2026
SEMESTER: SIXTH

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[6]: 21. CC 22. AECC 23. SEC 24. DSE
				L	T	P			
THEORY SUBJECTS									
1.		BIT325	Radiographic Technique & parameters -II	4	-	-	4	Core	CC
2.		BIT326	Special Radiographic Techniques& Procedures-II	4	-	-	4	Core	CC
3.		BIT327	Advancements in Imaging Technologies-II	4	-	-	4	Core	CC
4.		BIT328	Radiation Protection & Planning of Radiology Department-II	4	-	-	4	Core	CC
5.		OPE	OPE (Open Elective)	2	-		2	OPE	OPE
6.		RBL004	RBL (Research Based Learning)	-	-	4	2		
Practical/Viva-Voce/Jury									
7.		RBL004	RBL (Research Based Learning)	-	-	4	2		
8.		BIT008	Clinical Postings- II(LAB)	-	-	4	2	Core	CC
9.		BIT330	Radiographic Technique & parameters –II (LAB)	-	-	2	1	Core	SEC
TOTAL CREDITS							**23**		

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

Sharda School Allied Health Sciences
Allied Health Sciences
Bachelor of Science in Radiological Imaging Techniques (Radiology/CT/MRI)
Batch: 2023-2026
SEMESTER: SEVENTH

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite / Co Requisite	Type of Course[7]: 25. CC 26. AECC 27. SEC 28. DSE
				L	T	P			
Practical/Viva-Voce/Jury									
1.		BIT009	INTERSHIP	-	-	40	20	Core	CC
TOTAL CREDITS							**20**		

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

Course Modules

School: SSAHS		**Batch : 2023-26**
Programme: BRIT		**Current Academic Year: 2023-2024**
Branch:		**SEMESTER: FIRST**
1	Course Code	HAN101
2	Course Title	**Human Anatomy – I**
3	Credits	4
4	Contact Hours (L-T-P)	4-0-0
	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 skeleton 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 CO6: Point out various features of appearance of Salivary glands.

8	Outline syllabus		CO Mapping
	UNIT 1	**Anatomical introduction**	
	A	Introduction - human body as a whole, Definitions and terms of anatomy	CO1
	B	Positions and planes	CO1
	C	Types of muscle and difference between them	CO1
	UNIT 2	**Bones and joints**	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) **(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	CO2
	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,
	B	Systemic and pulmonary circulation	CO3
	C	Difference between artery and vein	CO3
	UNIT 4	**Respiratory system**	CO4
	A	Parts of respiratory system – (nose, nasal cavity, pharynx, larynx, trachea, lung, alveoli)	CO4,CO6
	B	Bronchopulmonary segments	CO4
	C	Lung and pleura Names of paranasal air sinuses	CO4
	UNIT 5	**GIT**	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			CO6
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETA	
		25%	25%	50%	
	Text book/s*	1. General anatomy B D Chaursia			
	Other References	Textbook Of Anatomy & Physiology For Nurses			

POs Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	1	2	2	3
CO2	2	2	1	2	2
CO3	3	2	3	2	3
CO.4	2	3	2	2	2
CO5	1	3	3	2	3
CO6	2	3	2	3	3

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

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-24**	
Branch:		**SEMESTER: FIRST**	
1	Course Code	HYP101	
2	Course Title	**Human Physiology –I**	
3	Credits	4	
.	Contact Hours (L-T-P)	4-0-0	
	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 . CO6: Identify organs and tissues under microscope	
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
	C	neuromuscular junction, Difference between skeletal muscle, smooth muscle & cardiac muscle.	CO1,
	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
	UNIT 3	***CARDIO VASCULAR SYSTEM***	**CO3**
	A	Cardiac Muscle, physiological anatomy of the heart & blood vessels, cardiac cycle.	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 , airways, dead space, graph of lung volume & capacities .	CO4
	B	Transport of Gases.	CO4
	C	Regulation of respiration & Hypoxia	CO4
	UNIT 5	***DIGESTIVE SYSTEM***	CO5
	A	Physiological anatomy and functions of GIT, Saliva , Mouth & Oesophagus.	CO5,CO6
	B	Stomach, Pancreas, Liver & Gall Bladder. digestive juices and their functions.	CO5
	C	Small Intestine , Large Intestine , Digestion and Absorption in GIT.	CO6
	Mode of examination	Theory/Practical/Viva	
	Weightage Distribution	CA: 25% / MTE: 25% / ETA: 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**
CO1	3	1	1	1	1
CO2	3	2	1	1	1
CO3	3	3	3	1	2
CO4	3	3	3	1	2
CO5	3	3	3	1	3
CO6	3	3	3	3	3

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

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-24**	
Branch:		**SEMESTER: FIRST**	
1	Course Code	BIT106	
2	Course Title	**Basics and Radiation Physics-I**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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. **CO6:** Differentiate between x-ray equipments and other radiology related 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 voltage.			CO4
	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	
		25%	25%	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
CO1	3	3	2	3	2
CO2	3	3	3	3	3
CO3	3	2	3	3	3
CO4	3	3	3	3	3
CO5	2	3	2	2	2
CO6	3	3	3	3	3

Schools: SSAHS		**Batch :** 2023-2026 **Academic Year:** 2023-2024 **Semester: I**
1	Course Code	**ARP101**
2	Course Title	Communicative English-1
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To minimize the linguistic barriers that emerges in varied socio-linguistic environments through the use of English. Help students to understand different accents and standardise their existing English. Guide the students to hone the basic communication skills - listening, speaking, reading and writing while also uplifting their perception of themselves, giving them self-confidence and building positive attitude.
6	Course Outcomes	After completion of this course, students will be able to: CO1 Develop a better understanding of advanced grammar rules and write grammatically correct sentences CO2 Acquire wide vocabulary and punctuation rules and learn strategies for error-free communication. CO3 Interpret texts, pictures and improve both reading and writing skills which would help them in their academic as well as professional career CO4 Comprehend language and improve speaking skills in academic and social contexts CO5 Develop, share and maximise new ideas with the concept of brainstorming and the documentation of key critical thoughts articulated towards preparing for a career based on their potentials and availability of opportunities. CO6 Function effectively in multi-disciplinary teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality
7	Course Description	The course is designed to equip students, who are at a very basic level of language comprehension, to communicate and work with ease in varied workplace environment. The course begins with basic grammar structure and pronunciation patterns, leading up to apprehension of oneself through written and verbal expression as a first step towards greater employability.
8	Outline syllabus – ARP 101	

	Unit A	**Sentence Structure**	**CO Mapping**
	Topic 1	Subject Verb Agreement	CO1
	Topic 2	Parts of speech	
	Topic 3	Writing well-formed sentences	

	Unit B	**Vocabulary Building & Punctuation**	
	Topic 1	Homonyms/ homophones, Synonyms/Antonyms	CO1, CO2
	Topic 2	Punctuation/ Spellings (Prefixes-suffixes/Unjumbled Words)	CO1, CO2
	Topic 3	Conjunctions/Compound Sentences	CO1, CO2
	Unit C	**Writing Skills**	
	Topic 1	Picture Description – Student Group Activity	CO3
	Topic 2	Positive Thinking - Dead Poets Society-Full-length feature film - Paragraph Writing inculcating the positive attitude of a learner through the movie | SWOT Analysis – Know yourself	CO3, CO2, CO3
	Topic 3	Story Completion Exercise –Building positive attitude - The Man from Earth (Watching a Full length Feature Film)	CO2, CO3
	Topic 4	Digital Literacy | Effective Use of Social Media	CO3
	Unit D	**Speaking Skill**	
	Topic 1	Self-introduction/Greeting/Meeting people – Self branding	CO4
	Topic 2	Describing people and situations - To Sir With Love (Watching a Full length Feature Film)	CO4
	Topic 3	Dialogues/conversations (Situation based Role Plays)	CO4
	Unit E	**Professional Skills | Career Skills**	
	Topic 1	Exploring Career Opportunities	CO4, CO5
	Topic 2	Brainstorming Techniques & Models	CO4, CO5
	Topic 3	Social and Cultural Etiquettes	CO4, CO5
	Topic 4	Internal Communication	CO4, CO5
	Unit F	**Leadership and Management Skills**	
	Topic 1	Managerial Skills	CO6
	Topic 2	Entrepreneurial Skills	CO6
9	Evaluations	*Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE*	*N/A*
10	Texts & References | Library Links	• Blum, M. Rosen. *How to Build Better Vocabulary*. London: Bloomsbury Publication • Comfort, Jeremy (et.al). *Speaking Effectively*. Cambridge University Press	

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PS O1	PSO 2	PSO 3
ARP101.1	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.2	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.3	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP101.5	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP101.6	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-

School: SSAHS		**Batch :** 2023-2026	
Programme: BRIT		**Academic Year:** 2023-2024	
		Semester: 1	
1	Course Code	**PAT101**	
2	Course Title	Pathology as Applied to Radiology **-I**	
3	Credits	**4**	
4	Contact Hours (L)	**4**	
	Course Status	Compulsory	
5	Course Objective	• To introduce basic principles and application relevance of clinical disease for students who are in preparation for laboratory technologists. • The content of rigorous course provide knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis. • It also provide knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease. • The student will be able to properly order and interpret hematologic and coagulation tests, including CBC's, PT's, INR's, and APTT's, for the proper diagnosis and effective treatment of patients with hematologic, bleeding, and thrombotic disorders.	
6	Course Outcomes	CO1: To understand the importance of Haematology CO2: To understand the importance of Laboratory safety guidelines CO3: To understand the importance of Hb, PCV estimation CO4: To understand the importance of Section cutting and Biomedical waste management CO5: To understand the importance of Blood Bank CO6: Identify organs and tissues under microscope	
7	Course Description	● Introduction to Haematology ● Laboratory safety guidelines ● Estimation of Bleeding time, Clotting time, Prothrombin time ● Biomedical waste management	

		● Blood bank			
8	Outline syllabus **Theory**				CO mapping
	Unit 1				
		1. Introduction to Haematology: Normal collection of blood, their structure and function. 2. Various anticoagulants used in Haematology 3. Various instruments and glassware's used in Haematology			CO1, CO2
	Unit 2				
		1. Preparation and use of glassware's. 2. Laboratory safety guidelines 3. SI units and conventional units in hospital laboratory			CO1, CO2
	Unit 3				
		1. Hb, PCV, ESR & Normal haemostasis 2. Bleeding time, Clotting time, Prothrombin time 3. Activated partial thromboplastin time			CO1, CO3
	Unit 4				
		1. Section cutting and Tissue processing for routine paraffin sections 2. Decalcification of tissues & Staining of tissues – H& E staining 3. Biomedical waste management			CO1, CO4
	Unit 5				
		1. Introduction of Blood bank 2. Blood grouping and Rh types 3. Cross matching			CO1, CO5,CO6
	Weightage Distribution for Theory	CA	MTE	ETE	
		25%	25%	50%	
	Weightage Distribution for Practical's	CA	MTE	ETE	
		27	0%	75	

	Text book/s*	1) Histopathology Techniques by Culling 2) Cytology by Koss 3) Clinical diagnosis by Laboratory method by Todd and Sanford 4) Laboratory Technology by Ramnic Sood 5) Practical Haematology by Dacie and Lewis 6) Text book of Pathology by Krishna	

POs **COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	3	3	2	2
CO2	3	3	3	3	3
CO3	2	3	3	2	3
CO4	3	3	3	3	3
CO5	1	1	1	1	1
CO6	3	2	3	1	3

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-24**	
Branch: BRIT		**Semester: I**	
1	Course Code	**PAT151**	
2	Course Title	**PATHOLOGY –I LAB**	
3	Credits	**1**	
4	Contact Hours (L-T-P)	**0-0-2**	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To define the importance of Haematology CO2: To explain the importance of ABO blood grouping CO3: To describe the importance of WBC, RBCs, Platelets estimation CO4: To explain the importance of Bleeding time CO5: To define the importance of Clotting time CO6: To explain the advanced centrifugation techniques	
6	Course Description	• Introduction to Haematology • Laboratory safety guidelines • Estimation of Bleeding time • Estimation of Clotting time • Estimation of Hb and Prothrombin time	
7	Outline syllabus	**PRACTICAL'S**	CO mapping
	Unit 1	**Sahli's & ESR**	CO1, CO2
	A	Collection of Blood sample, Plasma separation	CO1, CO2
	B	Hemoglobin (Hb) estimation Sahli 's method	CO1, CO2
	C	Estimation of ESR	CO1, CO2
	Unit 2	**Blood Grouping**	CO2, CO3, CO4
	A	ABO Blood Grouping	CO2, CO3, CO4
	B	Bleeding Time. Clotting Time	CO2, CO3, CO4
	C	Differential leukocyte count (DLC) Preparation of blood smear	CO2, CO3, CO4
	Unit 3	**Blood Cells**	CO3, CO4,

					CO4
	A	Total White Blood Cell Count in Blood			CO3, CO4, CO4
	B	Total Red Blood Cell Count in Blood			CO3, CO4, CO4
	C	Estimation of Platelets count in Blood			CO3, CO4, CO4
	Unit 4	**BT & CT**			CO4, CO6
	A	Preparation of EDTA Vials			CO4, CO6
	B	Bleeding Time.			CO4, CO6
	C	Clotting Time,			CO4, CO6
	Unit 5	**Centrifuge**			CO5, CO6
	A	Types of Centrifuges,			CO5, CO6
	B	Centrifugation technique			CO5, CO6
	C	Principle, Application and uses			CO5, CO6
	Mode of examination	Practical			
	Weightage Distribution	CA	CE	ETE	
		25	25	50	
	Text Books	1. Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 2. Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers 3. Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates 4. Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
	PATHOLOGY- I (LAB)	CO1	3	3	3	3	1	2	2	1	1
		CO2	3	3	2	3	1	2	3	1	2
		CO3	3	3	3	3	1	2	3	1	3
		CO4	3	3	3	3	2	1	2	1	2
		CO5	3	3	3	3	2	2	3	1	2
		CO6	3	3	3	3	1	1	3	1	2
		Avg PO attainted	3.0	3.0	2.8	3.0	1.3	1.6	2.66	1.0	2.0

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-24**	
Branch: BRIT		**Semester: I**	
1	Course Code	**HPY151**	
2	Course Title	**HUMAN PHYSIOLOGY-I**	
3	Credits	**1**	
4	Contact Hours (L-T-P)	**0-0-2**	
	Course Status	Compulsory	
5	Course Objective	● To learn and understand the fundamental scientific concepts relating to a broad range of topics in human physiology. ● To make the students familiar with the basic factual information concerning the mechanisms and functioning of humans body system. ● To develop investigative skills and to become familiar with standard techniques of measurement. ● To help the students to gain practice and confidence in applying this knowledge, in a quantitative manner where appropriate, to actual experiments.	
6	Course Outcomes	CO1: To define the importance of general physiology of the human body CO2: To explain the importance of nerve muscle physiology CO3: To define the importance, function and function of Blood along with clinical importance CO4:To explain in detail about the information about Cardiovascular system CO5: To describe the respiratory system and its function CO6:To explain about Digestive system of the body	
7	Course Description	● General & nerve muscle physiology ● Blood ● Cardiovascular system ● The respiratory system ● Digestive system	
8	Outline syllabus	**Theory**	Outline syllabus **Theory**
	Unit 1	**Cell Structure, Nerve Tissue, Muscles**	CO1

	A	Cell and cell organelle Structure & function, transport across cell membrane, homeostasis, membrane potential.	CO1
	B	Structure & functions of nerve tissues, physiological properties of nerve fibres, nerve fibre types & functions.	CO1
	C	Neuromuscular junction, Difference between skeletal muscle, smooth muscle & cardiac muscle.	CO1
	Unit 2	**BLOOD**: Composition & functions of blood	CO2
	A	Composition & functions of blood, plasma proteins & haemoglobin.	CO2
	B	Erythrocytes, jaundice, leucocytes & platelets.	CO2
	C	Blood coagulation, blood groups & immunity	CO2
	Unit 3	**Cardiovascular System**	CO3
	A	Cardiac Muscle, physiological anatomy of the heart & blood vessels, cardiac cycle.	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, airways, dead space, graph of lung volume & capacities.	CO4
	B	Transport of Gases.	CO4
	C	Regulation of respiration & Hypoxia.	CO4
	Unit 5	**Gastrointestinal System** : Physiological anatomy of GIT	CO5, CO6
	A	Physiological anatomy of GIT, Saliva, Mouth & Oesophagus.	CO5, CO6
	B	Stomach, Pancreas, Liver & Gall Bladder.	CO5, CO6

	C	Small Intestine, Large Intestine, Digestion and Absorption in GIT.			CO5, CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25	25	50	
	Text Books	1. Textbook Of Physiology Volume 1 & 2 AK Jain 2.Guyton and Hall Textbook of Medical Physiology 3.Medical Physiology-GK Pal and Parvati Pal			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
	HUMAN PHYSIOLOGY-I	CO1	3	3	3	3	1	2	3	2	3
		CO2	3	3	2	3	1	2	3	2	2
		CO3	3	3	3	3	2	3	3	1	3
		CO4	3	3	3	3	2	1	2	1	3
		CO5	3	3	3	3	2	3	2	1	3
		CO6	3	3	3	3	1	1	3	1	2
		Avg PO attainted	3.0	3.0	2.8	3.0	1.5	2.0	2.66	1.33	2.66

School: SSAHS		**Batch : 2023-26**	
Programme:		**BRIT**	
CURRENT ACADEMIC YEAR: 2023-24		**Semester: I**	
1	Course Code	**HAN151**	
2	Course Title	**HUMAN ANATOMY–I LAB**	
3	Credits	**1**	
4	Contact Hours (L-T-P)	**0-0-2**	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To explain about Anatomy and its importance CO2: To describe the importance of epithelium, cartilage and bones CO3: To define the importance of skeletal (TS & LS), smooth and cardiac muscle CO4: To analyze the importance of artery, vein, lymph node, spleen, tonsil and thymus CO5: To explain the importance of respiratory system CO6: To know the applied aspects of various systems of human body.	
6	Course Description	• To define Histology of types of epithelium, serous, mucus and mixed salivary gland, cartilages, bones, skeletal (TS & LS), smooth and cardiac muscles.	
7	Outline syllabus	**PRACTICAL'S**	CO mapping
	Unit 1	**Epithelium and salivary gland**	CO1
	A	Histology of epithelium and salivary gland,	CO1
	B	Histology of cartilage, compact and cancellous bone.	CO1
	C	Histology of muscle tissue.	CO1
	Unit 2	**Bones & Joints**	CO2
	A	Demonstration of all bone.	CO2
	B	Radiograph of bones & joints.	CO2
	C	Demonstration of all body muscles	CO2
	Unit 3	**Lymph Node**	CO3

	A	Histology of Tonsil & Thymus			CO3
	B	Histology of lymph node			CO3
	C	Histology of spleen.			CO3
	Unit 4	**Heart and blood vessels**			CO4, CO6
	A	Histology of blood vessels			CO4, CO6
	B	Demonstration of heart and related structure			CO4, CO6
	C	Radiograph related to heart			CO4, CO6
	Unit 5	**Lungs Structure**			CO5, CO6
	A	Demonstration and histology of lung			CO5, CO6
	B	Demonstration of lung related structure.			CO5, CO6
	C	Radiograph related to lungs.			CO5, CO6
	Mode of examination	Practical			
	Weightage Distribution	CA	CE	ETE	
		25	25	50	
	Text Books	1.Human anatomy vol 1,2,3 ,B D chaurasia. 2.Color Atlas of Cytology, Histology, and Microscopic Anatomy - Bio Nica 3.Netter's Concise Radiologic Anatomy - MedEd Connect			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
	HUMAN ANATOMY-I (LAB)	CO1	3	3	3	3	2	3	2	3	3
		CO2	3	3	2	3	3	3	2	2	3
		CO3	3	3	3	3	2	1	3	3	3
		CO4	3	3	3	3	2	3	2	2	3
		CO5	3	3	3	3	2	2	3	1	3

		CO6	3	3	3	3	1	1	2	2	3
		Avg PO attainted	3.0	3.0	2.8	3.0	2.0	2.1	2.33	2.16	3.0

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-24**	
Branch:		**SEMESTER: FIRST**	
1	Course Code	BIT168	
2	Course Title	**Basics and Radiation Physics-I**	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	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. **CO6:** Differentiate between x-ray equipments and other radiology related 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 voltage.	CO4
	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: 25% / MTE: 25% / ETA: 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**
CO1	3	3	2	3	2
CO2	3	3	3	3	3

CO3	3	2	3	3	3
CO4	3	3	3	3	3
CO5	2	3	2	2	2
CO6	3	3	3	3	3

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-2024**	
Branch:		**SEMESTER: 2ND**	
1	Course Code	HAN201	
2	Course Title	**Human Anatomy - II**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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**: Evaluate the anatomy of reproductive system **CO3**:. Discuss the radiological anatomy and surface anatomy **CO4:** Understand the excretory system anatomy **CO5** : Examine the nervous system anatomy CO6: Analyse structure of neuron and excretory system	
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 positioning-			CO3
	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,CO 6
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETA	
		25%	25%	50%	
	Text book/s*				
	Other References	General anatomy B D Chaursia			

POs COs	PO1	PO2	PO3	PO4	PO5
CO1	1	2	1	2	3
CO2	3	2	3	2	3
CO3	2	3	2	2	3
CO4	1	2	3	1	2
CO5	3	2	3	2	1
CO6	3	2	3	2	1

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

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**BRIT**	
		Semester: II	
1	Course Code	**HAN251**	
2	Course Title	**HUMAN ANATOMY –II (LAB)**	
3	Credits	**1**	
4	Contact Hours (L-T-P)	**0-0-2**	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To define about the importance of urinary system CO2: To describe the location and importance of glands CO3: To explain the importance and role of different types of nerves CO4: To define the importance and parts of Brain CO5: To describe the importance and location of Sensory organs CO6:To analyze and applied aspects of various systems of human body.	
6	Course Description	To define the importance of all the body systems and importance of it in our body.	
7	Outline syllabus	**PRACTICAL'S**	CO mapping
	Unit 1	**Urinary Tract Infection**	CO1, CO6
	A	Demonstration of parts of urinary system	CO1, CO6
	B	Histology of kidney, ureter and urinary bladder	CO1, CO6
	C	Radiograph related to urinary system	CO1, CO6
	Unit 2	**Reproductive System**	CO2
	A	Demonstration of reproductive organ	CO2
	B	Radiograph related to reproductive system	CO2
	C	Function of reproductive organ	CO2
	Unit 3	**Nervous system**	CO3

	A	Demonstration of brainstem and spinal cord	CO3
	B	Demonstration of cerebrum	CO3
	C	Demonstration of cerebellum	CO3
	Unit 4	**Glands**	CO4, CO6
	A	Demonstration of glands	CO4 , CO6
	B	Histology of pituitary gland and thyroid gland.	CO4, CO6
	C	Histology of parathyroid and suprarenal gland.	CO4, CO6
	Unit 5	**Sensory organs**	CO5, CO6
	A	Histology of thick skin & thin skin	CO5, CO6
	B	Histology of tongue	CO5, CO6
	C	Demonstration of tongue	CO5, CO6
	Mode of examination	Practical	
	Weightage Distribution	CA / ETE	
		25 / 75	
	Text Books	1.Color Atlas of Cytology, Histology, and Microscopic Anatomy - Bio Nica 2.Netter's Concise Radiologic Anatomy - MedEd Connect	

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
	HUMAN ANATOMY-II (LAB)	CO1	3	3	3	3	2	1	3	2	1
		CO2	3	3	2	3	2	1	3	1	1
		CO3	3	3	3	3	2	3	3	1	1

		CO4	3	3	3	3	2	2	3	2	1
		CO5	3	3	3	3	2	1	3	2	1
		CO6	3	3	3	3	2	2	3	1	1
		Avg PO attainted	3.0	3.0	2.83	3.0	2.0	1.66	3.0	1.5	1.0

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-2024**	
Branch:		**SEMESTER: SECOND**	
1	Course Code	HPY201	
2	Course Title	**Human Physiology –II**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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. **CO6**: Understand the physiological anatomy of eye ball, rods and cones	
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,
	C	Physiology of micturition and Regulation of Body	CO1,

		Temperature in Humans.			
	UNIT 2	***ENDOCRINE SYSTEM***			**CO2**
	A	General principles of endocrinology, The pituitary Gland.			CO2
	B	The Thyroid Gland , The parathyroids , Calcitonin and Vitamin D.			CO2
	C	The Adrenal Cortex & Pancreas.			CO2
	UNIT 3	***REPRODUCTIVE SYSTEM***			**CO3**
	A	Changes during Puberty, Classification of Male sex hormones and their functions, Spermatogenesis & semen.			CO3
	B	Changes during Puberty, Classification and Functions of female sex hormones, mensturation, ovulation and contraception.			CO3
	C	Physiological changes during pregnancy, functions of placenta and physiology of lactation.			CO3
	UNIT 4	***THE NERVOUS SYSTEM***			CO4
	A	Organisation of Nervous system, The Synapse , Physiology of receptor organs for special and general sensation, physiology of reflex action, classification and properties of reflexes .			CO4
	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,CO6
	A	Taste and Smell.			CO5
	B	Vision—structure and function of eye, errors of refraction & their correction. colour blindness.			CO5
	C	Hearing—structure and function of ear, general outline of mechanism of hearing and perception of sound.			CO5, CO6
	Mode of examination				
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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
CO1	3	3	3	2	2
CO2	3	3	3	3	3
CO3	2	3	3	2	3
CO.4	3	3	3	3	3
CO5	1	1	1	1	1
CO6	3	2	3	1	3

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-24**	
Branch: BRIT		**Semester: 2**	
1	Course Code	**HPY251**	
2	Course Title	**HUMAN PHYSIOLOGY-II**	
3	Credits	**1**	
4	Contact Hours (L-T-P)	**0-0-2**	
	Course Status	Compulsory	
5	Course Objective	● To learn and understand the fundamental scientific concepts relating to a broad range of topics in human physiology. ● To make the students familiar with the basic factual information concerning the mechanisms and functioning of humans body system. ● To develop investigative skills and to become familiar with standard techniques of measurement. ● To help the students to gain practice and confidence in applying this knowledge, in a quantitative manner where appropriate, to actual experiments.	
6	Course Outcomes	CO1:To define the physiology of the different system of the human body CO2: To explain the importance, function and function of Excretory system of body CO3:To get the information about Endocrine system CO4: To describe the Nervous system and its function CO5: To explain the reproductive system and its function CO6:To analyze about special senses of the body	
7	Course Description	● Physiology of Excretion system ● Endocrine system ● Nervous system ● Reproductive system ● Special Senses	

7	Outline syllabus **Theory**		CO mapping
	Unit 1	**Excretory system**	CO1
	A	Physiological anatomy of kidney, structure and functions of excretory system, structure of nephron.	CO1
	B	Mechanism of formation of Urine. & mechanism of concentration and dilution of urine.	CO1
	C	The Countercurrent System: Physiology of micturition and Regulation of Body Temperature in Humans.	CO1
	Unit 2	**Endocrine system**	CO2
	A	General principles of endocrinology, The pituitary Gland.	CO2
	B	The Thyroid Gland, The parathyroid, Calcitonin and Vitamin D	CO2
	C	The Adrenal Cortex & Pancreas.	CO2
	Unit 3	**Reproductive system**	CO3
	A	Changes during Puberty, Classification of Male sex hormones and their functions, Spermatogenesis & semen.	CO3
	B	Changes during Puberty, Classification and Functions of female sex hormones, menstruation, ovulation and contraception.	CO3
	C	Physiological changes during pregnancy, functions of placenta and physiology of lactation.	CO3
	Unit 4	**Nervous system**	CO4
	A	Organisation of Nervous system, The Synapse , Physiology of receptor organs for special and general sensation, physiology of reflex action, classification and properties of reflexes.	CO4
	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, CO6
	A	Taste and Olfaction.	CO5, CO6
	B	Vision—structure and function of the eye, errors of refraction & their correction. Color blindness.	CO5, CO6

	C	Hearing—structure and function of ear, general outline of mechanism of hearing and perception of sound.			CO5, CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25	25	50	
	Text Books	1. Textbook Of Physiology Volume 1 & 2 AK Jain 2.Guyton and Hall Textbook of Medical Physiology 3.Medical Physiology-GK Pal and Parvati Pal			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
	HUMAN PHYSIOLOGY-II	CO1	3	3	3	3	3	3	3	3	3
		CO2	3	3	2	3	3	3	3	3	3
		CO3	3	3	3	3	3	3	2	3	3
		CO4	3	3	3	3	3	3	3	3	3
		CO5	3	3	3	3	2	3	3	3	3
		CO6	3	3	3	3	3	3	3	3	3
		Avg PO attainted	3.0	3.0	2.8	3.0	2.8	3.0	2.83	3.0	3.0

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-2024**	
Branch:		**SEMESTER: SECOND**	
1	Course Code	BIT111	
2	Course Title	**Basics and Radiation Physics-II**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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 equipment. CO6: Discuss image intensifier of fluoroscopy.	
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) , image intensifier	CO4, CO6
	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: 25% / MTE: 25% / ETA: 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**
CO1	3	3	3	3	2
CO2	3	3	2	3	3
CO3	3	3	2	3	3

CO.4	3	3	3	3	3
CO5	3	3	2	3	3
CO6	3	3	3	3	2

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-2024**	
Branch:		**SEMESTER: SECOND**	
1	Course Code	BIT173	
2	Course Title	**Basics and Radiation Physics-II**	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	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 equipment. CO6: Discuss image intensifier of fluoroscopy.	
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) , image intensifier	CO4, CO6
	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: 25% / MTE: 25% / ETA: 50%	
	Text book/s*	**-Physics of diagnostic radiology (christensen), -The essential physics of medical imaging (by bushberg 3rd) - 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
CO1	3	3	3	3	2
CO2	3	3	2	3	3
CO3	3	3	2	3	3

CO.4	3	3	3	3	3
CO5	3	3	2	3	3
CO6	3	3	3	3	2

Schools: SSAHS		Batch : 2023-2026 Current Academic Year: 2023-2024 Semester: II	
1	Course Code	ARP102	
2	Course Title	Communicative English -2	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
5	Course Objective	To Develop LSRW skills through audio-visual language acquirement, creative writing, advanced speech et al and MTI Reduction with the aid of certain tools like texts, movies, long and short essays.	
6	Course Outcomes	After completion of this course, students will be able to: CO1 Acquire Vision, Goals and Strategies through Audio-visual Language Texts CO2 Synthesize complex concepts and present them in creative writing CO3 Develop MTI Reduction/Neutral Accent through Classroom Sessions & Practice CO4 Determine their role in achieving team success through defining strategies for effective communication with different people CO5 Realize their potentials as human beings and conduct themselves properly in the ways of world. CO6 Acquire satisfactory competency in use of Quantitative aptitude and Logical Reasoning	
7	Course Description	The course takes the learnings from the previous semester to an advanced level of language learning and self-comprehension through the introduction of audio-visual aids as language enablers. It also leads learners to an advanced level of writing, reading, listening and speaking abilities, while also reducing the usage of L1 to minimal in order to increase the employability chances.	
8	Outline syllabus – ARP 102		
	Unit A	**Acquiring Vision, Goals and Strategies through Audio-visual Language Texts**	**CO Mapping**
	Topic 1	Pursuit of Happiness / Goal Setting & Value Proposition in life	CO1
	Topic 2	12 Angry Men / Ethics & Principles	

	Topic 3	The King's Speech / Mission statement in life | strategies & Action Plans in Life	
	Unit B	**Creative Writing**	
	Topic 1	Story Reconstruction - Positive Thinking	CO2
	Topic 2	Theme based Story Writing - Positive attitude	
	Topic 3	Learning Diary Learning Log – Self-introspection	
	Unit C	**Writing Skills 1**	
	Topic 1	Precis	CO2
	Topic 2	Paraphrasing	
	Topic 3	Essays (Simple essays)	
	Unit D	**MTI Reduction/Neutral Accent through Classroom Sessions & Practice**	
	Topic 1	Vowel, Consonant, sound correction, speech sounds, Monothongs, Dipthongs and Tripthongs	CO3
	Topic 2	Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds	
	Topic 3	Speech Sounds | Speech Music| Tone | Volume| Diction |Syntax |Intonation | Syllable Stress |	
	Unit E	**Gauging MTI Reduction Effectiveness through Free Speech**	
	Topic 1	Jam sessions	CO3
	Topic 2	Extempore	
	Topic 3	Situation-based Role Play	
	Unit F	**Leadership and Management Skills**	
	Topic 1	Innovative Leadership and Design Thinking	CO4
	Topic 2	Ethics and Integrity	CO4
	Unit F	**Universal Human Values**	
	Topic 1	Love & Compassion, Non-Violence & Truth	CO5
	Topic 2	Righteousness, Peace	CO5
	Topic 3	Service, Renunciation (Sacrifice)	CO5
	Unit G	**Introduction to Quantitative aptitude & Logical Reasoning**	
	Topic 1	Analytical Reasoning & Puzzle Solving	CO6
	Topic 2	Number Systems and its Application in Solving Problems	CO6
9	Evaluations	*Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE*	*N/A*
10	Texts & References | Library Links	• Wren, P.C.&Martin H. *High English Grammar and Composition*, S.Chand& Company Ltd, New Delhi. • Blum, M. Rosen. *How to Build Better Vocabulary*. London: Bloomsbury Publication • Comfort, Jeremy(et.al). *Speaking Effectively*. Cambridge University Press.	

		The Luncheon by W.Somerset Maugham - http://mistera.co.nf/files/sm_luncheon.pdf	

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ARP102.1	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.2	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.3	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP102.5	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP102.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-24**	
Branch: RADIOLOGY		**Semester: 2**	
1	Course Code	**PAT201**	
2	Course Title	**PATHOLOGY II**	
3	Credits	**4**	
4	Contact Hours (L-T-P)	**4-0-0**	
	Course Status	Compulsory	
5	Course Objective	• To introduce basic principles and application relevance of clinical disease for students who are in preparation for laboratory technologists. • The content of rigorous course provide knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis. • It also provide knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease. • The student will be able to properly order and interpret hematologic and coagulation tests, including CBC's, PT's, INR's, and APTT's, for the proper diagnosis and effective treatment of patients with hematologic, bleeding, and thrombotic disorders.	
6	Course Outcomes	CO1: To define the importance of Histopathology CO2: To explain the importance of Grossing and mounting techniques CO3: To describe the importance of Clinical pathology CO4: To analyze the importance of Urine examination CO5: To define the importance of examination of body fluids CO6: To analyze the importance of embedding and mounting techniques	
7	Course Description	• Introduction to Histopathology • Grossing and mounting techniques • Clinical pathology • Urine collection and examination • Examination of body fluid	

7	Outline syllabus **Theory**		CO mapping
	Unit 1	**Introduction To Histopathology, Microscopy, Equipments**	CO1, CO2
	A	Introduction to histopathology and laboratory organization, Laboratory equipment, uses and maintenance, Laboratory hazards and safety precautions.	CO1, CO2
	B	Types of Microscope: Compound microscope-optical system, magnification, and maintenance	CO1, CO2
	C	Microtome -Types, Uses, Parts, different types of microtome knives, care & maintenance. Automated tissue processor components, working & precautions during use, Tissue floating bath	CO1, CO2
	Unit 2	**Tissue processing**	CO2, CO3, CO4
	A	Processing of histological tissues	CO2, CO3, CO4
	B	Reception, Recording and labeling of tissue specimens, Fixation, and various simple fixatives	CO2, CO3, CO4
	C	Processing of histological tissues for paraffin embedding, Embedding, and embedding media, Decalcification.	CO2, CO3, CO4
	Unit 3	**Various Microtomes, uses and application**	CO3, CO6
	A	Microtomes-various types, their working principle and maintenance, Microtomes knives and knife sharpening (honing and stropping) cutting faults and remedies	CO3, CO6
	B	Dye Chemistry, Theory and practice of staining-Hematoxylin and Eosin	CO3, CO6
	C	Introduction, Preparation & Fixation of specimen- Kaiserling solution-1 & Kaiserling solution-2 Precaution taken for the Fixation of Specimens.The mounting of pathological specimens, Storage of Specimens. Mounting of Museum Specimens	CO3, CO6
	Unit 4	**Fixation**	CO4, CO5
	A	Introduction, Preparation & Fixation of specimen	CO4, CO5
	B	Precaution taken for the Fixation of Specimens.	CO4, CO5
	C	The mounting of pathological specimens,	CO4, CO5
	Unit 5	**Embedding and mounting**	CO5, CO6

	A	1. Processing of histological tissues for paraffin embedding, Embedding, and embedding media,			CO5, CO6
	B	2. Decalcification			CO5, CO6
	C	3. Storage of Specimens. Mounting of Museum Specimens			CO5, CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25	25	50	
	Text Books	• Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 • Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers • Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates • Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004 • Histopathology Techniques by Culling • Cytology by Koss			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
	PATHOLOGY- II	CO1	3	3	3	3	2	1	3	3	1
		CO2	3	3	2	3	2	1	3	2	1
		CO3	3	3	3	3	2	1	3	3	1
		CO4	3	3	2	3	2	1	3	3	1
		CO5	3	3	3	3	2	1	3	3	1
		CO6	3	3	3	3	2	1	3	3	1
		Avg PO attainted	3.0	3.0	2.6	3.0	2.0	1.0	3.0	2.83	1.0

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2023-24**	
Branch: RADIOLOGY		**Semester: II**	
1	Course Code	**PAT251**	
2	Course Title	**PATHOLOGY–II LAB**	
3	Credits	**1**	
4	Contact Hours (L-T-P)	**0-0-2**	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To define the importance of Histopathology testing CO2: To explain the importance of instruments in Histopathology CO3: To describe the importance of section cutting CO4: To define the importance of Tissue processing CO5: To analyze the importance of tissue staining CO6: To explain the importance of H&E staining	
6	Course Description	• Histopathology • Instrumentation in histopathology • Section cutting • Tissue processing for routine paraffin sections • Staining of tissues-H & E staining	
7	Outline syllabus	**PRACTICAL'S**	CO mapping
	Unit 1	**Instruments of Histopathology-1**	CO1, CO2
	A	To demonstrate organization of histopathology Laboratory	CO1,CO2
	B	To Study the principle & use of various instrument in histopathology laboratory	CO1, CO2
	C	Microscope, Microtome, microtome blades	CO1, CO2
	Unit 2	**Instruments of Histopathology-II**	CO1, CO2, CO4
	A	To Study the principle & use of wax bath, slide warmer, tissue floating bath, digital balance used in histopathology laboratory	CO1, CO2, CO4
	B	To demonstrate principle, construction & working of Compound microscope	CO1, CO2, CO4

	C	Electron Microscope			CO1, CO2, CO4
	Unit 3	**Fixation**			CO1, CO3, CO4
	A	Process of reception, recording & labeling of various histopathology specimen.			CO1, CO3, CO4
	B	To prepare various fixatives			CO1, CO3, CO4
	C	Demonstrate the process of tissue fixation in Histopathology.			CO1, CO3, CO4
	Unit 4	**Embedding**			CO4, CO5,CO6
	A	To demonstrate the principle and method of tissue embedding using paraffin wax.			CO4, CO5,CO6
	B	To demonstrate the process of decalcification of calcified tissue before processing.			CO4, CO5,CO6
	C	To demonstrate the process of Washing and preparation of wash buffer			CO4, CO5,CO6
	Unit 5	**Microtomy**			CO5, CO6
	A	To study principle, working, maintenance of Microtome & Honing & stropping techniques			CO5, CO6
	B	Used for correcting fault and remedies of microtome knives			CO5, CO6
	C	To demonstrate principle and method of Haematoxylin and eosin staining techniques			CO5, CO6
	Mode of examination	Practical			
	Weightage Distribution	CA	CE	ETE	
		25	25	50	
	Text Books	1. Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 2. Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers 3. Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates **4.** Text book of Pathology by Krishna, V. Krishna (Author),			

		Orient Longman, 2004 **5.** An Introduction to medical laboratory technology, F.J. Baker et al., Butter works and co. , London. **6.** Bancroft and Stevens ,Theory and practice of Histological Techniques, Butterworth's London	

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
	PATHOLOGY-II(LAB)	CO1	3	3	3	3	2	1	3	3	1
		CO2	3	3	2	3	2	1	3	2	1
		CO3	3	3	3	3	2	1	3	3	1
		CO4	3	3	2	3	2	1	3	3	1
		CO5	3	3	3	3	2	1	3	3	1
		CO6	3	3	3	3	2	1	3	3	1
		Avg PO attainted	3.0	3.0	2.66	3.0	2.0	1.0	3.0	2.83	1.0

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2024-2025**	
Branch:		**SEMESTER: THIRD**	
1	Course Code	BIT216	
2	Course Title	Dark Room Techniques– I	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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 discuss about the photographic process: Introduction, visible light, images produced by radiation, light sensitive photographic materials **CO2**: To analyse about the Film processing: Development. The nature of development-manual or automatic. The PH scale **CO3**: To evaluate about the construction of x-ray film & its cross over effect **CO4:** To discuss about the Intensifying screens and cassettes. Luminescence: fluorescence and phosphorescence **CO5** : To explain about the Image characteristic: Real and mental images, reflected, transmitted and emitted light images Photographic emulsions **CO6:** To demonstrate process the radiographic film in different systems	
8	Outline syllabus		CO Mapping
	UNIT 1	**<u>Basic Principle of radiographic film</u>**	**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,CO6
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	2	2	2	2	2	2
CO.4	3	3	3	3	3	3
CO5	2	2	2	2	2	2
CO6	2	2	3	2	2	2
PO ATTAINMENT	2.5	2.5	2.6	2.5	2.5	2.5

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2024-2025**	
Branch:		**SEMESTER: THIRD**	
1	Course Code	BIT221	
2	Course Title	Dark Room Techniques– I (LAB)	
3	Credits	1	
4	Contact Hours (P)	0-0-2	
	Course Status	**Compulsory**	
5	Course Objective	4. Defining, listing and recognizing the x ray films and identify image artefacts and improve it.. 5. Understanding, characterizing, explaining, identifying problems with x ray films and remove it from x ray film and improve image quality. 6. Performing, demonstrating, implementing and applying the concept of darkroom related in better understanding the relevance Radiographic image.	
6	Course Outcomes	**CO1**: To demonstrate about the photographic process: Introduction, visible light, images produced by radiation, light sensitive photographic materials **CO2**: To exercise about the Film processing: Development. The nature of development-manual or automatic. The PH scale **CO3**: To analyse about the construction of x-ray film & its cross over effect **CO4:** To identify about the Intensifying screens and cassettes. Luminescence: fluorescence and phosphorescence **CO5** : To estimate about the Image characteristic: Real and mental images, reflected, transmitted and emitted light images Photographic emulsions **CO6:** To demonstrate process the radiographic film in different systems	
8	Outline syllabus		CO Mapping
	UNIT 1		
	EXPERIMENT-1	Fundamental of photographic emulsion, light sensitive materials, construction and emulsion formation.	CO1, CO2
	EXPERIMENT-2	Formation of latent image. Chemical development of the latent image.	CO1, CO2
	EXPERIMENT-3	Storage of X-Ray films and its transportation.	CO3, CO2
	UNIT 2	**Grain Technology**	

	EXPERIMENT-4	Type of photography emulsion size of grain			CO2, CO4
	EXPERIMENT-5	Advances in film grain technology			CO3, CO4,
	EXPERIMENT-6	Speed of the films			CO3, CO4
	UNIT 3	**Sensitometry**			
	EXPERIMENT-7	Evaluation of emulsion characteristic – density. Contrast and latitude – basic fog- characteristic curve.			CO3
	EXPERIMENT-8	Mechanism of Lumiscence – fluorescence and phosphorescence. Fluorescent screens .			CO4
	EXPERIMENT-9	Cassettes. Intensification factor. Size of crystals			CO4
	UNIT 4	**X RAY films**			
	EXPERIMENT-10	(Construction,all types and its uses)(X-rays, material etc.)			CO4
	EXPERIMENT-11	Cassettes- principle, Construction & types.			CO4
	EXPERIMENT-12	CR Cassette (principle, Construction, function, working and uses), medical imaging films, laser imager, day light processing, dry processing.			CO4
	UNIT 5	**Dark room Processing**			
	EXPERIMENT-13	Dark room Processing agents, Developing Agents			CO2
	EXPERIMENT-14	Function and construction of the developer – standardization by time and temperature			CO2
	EXPERIMENT-15	Process of development- latitude- exhaustion of developer – regeneration by replacement.			CO2,CO 6
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	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	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	2	2	2	2	2	2
CO.4	3	3	3	3	3	3
CO5	2	2	2	2	2	2
CO6	2	2	3	2	2	2
PO ATTAINMENT	2.5	2.5	2.6	2.5	2.5	2.5

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2024-2025**	
Branch:		**SEMESTER: THIRD**	
1	Course Code	BIT217	
2	Course Title	Patient Care & Medical Ethics of Radiology –I	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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 analyse sensitivities involved in patient's right and responsibilities **CO2**: To understand the radiological diagnostic needs for patients **CO3**: Analyse planning and organization of work **CO4:** To describe how handle effective Communication with Peers/ colleagues using medical terminology in communication **CO5** : To understand Radiology Technician's role in maintaining patient's rights CO6: To discuss contrast media used in the radiology department	
8	Outline syllabus		CO Mapping
	UNIT 1	**Hospital staffing and administration**	**CO1, CO2**
	A	Hospital staffing and administration- records- professional ethics in attitudes to patients	CO1, CO3
	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,CO6
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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**	**PO6**
CO1	1	1	2	3	1	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	2
CO.4	3	3	3	3	3	3
CO5	2	2	2	2	2	2
CO6	3	3	3	3	3	2
PO ATTAINMENT	2.5	2.5	2.1	2.8	2.5	2.5

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2024-2025**	
Branch:		**SEMESTER: THIRD**	
1	Course Code	BIT218	
2	Course Title	Instrumentation for Radiography & Imaging Machines– I	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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 discuss about its Principles and about related Equipment **CO2**: To analyse about CT scan, Historical development,its principle and applications **CO3**: To identify about conventional, spiral (helical), Multislice, Historical development, its principle and applications **CO4:** To understand about Computerized Radiography-: Principle, application, asvantage & technique **CO5** : To evaluate about the reconstruction techniques of computed tomography. **CO6:** To discuss post processing of raw Computed Tomography images	
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	CO2, CO1

		fluoroscopy-			
	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,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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**	**PO6**
CO1	3	3	3	3	3	3
CO2	2	2	2	3	3	3
CO3	2	2	2	2	3	2
CO.4	3	3	3	3	3	3
CO5	2	3	3	2	2	2
CO6	2	3	3	2	2	2
PO ATTAINMENT	2.3	2.6	2.6	2.5	2.6	2.5

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2024-2025**	
Branch:		**SEMESTER: THIRD**	
1	Course Code	BIT219	
2	Course Title	Radiographic Introductions of extremities –I	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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 analyse regarding anatomical terminology and Positioning terminology **CO2:** To understanding about positioning of the upper limb **CO3:** To discuss about Chest & Thorax Bones **CO4:** To classify ensure availability of medical and diagnostic supplies **CO5:** To understand about Selecting and performing basic views (projections) and conventional contrast **CO6:** To describe proper thorax position during radiography.	
8			CO Mapping
	UNIT 1	**<u>Introduction of skeleton system</u>**	**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	CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / MTE: 25% / ETE: 50%	
	Text book/s*		
	Other References		

POs	PO1	PO2	PO3	PO4	PO5	PO6

COs						
CO1	1	3	3	3	3	3
CO2	2	3	3	2	3	3
CO3	3	3	3	3	2	2
CO.4	3	3	3	3	3	3
CO5	3	2	2	2	2	2
CO6	3	2	2	2	2	2
PO ATTAINMENT	2.5	2.6	2.6	2.6	2.5	2.5

School: SSAHS	**Batch : 2023-2026 CURRENT ACADEMIC YEAR: 2024-25**	
Programme: BRIT		
Branch:	**Semester:3RD SEM**	
Course Code	RMS001	
Course Title	***Research Methodology and Statistics***	
Credits	3	
Contact Hours	3-0-0	
Course Type	Compulsory	

Course Objective	1. To enable students, comprehend researchissues 2. To enable students to identify research questions and formulate research hypothesis 3. To equip students with various techniques of research design and data collection 4. Toenablestudentstosynthesizequalitativeandquantitativedatacrunchingtechniques
Course Outcomes	CO1: Define the basic concepts and methods of research CO2: To Explain the research issues CO3: Applytheapplicationofdescriptivestatistics in data. CO4:Classify various techniques of research design and data collection CO5:Evaluate quantitative data techniques CO6:Discuss qualitative data techniques
Course Description	TohelpthestudentstounderstandthebasicPrinciplesofbiostatistics&researchmethodology andappliedtodrawtheinferencesfromthedata.

Outline syllabus		COMapping
Unit1	**Introduction to Research**	CO1,CO2
A	● Meaning of research,	CO1,CO2
	● Types of research	CO1,CO2
	● Research Process	CO1,CO2
B	**Literature Review**	CO1,CO2
	● Literature review basics	CO1,CO2
	● Primary data ● Secondary data and exploration	CO1,CO2
C	**Theoretical Framework and Hypothesis Formulation**	CO1,CO2
	● Types of variables	CO1,CO2
	● Exogenous and Endogenous variables	CO1,CO2
	● Formulation of Hypothesis and Research question	CO1,CO2

Unit2	**Research Design**	CO2,CO3
A	• Types of Research design	CO2,CO3
	• Instrument design, Scale formation	CO2,CO3
B	• Basics Biostatistics	CO1,CO3
C	• Methods of data collection	CO2,CO3
	• Questionnaires creation	CO2,CO3
	• Sampling Design	CO2,CO3
Unit3	**Data Analysis &Interpretation**	
A	**-Data Analysis** **-Normality Tests**	
B	· Outlier tests.	CO1,CO3
C	· Hypothesis testing	CO3,CO4
Unit4	**Referencing**	
A	· APA format	CO4,CO5
	MLAformat	CO2,CO3
B	· Harvard Style	CO4,CO5
	· IEEE format	CO2,CO3
C	· · **Report Writing**	CO4,CO5
Unit5	· **Ethical Practices in Research**	CO2,CO3
A	· · Plagiarism	CO5,C06
B	· · Introduction to plagiarism software	CO5,C06
C	· · Legal, Governmental and other norms	CO5,C06
Mode of Examination	·	Theory

Weightage Distribution	CA	· MTE	· ETE
	25%	· 25%	· 50%

Text book/s*	1. Research Methodology-CRKothari Statistics in Medicine-Colton-LittleBrown.Boston
Other References	1. Adler,StierandClark,Howit'sdone:AnInvitationtoSocialResearch 1. 3. Cooper, Schindler , Social Sciences Research Methods:How to start and finish yourthesis,book, or article

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT-Hons		**Current Academic Year: 2024-25**	
Branch:		**Semester: III**	
1	Course Code	**BIT215**	
2	Course Title	**BIOCHEMISTRY**	
3	Credits	**3**	
4	Contact Hours (L-T-P)	**3-0-0**	
	Course Status	Compulsory	
5	Course Objective	• To train the students in the management of medical laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment's used in modern medical laboratories. • To make the students able to do routine laboratory testing under stipulated conditions. • To prepare specimens and operate machines that automatically analyse samples. • To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life. • To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To understand the importance of different types of glassware's and laboratory equipment's CO2: To understand the importance of safety measurements and sampling techniques CO3: To understand the importance of chemistry of carbohydrates CO4: To understand the importance of chemistry of amino acid and proteins CO5: To understand the importance of chemistry of lipids	
7	Course Description	• Introduction of Glassware's • Introduction of Laboratory Equipment's • Safety of measurements in Laboratory, Sampling technique and its preservation • Preparation of Solutions • Acid, Base and Indicators	
		• Nutrition	

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2024-2025**	
Branch:		**SEMESTER: FOURTH**	
1	Course Code	BIT222	
2	Course Title	Dark Room Techniques– II	
3	Credits	4	
4	Contact Hours (L)	4	
	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 define 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 analyse 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 create about the GRIDS types and cassettes **CO5:** To classify about factors and its affects in radiographic film. **CO6:** evaluate the factors affecting image quality in radiographic image and their application.	
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, CO6
	Mode of examination	Theory/Practical/Viva	
	Weightage Distribution	CA: 25% / MTE: 25% / ETE: 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**

CO222.1	1	2	1	2	1
CO222.2	2	2	3	1	1
CO222.3	2	3	2	3	3
CO222.4	3	3	3	2	2
CO222.5	3	3	3	3	3
CO222.6	3	3	3	3	3
PO ATTAINMENT	2.3	2.6	2.5	2.3	2.1

School: SSAHS		**Batch : 2023-26**
Programme: BRIT		**Current Academic Year: 2024-2025**
Branch:		**SEMESTER: FOURTH**
1	Course Code	BIT226

2	Course Title	**Dark Room TECHNIQUES – II (LAB)**	
3	Credits	1	
4	Contact Hours (P)	1	
	Course Status	Compulsory	
5	Course Objective	6. Acquire skills necessary for safe and effective darkroom practice, 7. Mix and store chemicals to perform at their optimum. 8. Choose materials suitable for the range of work to be undertaken 9. Describe the necessity for separate wet and dry areas 10. Develop an appreciation of print tonality on final interpretation of images.	
6	Course Outcomes	**CO1:** To analyze 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 understand 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 discuss about Location To understand about Layout, To understand Illumination, To understand about related, Accessories & apparatus required **CO4:** To evaluate about the GRIDS types and cassettes **CO5:** To explain about factors and its affects in radiographic film. **CO6:** Discuss the factors affecting image quality in radiographic image and their application.	
8			CO Mapping
	UNIT 1	**Developing**	
	EXPERIMENT-1	Types of **developer** used in radiography powder and liquid concentrates- standard high contrast and high energy developers-	CO1
	EXPERIMENT-2	Ultra rapid development methods- increased temperature.	CO1
	EXPERIMENT-3	Used of replenisher, Special ultra rapid developer combined developer/ fixer solutions.	CO1,CO2
	UNIT 2	**Fixation**	**CO2**
	EXPERIMENT-4	- fixing agents- constituents of radiographic fixer and function of the chemicals fixation time exhaustion of fixer-	CO2

	EXPERIMENT-5	Silver recovery combined with generation of fixer (electrolysis)- other silver recovery methods- rapid fixer.	CO2
	EXPERIMENT-6	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**	
	EXPERIMENT-7	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
	EXPERIMENT-8	Processing apparatus – temperature control- immersion heaters- thermostat – ice cooling and refrigeration cooling. Type and care of hangers. Technical and processing faults	CO3
	EXPERIMENT-9	Fog, static pressure, screen artifacts	CO3
	UNIT 4	**Dark Room Lay out**	
	EXPERIMENT-10	The X-Ray dark room- minimum dimensions- planned circulation and layout – light proofing- ventilation- radiation protection- radiation and chemical proof materials.	CO3
	EXPERIMENT-11	Bench design, film hoppers, film makers, hanger location- Location of processing unit- Pass box, fixer or wash tank	CO3,CO4
	EXPERIMENT-12	Wet of dry viewing rooms following manual of automatic processing rapid drying apparatus- effects of circulation and layout planning of efficiency	CO3
	UNIT 5	**Factors affecting radiographic film**	
	EXPERIMENT-13	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
	EXPERIMENT-14	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
	EXPERIMENT-15	Dental mounts, films, films envelopes- filling system and units- stores viewers, Fluorescent	CO5, CO6

		screen photography- photofluorography, Cineradiography and cineradiography, Cassettes types- film magazines – manual and automatic operation.			
	Mode of examination	Theory/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		25%	-	75%	
	Text book/s*	• Physics of diagnostic radiology (by christensen). • Principles of radiographic imaging by Richard R.Carlton (5th or 6th Edition) • DN,MO Chesney			
	Other References	• Articles/Internet			

POs Cos	PO1	PO2	PO3	PO4	PO5
CO1	1	2	1	2	1
CO2	2	2	3	1	1
CO3	2	3	2	3	3
CO4	3	3	3	2	2
CO5	3	3	3	3	3
CO6	3	3	3	3	3
PO ATTAINMENT	2.3	2.6	2.5	2.3	2.1

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2024-2025**	
Branch:		**SEMESTER: FOURTH**	
1	**Course Code**	BIT223	
2	**Course Title**	Patient Care & Medical Ethics of Radiology –II	
3	Credits	4	
4	Contact Hours (L)	4	
	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 discuss understanding about Drugs in the x-ray department **CO2:** To analyse How to handle: Children, Adult etc **CO3:** To understand how handle patient in special conditions **CO4:** To understand about Preparation of the patient for special radiological procedure **CO5:** To understand about Side effect and reaction of contrast media, classification of reactions of contrast media and treatment of contrast reactions **CO6:** Discuss how to management and Care of patient during emergency situations.	
8			CO Mapping
	UNIT 1	**Emergency Trolley**	
	A	Trolley setting for special X-Ray examinations, like barium study, IVP study, HSG study,	CO1
	B	Emergency trolley and drugs and	
	C	all type needle, syringe, Catheters, cannula.	
	UNIT 2	**Safety**	
	A	Safety of patient	CO2
	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,	CO3
	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			CO4
	B	patient having oxygen therapy,			
	C	Patient having intravenous infusion of fluid.			
	UNIT 5	**Reactions**			
	A	**Contrast reactions**			CO5,CO6
	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	
		25%	25%	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**	**PO6**
CO1	1	2	3	2	2	2
CO2	2	1	2	3	2	3
CO3	3	2	1	3	3	3
CO4	3	3	3	2	1	2
CO5	1	3	3	1	1	1
CO6	3	3	3	3	3	3
PO ATTAINMENT	2.1	2.3	2.5	2.3	2	2.3

School: SSAHS		**Batch : 2023-26**
Programme: BRIT		**Current Academic Year: 2024-2025**
Branch:		**SEMESTER: FOURTH**
1	Course Code	BIT224
2	Course Title	Instrumentation for Radiography & Imaging Machines– II
3	Credits	4
4	Contact Hours (L)	4
	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 understand to prepare the patient and the fluroscopy machine and room for the procedure **CO2:** To analyze regarding Ultrasound Scanning principal Display of images, modes Doppler ultrasound **CO3:** To construct about Magnetic Resonance Imaging (MRI)-: Principle, application, its advantage over computed tomography or ultra sonography. Its limitations, uses & cross sectional anatomy. **CO4:** To understand about Mammography, Equipment, Positioning and projections **CO5:** To discuss about portable and mobile radiography and its uses,advantages,Disadvantages **CO6:** To explain about x-ray equipments and other radiology related equipments
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,CO6
	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	
		25%	25%	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	PO6
CO1	3	3	3	3	2	3
CO2	3	2	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	3	3	3	3
CO5	3	3	2	3	2	2
CO6	3	3	2	3	2	2
PO ATTAINMENT	2.8	2.6	2.6	3	2.5	2.6

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2024-2025**	
Branch:		**SEMESTER: FOURTH**	
1	Course Code	BIT225	
2	Course Title	Radiographic Introductions of extremities –II	
3	Credits	4	
4	Contact Hours(L)	4	
	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 Outcomes	**CO1:** To understand regarding anatomical terminology **CO2:** To classify regarding Exposure factors : Millie ampere, Kilovolt age **CO3:** Understand clinical observation of radiology department , radiographic procedures and x-ray equipment. **CO4:** To define radiographic positioning terms , manipulate equipment properly, **CO5:** To identify position and align anatomical structure and equipment, evaluate images for proper demonstration of anatomy and pathology. **CO6:** Explain the radiographic appearances of both normal and common abnormal conditions.	
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	CO1,CO2,

		ankle joint), tibia, fibula			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,CO6
	C	Child Radiography for (upper and lower limbs)			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETA	
		25%	25%	50%	
	Text book/s*	**-Radiographic positioning by Ronald L.Eisenberg MD** **-K,C Clark**			
	Other References	• Radiopedia			

POs **Cos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	1	1	1	1	2	2
CO2	2	3	3	3	3	3
CO3	3	2	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	3	2	1	1
CO6	1	2	1	2	1	1
PO ATTAINMENT	2.2	2.3	2.1	2.3	2.1	2.1

School: SSAHS		**BATACH- 2023-26**
Programme: BRIT		**Current Academic Year: 2024-25**
Branch:		**SEMESTER: FOURTH**
1	Course Code	BIT004
2	Course Title	**Clinical Postings**
3	Credits	1
4	Contact Hours (P)	2
	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** - The hospital posting project will enable our students to acquire knowledge and skills which will help them take up jobs in hospitals. **CO2**- These types of activities will give practical exposure to our students working in a hospital. **C03**- These postings will add value to students, faculty members, school and university. **CO4**- understand the role of imaging technology for OPD patients. **CO5**- Understand hospital working and patient preparation for radiological procedures in hospital.

8			CO Mapping
-	**UNIT 1**	**Introduction of X-ray**	**CO1, CO2**
	A	Anode	CO1, CO2
	B	Cathode	CO1
	C	Principles of radiation protection and Methods of radiation protection	CO1
	UNIT 2	**Introduction of CT**	
	A	PRINCIPLE	CO1
	B	PARTS AND FUNCTIONS	CO1
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN	CO1, CO2
	UNIT 3	**Introduction of MRI**	

	A	PRINCIPLE			CO2
	B	PARTS AND FUNCTIONS			CO2
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN			CO1,CO2,CO3
	UNIT 4	**Introduction of FLUOROSCOPY**			
	A	PRINCIPLE			CO3
	B	PARTS AND FUNCTIONS			CO3
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN			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	MTE	ETE	
		30%	20%	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**	**PO6**
CO1	1	1	1	1	2	2
CO2	2	3	3	3	3	3
CO3	3	2	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	3	2	1	1
CO6	1	2	1	2	1	1
PO ATTAINMENT	2.2	2.3	2.1	2.3	2.1	2.1

School: SSAHS		**Batch:2023-2026 CURRENT ACADEMIC YEAR: 2024-25**	
Programme: BRIT			
		Semester: 4th	
1	**Course Code**	**CCU108**	
2	**Course Title**	**Community Connect**	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. The objective of assigning the project related to community work is to expose our students to different social issues faced by the people in different sections of society. 2. This type of project work will help the students to develop better understanding of problems of people living in disadvantage position in the society, may be socially, medically, economically, or otherwise. 3. This type of live project work will help our students to connect their class-room learning with practical issues/problems in the society.	
6	Course Outcomes	Students will be able to: 1. **CO1: Students develop awareness** of the social, health, and environmental challenges faced by the community 2. **C02: Students are more appreciative** of socio-economic realities beyond textbooks and classrooms 3. **CO3: Students described to apply their knowledge** through research, awareness creation, and services for community benefit 4. **CO4: Students are able to carry** out community-based projects with sincerity, teamwork and timely delivery 5. **CO5: Students learn to respectfully engage** with communities with purposive intent to contribute to society and sustainable development 6. **C06: Students are understand to document and present** their community project findings in an academically robust manner	
7	Course Description	In Community Connect projects, students will learn how to identify problems of rural and underprivileged communities by conducting surveys, or will help the communities by providing services or solutions for the issues faced by them.	
8	Outline syllabus		CO Mapping
	Unit 1	Team/Group formation and Project Assignment. Problem Definition & Finalizing the problem statement, Resource requirement, if any.	CO1, CO2
	Unit 2	Develop a useful questionnaire or service to the community that will aid in achieving the objectives of the project.	CO2, CO3. CO4

	Unit 3	Learn how to interact with the community members, whether in survey or service-based project – to help develop a more open mindset in the students.			CO3, CO4, CO5
	Unit 4	Analysis of survey data and/or impact on the community members.			CO3, CO4
	Unit 5	Demonstrate and justify their findings in light of the data they have gathered, or show the benefits to the community of the actions they have taken.			CO4, CO5, CO6
	Mode of examination	Practical /Viva			
	Weight age Distribution	CA	MTE	ETE	
		25%	NA	75%	

POs Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	1	1	1	1	2	2
CO2	2	3	3	3	3	3
CO3	3	2	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	3	2	1	1
CO6	1	2	1	2	1	1
PO ATTAINMENT	2.2	2.3	2.1	2.3	2.1	2.1

School: SSAHS		**BATCH – 2023-26**	
Programme: BRIT		**CURRENT ACADEMIC YEAR: 2025-26**	
Branch:		**SEMESTER: FIFTH**	
1	Course Code	**BIT319**	
2	Course Title	**Biomedical Waste**	
3	Credits	2	
4	Contact Hours (L)	2	
	Course Status	**Compulsory**	
5	Course Objective	1**:** Defining, listing and understanding biomedical waste 2. Understanding, characterizing & explaining the biomedical waste system . 3. Performing, demonstrating & implementing the concept biomedical waste Principles in the Practice of hospital with new technology.	
6	Course Outcomes	**CO1**: Demonstrate the general biomedical waste aspects to make the fundamental concepts of waste. **CO2**: Describe the composition, functions and applied related to biomedical waste **CO3**: Demonstrate an understanding of new technology, its structure, functioning and related applied aspects. **CO4:** Discuss the basic Principles of structure, functions and applied of biomedical waste management system. **CO5**: Explain the structure, functions and applied of biomedical waste management in hospital **CO6**: To analyse and decide the treatment and disposal scheme of waste as per the guidelines of monastery of Health	
8	Outline syllabus		CO Mapping
	UNIT 1	**BIOMEDICAL WASTE introduction**	
	A	Definition of Biomedical Waste	CO1,CO2
	B	BMW – Segregation, collection, transportation, disposal	CO1,CO2
	C	collection, transportation, disposal	CO1,CO2
	UNIT 2	**TYPES OF WASTE**	CO1,CO2
	A	Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste,	CO2
	B	BMW Management methods of disinfection	CO2
	C	methods of disinfection	CO2
	UNIT 3	**NEW TECHNOLOGY FOR BIOMEDICAL WASTE**	**CO3**
	A	Modern technology for handling BMW,	CO3,.CO1
	B	Monitoring of cross infection	CO1,CO3
	C	controlling of cross infection (Protective devices)	CO3
	UNIT 4	**ADMINISTRATION OF BIOMEDICAL WASTE**	CO1,CO4
	A	BMW from Administrative point (Budget, Health check-up, Insurance) ,	CO4

	B	Biomedical waste- handling rule, segregation, collection,	CO4
	C	transportation, disposal, modern.	CO4
	UNIT 5	**BIOMEDICAL WASTE IN HOSPITAL**	CO1,CO5
	A	Technology, for disposal radioactive waste handling,	CO5
	B	Disaster managements in hospital: definition,	CO5 CO6
	C	Types OF Disaster managements in hospital	CO5 CO6
	Mode of examination	Theory/	
	Weightage Distribution	**CA MTE ETE** **25% 25% 50%**	
	Text book/s*	Reference Book: 1.Prospects and perspective of solid waste management by B. B. Hosetti.	
	Other References	Biomedical waste management: understanding the issues and planning by Canadian Institute (1985-).	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	3	3	3	3
CO 2	2	3	2	2	3	3
CO.3	3	2	3	3	3	3
CO 4	3	3	2	2	3	3
CO 5	3	3	2	3	3	3
CO 6	3	2	2	2	3	3
PO Attainment	**2.6**	**2.6**	**2.3**	**2.5**	**3**	**3**

School: SSAHS		**Batch : 2023-26**	
Programme : BRIT		**Current Academic Year: 2025-2026**	
Branch:		**SEMESTER: FIFTH**	
1	Course Code	BIT320	
2	Course Title	**Radiographic Technique & parameters –I**	
3	Credits	4	
4	Contact Hours(L-T-P)	4-0-0	
	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 understand about dental radiographic positioning **CO4:** To explain about lung & Thorax Bones **CO5:** To develop understanding about Selecting and performing basic views (projections) and conventional contrast. **CO6:** To summerized the basic patient positioning during radiographic investigation**.**	
8			CO Mapping
	UNIT 1	**<u>Introduction of Skeleton system</u>**	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	**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	**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	**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	**Radiography of Diaphragm**			
	A	Diaphragmatic excretion			CO4,CO5
	B	Double exposure technique			CO5
	C	Mediastinum – routine projections			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	Total
		25	25	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	PO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	3	3	3	2	3	2
CO4	3	2	3	3	3	3
CO5	1	2	3	2	1	2
CO6	1	2	3	2	1	2
PO Attainment	2.3	2.5	3	2.5	2.1	2.5

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2025-2026**	
Branch:		**SEMESTER: FIFTH**	
1	Course Code	**BIT-324**	
2	Course Title	**Radiographic Technique & parameters -I (LAB)**	
3	Credits	1	
4	Contact Hours(L-T-P)	0-0-2	
	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. **CO6:** To understand the basic patient positioning during radiographic investigation**.**	
8			**CO Mapping**
	UNIT 1		CO1, CO2
	Experiment 1	Demonstration of bones of skeleton system of human body	CO1, CO2
	Experiment 2	Assessment of all bones, joints, movements.	CO1, CO2
	Experiment	Demonstration of all Radiographic terminology related projections.	CO1

	3				
	UNIT 2				
	Experiment 4	Assessment of Skull related radiographic terminology			CO2
	Experiment 5	Examination of routine projections like AP, Lateral, facial bones, nasal bone			CO2
	Experiment 6	Demonstration of special projection in skull including petrous, oral, mastoids, accessory nasal arches, nasal bone, maxilla, mandible, T.M. Joint, optic foramina,			CO2
	UNIT 3				
	Experiment 7	Demonstration of Dental views			CO3
	Experiment 8	Assessment of Intra oral and extra oral projection			CO2, CO3
	Experiment 9	Examination of Occlusal view. (manual/Digital), OPG & CBCT			CO3
	UNIT 4				
	Experiment 10	Assessment of routine projection- evaluation of unilateral density			CO4
	Experiment 11	Demonstration of inspiration and expiration exposures.			CO4
	Experiment 12	Experiment on Valsalva and Muller manoeuvres- Pleura Techniques to demonstrate fluid levels.			CO4
	UNIT 5				
	Experiment 13	Assessment of diaphragmatic excretion			CO4,CO5
	Experiment 14	Demonstration of double exposure technique			CO5
	Experiment 15	Assessment of Mediastinum – routine projections			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	Total
		25%	25%	50%	100
	Text book/s*	1. K. C. Clerk Radiographic positioning **2. Radiographic positioning by Ronald L.Eisenberg MD** **3. Special procedures (BY whitehouse)**			
	Other References	• Radiopedia			

PO Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	2
CO3	3	3	3	2	3	2
CO4	3	2	3	3	3	2
CO5	1	2	3	2	1	3
CO6	1	2	3	2	1	2
PO Attainment	2.3	2.5	3	2.5	2.1	2.1

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2025-2026**	
Branch:		**SEMESTER: FIFTH**	
1	Course Code	**BIT321**	
2	Course Title	**Special Radiographic Investigations& Procedures-I**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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 CO6: To learn the position of patients for radiological procedures.	
8			CO Mapping
	UNIT 1	**<u>Salivary Glands</u>**	**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	**<u>Angiography</u>**	**C01,CO3**
	A	General and selective abdominal angiography,	CO1, CO3

		Peripheral angiography	
	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.	CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / MTE: 25% / ETE: 50%	
	Text book/s*	**1. Special procedures (BY whitehouse).** **2. Radiographic positioning by Ronald L.Eisenberg MD**	
	Other References	• Radiopedia	

PO COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	2	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	3	3	2	2
CO5	2	2	2	2	2	2
CO6	2	2	2	2	2	2
PO Attainment	2.5	2.5	2.6	2.5	2.5	2.5

School: SSAHS		**Batch : 2023-26**
Programme: BRIT		**Current Academic Year: 2025-2026**
Branch:		**SEMESTER: FIFTH**
1	Course Code	**BIT322**
2	Course Title	**Advancements in Imaging Technologies-I**
3	Credits	4
4	Contact Hours (L-T-P)	4-0-0
	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 equipment and how to use it.. 3. Performing, demonstrating, implementing and applying the concept and physics of machines in better understanding the relevance Radiographic equipment.
6	Course Outcomes	**CO1:** To discuss about radionuclide and their half life **CO2:** To explain about PET-CT , Gamma camera imaging and instrumentation **CO3:** To know about recent advances in imaging technology-: of ultrasound, colour Doppler, different types of transducers, their principles, applications **CO4:** To know about CT scan, conventional, spiral (helical), Multislice CT **CO5:** To know about Magnetic Resonance Imaging (MRI)-: Principle, application, its advantage over computed tomography or ultra sonography. **CO6:** Describe advancement of CT technology
8			CO Mapping
	<u>UNIT 1</u>	**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			CO5
	UNIT 4	**Advancement in USG**			
	A	Advancements in convectional Ultrasound techniques			CO3
	B	Advancements in Doppler ultrasound techniques			CO3
	C	Advance application in Doppler US			CO3
	UNIT 5	**<u>Advancement in CT</u>**			
	A	CT advancement, Advancement on detector technology			CO4
	B	CT X ray tube advancements			CO5
	C	CT applications like, dual source CT, Portable CT,			CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	**1-Physics of diagnostic radiology (christensen),** **2-The essential physics of medical imaging (by bushberg 3rd edition)** 3- **Text book of radiology for residents and technicians 5th Edition by Prof S.K Bahrgava.** **4.Advance Imaging (AIIMS)**			
	Other References	AERB website , Radiopedia			

PO COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	3	3	3	2
CO2	2	2	3	3	3	2
CO3	3	3	2	3	2	3
CO4	3	3	3	2	3	1
CO5	3	1	2	1	1	2
CO6	3	1	2	1	1	2
PO Attainment	2.6	2	2.5	2.1	2.1	2.1

School: SSAHS		**Batch : 2023-26**
Programme: BRIT		**Current Academic Year: 2025-2026**
Branch:		**SEMESTER: FIFTH**
1	Course Code	**BIT323**
2	Course Title	**Radiation Protection & Planning of Radiology Department-I**
3	Credits	4
4	Contact Hours (L-T-P)	4-0-0
	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 equipment and how to use it.. 3. Performing, demonstrating, implementing and applying the concept and physics of machines in better understanding the relevance Radiographic equipment.
6	Course Outcomes	**CO1:** To develop understanding for biological effect of radiation and Orientation to Radiation Protection **CO2:** To explain about various radiation units – Roentgen, rad, rem, etc CO3: 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 **CO5:** To know how to minimize the harmful effects of ionizing radiation **CO6:** To perform radiographic procedures ensuring safety of patients and personnel involved

8			CO Mapping
	<u>UNIT 1</u>	**<u>Introduction of radiation hazards</u>**	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 CO6
	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 (teratogenic effect)	CO2

	B	Radiations units			CO2
	C	Radiation effect on DNA , RNA,,			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			CO4CO6
	B	Storage , handling and maintenance of radiation protective equipment/devices			CO4,C05,CO6
	C	Role of different regulatory bodies regarding radiation protection in india			CO4,CO5&CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	**Radiation Protection by Euclid Seeram.** **The essential physics of medical imaging (by bushberg 3rd edition)**			
	Other References	AERB Web content			

PO COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	2
CO4	2	2	2	3	2	3
CO5	3	2	3	2	3	3
CO6	3	3	2	3	2	2
PO Attainment	**2.8**	**2.6**	**2.6**	**2.8**	**2.6**	**2.6**

School: SSAHS		**BATCH – 2023-26**
Programme: BRIT		**CURRENT ACADEMIC YEAR: 2025-26**
Branch:		**SEMESTER: FIFTH**
1	Course Code	BIT007
2	Course Title	**Clinical Postings**
3	Credits	2
4	Contact Hours (P)	4
	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** - The hospital posting project will enable our students to acquire knowledge and skills which will help them take up jobs in hospitals. **CO2**- These types of activities will give practical exposure to our students working in a hospital. **C03**- These postings will add value to students, faculty members, school and university. **CO4**- understand the role of imaging technology for OPD patients. **CO5**- Understand hospital working and patient preparation for radiological procedures in hospital.

8			CO Mapping
-	**UNIT 1**	**Introduction of X-ray**	**CO1, CO2**
	A	Anode	CO1, CO2
	B	Cathode	CO1
	C	Principles of radiation protection and Methods of radiation protection	CO1
	UNIT 2	**Introduction of CT**	
	A	PRINCIPLE	CO1
	B	PARTS AND FUNCTIONS	CO1
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN	CO1, CO2
	UNIT 3	**Introduction of MRI**	
	A	PRINCIPLE	CO2

	B	PARTS AND FUNCTIONS			CO2
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN			CO1,CO2,CO3
	UNIT 4	**Introduction of FLUOROSCOPY**			
	A	PRINCIPLE			CO3
	B	PARTS AND FUNCTIONS			CO3
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN			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	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**Radiation Protection by Euclid Seeram.** **The essential physics of medical imaging (by bushberg 3rd edition)**			
	Other References	AERB Webcontent			

PO COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	2
CO4	2	2	2	3	2	3
CO5	3	2	3	2	3	3
CO6	3	3	2	3	2	2
PO Attainment	**2.8**	**2.6**	**2.6**	**2.8**	**2.6**	**2.6**

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2025-2026**	
Branch:		**SEMESTER: SIXTH**	
1	Course Code	BIT325	
2	Course Title	**Radiography Technique AND PARAMETERS-II**	
3	Credits	4	
4	Contact Hours (L-T)	4-0-0	
	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 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	**<u>Procedures for feotal and female infertility</u>**	
	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	

PO COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	2
CO4	2	2	2	3	2	3
CO5	3	2	3	2	3	3
CO6	3	3	2	3	2	2
PO Attainment	**2.8**	**2.6**	**2.6**	**2.8**	**2.6**	**2.6**

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2025-2026**	
Branch:		**SEMESTER: SIXTH**	
1	Course Code	**BIT326**	
2	Course Title	**Special Radiographic Investigations & Procedures-II**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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 equipment.	
6	Course Outcomes	**CO1**: To Understand about central nervous system and procedures **CO2**: To explain about alimentary system and barium procedures **CO3**: To described about biliary system and techniques for biliary system procedures **CO4:** To discussed about liver and spleen radiography procedures **CO5** : To explain about the lymphatic system procedure **CO6:** To analyse about Techniques for intraocular F.B. Technique for swallowed bones and obstructions to barium swallow-	
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	CO2

		control, special techniques in colsstomy, Hirschoprung's disease- double contrast enema with insufficiton technique Insuffiception. CT Colonoscopy	
	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, CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / MTE: 25% / ETE: 50%	
	Text book/s*	**Special procedures (BY whitehouse).** **Radiographic positioning by Ronald L.Eisenberg MD**	
	Other References	• Radiopedia	

PO COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	2	3	3	3	3
CO2	2	3	3	3	2	3
CO3	3	3	3	3	3	3
CO4	3	3	2	2	2	3
CO5	1	2	1	1	2	3
CO6	1	2	1	1	2	3
PO Attainment	1.8	2.5	2.1	2.1	2.3	3

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2025-2026**	
Branch:		**SEMESTER: SIXTH**	
1	Course Code	**BIT327**	
2	Course Title	**Advancements in Imaging Technologies-II**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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 discussed about the Nuclear medicine and radionuclides **CO2**: To understand about the production of Radio-nuclide **CO3**: To analyse about the cyclotron, SPECT, PET CT **CO4:** To described about the Gamma camera **CO5** : To explain about the OPG, Dental radiography CO6: To learn about the MRI, CT perfusion technology	
8	Outline syllabus		CO Mapping
	Unit 1	**Basics of Nuclear medicines**	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 working and construction	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 3	**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 4	**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 5	**Diagnostic radiology modalities 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,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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 Bhargava.** **Advance Imaging (AIIMS)**			
	Other References	AERB website , Radiopedia			

PO Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	3	2	2	3
CO2	2	3	2	3	3	3
CO3	2	2	2	2	2	3
CO4	3	3	2	3	2	3
CO5	3	2	3	2	2	3
CO6	3	2	3	2	2	3
PO Attainment	2.5	2.3	2.5	2.3	2.1	3

School: SSAHS		**Batch : 2023-26**	
Programme: BRIT		**Current Academic Year: 2025-2026**	
Branch:		**SEMESTER: SIXTH**	
1	Course Code	BIT328	
2	Course Title	**Radiation Protection & Planning of Radiology Department-II**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	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**: Described about planning and organization of work **CO4:** Able to handle effective Communication with Peers/ colleagues using medical terminology in communication **CO5** : Evaluate Radiology Technician's role in maintaining patient's rights **CO6** : Explain about Pocket dosimeter, principle and working of ionization chamber	
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**	
	A	TLD Badge , principle and working of TLD	CO2
	B	OSLD , principle and working of OSLD	CO2,CO4
	C	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,CO6
	B	Ionization chamber , principle and working of ionization chamber			CO4,CO6
	C	Pocket dosimeter, principle and working of ionization chamber			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	**1-Radiation Protection by Euclid Seeram.** **2-The essential physics of medical imaging (by bushberg 3rd edition).** **3-Quality Assurance in diagnostic radiology and imaging BY prof S.K Bhargava.**			
	Other References	• Articles,journals			

PO COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	2	2	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	2	3	3	3
CO4	1	2	3	2	2	3
CO5	1	2	2	2	2	3
CO6	1	2	2	2	2	3
PO Attainment	1.6	2.3	2.3	2.5	2.5	3

School: SSAHS		**BATCH – 2023-26**
Programme: BRIT		**CURRENT ACADEMIC YEAR: 2025-26**
Branch:		**SEMESTER: SIXTH**
1	Course Code	BIT008
2	Course Title	**Clinical Postings**
3	Credits	2
4	Contact Hours (P)	4
	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** - The hospital posting project will enable our students to acquire knowledge and skills which will help them take up jobs in hospitals. **CO2**- These types of activities will give practical exposure to our students working in a hospital. **C03**- These postings will add value to students, faculty members, school and university. **CO4**- understand the role of imaging technology for OPD patients. **CO5**- Understand hospital working and patient preparation for radiological procedures in hospital. CO6- To Understand The Role Of Radiography In The Protable Xrays

8			CO Mapping
-	**UNIT 1**	**Introduction of X-ray**	**CO1, CO2**
	A	Anode	CO1, CO2
	B	Cathode	CO1
	C	Principles of radiation protection and Methods of radiation protection	CO1
	UNIT 2	**Introduction of CT**	
	A	PRINCIPLE	CO1
	B	PARTS AND FUNCTIONS	CO1
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN	CO1, CO2
		Introduction of MRI	

	UNIT 3				
	A	PRINCIPLE			CO2
	B	PARTS AND FUNCTIONS			CO2
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN			CO1,CO2,CO3
	UNIT 4	**Introduction of FLUOROSCOPY**			
	A	PRINCIPLE			CO3
	B	PARTS AND FUNCTIONS			CO3
	C	DIFFERENT PROCEDURES RELATED TO CT SCAN			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	MTE	ETE	
		30%	20%	50%	
	Text book/s*	**Radiation Protection by Euclid Seeram.** **The essential physics of medical imaging (by bushberg 3rd edition)**			
	Other References	AERB Webcontent			

PO COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1	2	2	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	2	3	3	3
CO4	1	2	3	2	2	3
CO5	1	2	2	2	2	3
CO6	1	2	2	2	2	3
PO Attainment	1.6	2.3	2.3	2.5	2.5	3

SOP for Internships for Paramedical Programmes of SSAHS

1. Introduction

Internships are a part of the academic curriculum in the paramedical Programmes being run in the Sharda School of Allied Health Sciences (SSAHS). Duration of the mandatory rotatory internship **for 6 months (180days) for BRIT IN 7TH SEMESTER OF THE PROGRAMME**

2. Eligibility

2.1 Student must have passed the final semester /year examination. There should be no active backlogs. All fees/dues must be cleared and 'No dues 'chit obtained from accounts office.

2.2 All internships must start within a month of the declaration of the result. Any exceptions have to be with prior written permission of the Dean SSAHS.

3. Choice of a Hospital

3.1 The primary choice for undergoing internship should be the our on- campus **1250 bedded** Sharda Hospital. However, students may also choose any recognized/approved hospital within the jurisdiction of India but preferably in **NCR having 300 or more in-patient beds and good OPD services.**

3.3 The whole period of internship is required to be completed in one hospital only. If someone wants to change to a different hospital after starting the internship, then the complete duration of internship will have to be completed afresh in the new hospital.

4. Procedure to process the documentation for internship

4.1 For Sharda Hospital

4.1.1 After declaration of the final semester/year result, the student will download the result from the PeopleSoft.

4.1.2 Student to put up an application for undergoing internship in Sharda Hospital, to the dean office SSAHS (through the Programme coordinator) along with the result copy and No Dues chit from the accounts office.

4.1.3 Dean office clerk will process the application and enter the relevant details in the data base including the start date and end date of internship and then forward it to the concerned dept.

4.1.4 Respective Programme heads/Coordinators will liaise beforehand with the HoD of the concerned specialty/department of SMSR and chart out the details of the conduct of the

internship followed by a letter /email keeping the Medical Superintendent of Sharda Hospital and the dean office in the loop.

4.1.5 Dean office staff will monitor the progress by incorporating suitable alerts like colour codes/reminders in the data base and raise a query if the student does not report to the dean office till one week after the indicated date of completion of internship.

4.1.6 At the end of the internship, the student will submit the 'Internship Completion Certificate' as per the format, attached as an annexure, to the dean office, duly completed and signed by the Internship coordinator and Programme head/coordinator.

4.1.7 Thereafter, the student will collect the "Final No Dues forms" from dean office and submit it back after completion from various departments of the university.

4.1.8 The student may now place his request to collect various passing out documents like mark sheets, provisional degree, transcripts, course completion certificate, migration certificate, character certificate etc. The same would be delivered after the indicated processing time displayed on the board.

4.2 For Internship in a hospital other than Sharda Hospital

4.2.1 After declaration of the final semester/year result, the student will download the result from the PeopleSoft.

4.2.2 Student to put up an application for undergoing internship outside of Sharda hospital, to dean office SSAHS routed through the Programme coordinator, along with the result copy and No Dues chit from the accounts office.

4.2.3 The student will be issued a bonafide certificate listing out the relevant credentials of the student.

4.2.4 On the basis of this bonafide certificate, the student may apply to the chosen hospitals for undergoing the internship.

4.2.5 If the particular hospital permits, then the student is required to take 'Acceptance letter" from that hospital administration and submit to the dean office.

4.2.6 Based on the acceptance letter, the Dean office will issue the NOC to that hospital for allowing the student to undergo the internship for a specified duration.

4.2.7 The dealing clerk in dean office will enter the relevant details of the student in the data base and would monitor the progress by incorporating suitable alerts like colour codes/reminders

in the data base and raise a query if the student does not report to the dean office till one week after the indicated date of completion of internship.

4.2.8 The date of start of internship will be counted only after the date of signing of the NOC. The student is required to intimate to this school, the exact date of start of internship.

4.2.9 At the end of internship, the student will bring the log book and "Internship completion certificate" as per the format attached as an Annexure.

4.2.10 The student will now report to the Programme head/coordinator who will assess the student by checking the log book and /or project work and conduct a viva-voce or a suitable assessment and then verify & sign the internship completion certificate.

4.2.11 For BRIT/International students, there will be an examination as per the evaluation scheme of the Programme submitted to the COE office.

4.2.12 The student will finally submitted the duly signed internship completion certificate to the dean office.

4.2.13 Thereafter, the student will collect the "Final No Dues Forms" from dean office and submit it back after completion from various departments of the university.

4.2.14 The student may now place his request to collect various passing out documents like mark sheets, provisional degree, transcripts, course completion certificate, migration certificate, character certificate etc. The same would be delivered after the indicated processing time.

5. Conduct of Internship

5.1 The internship is mandatory and rotatory, so the given batch would be divided into sub batches for rotation to various departments/wards/labs/machines & equipment so as to give desired exposure and hands on training to the internees under the supervision of senior trainers/ supervisors/faculty members.

5.2 Programme heads/Coordinators would prepare proper schedule and rotations for all round training of internees. They should also periodically enquire about the progress of our internees undergoing training at outside hospitals. Suitable log books will be designed by the Programme heads/coordinators for recording the internship activities.

5.3 Attendance record of internees would be strictly maintained. **They would work for minimum of 8 hours/day and may be put on various shift duties as per the traini**ng requirements.

5.4 The internees are required to be attired appropriately during the working shifts and will wear the indicated aprons/scrubs.

5.5 The internees will always exhibit polite and decent behavior with the patients and staff. Any rude behavior would invite appropriate disciplinary action.

5.6 Male internees will always deal with a female patient in the presence of another female intern/staff or a close relative of the patient to avoid any potential scope of allegations of professional/sexual misconduct. This aspect would be emphasized by the supervisors at all times.

5.7 Internees are not allowed to advise treatment/conduct investigations/sign any patient medical documents independently without the supervision/ countersignature of the faculty.

5.8 Internees will maintain a log book of the daily activities and get it signed by the supervisor at the end of the day/shift.

5.9 At the end of the internship, the Programme head/coordinator will assess the students of Sharda Hospital as well as those coming from other hospitals, by checking the log book and /or project work and conduct a viva-voce or a suitable assessment and then verify & sign the internship completion certificate for onward submission to the dean office.

5.10 For BRIT and International, there will be an examination as per the evaluation scheme of the Programme submittted to the COE office.

5.11 All official correspondence with the students will be on sharda email id.

6. Leave:

6.1 Sunday/ one day off per week may be granted.

6.2 Apart from this, a one-day leave per month is allowed which may be taken in a cumulative manner but not more than 3 days at a time.

6.3 Any absences more than this authorization would lead to extension of the internship by equivalent number of days.

6.4 Prior permission is mandatory for any leave /off.

Leave /off without prior permission would be considered as absence without leave(AWL) and would result in compensatory extension of internship along with action for indiscipline.

6.5 Emergent/medical leave of longer duration may be considered if supported by proper medical certificate/documents. However, internship would still get extended by equivalent number of absence days.

6.6 NOTE:

Student proceeds for internship after successful competition of all the 6 semester of the Programme. The internship is non-teaching credits course (NTCC) where each student undergoes a minimum of 180 days which equalling to 20 credits (approx. 1040hrs) of mandatory rotational internship. The evaluation will be on submission of logbook, project report and presentation/viva voice which lead to a satisfactory or unsatisfactory result.

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	4weeks
Dental	School of Dental Sciences(Radiology dept)	4weeks
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 Programme 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.