

Specialization	Radiologic Technology
Course Number	020810251
Course Title	Principles of Exposure (2)
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)

Brief Course Description:

- The aim of this course is to provide the students with the Knowledge and understanding means of the other parts of the imaging system including image intensifier, radiographic techniques like fluoroscopy, tomography, stereo -radiography, xeroradiography and magnification

Course Objectives:

Upon the completion of the course, the student will be able to:

1. Know principles of fluoroscopy, tomography, magnification and stereoradiography.
2. Know the structure and components of image intensifier and theirfunction.
3. Know the concept of image quality and its relation with the density, contrast & resolution.

Unit Number	Unit Name	Unit Content	Time Needed
1	Fluoroscopy	<ul style="list-style-type: none"> • Fluoroscope and visual physiology. • Image intensifier design. • Magnification gain, flux gain, and brightness gain. • Image Characteristics: contrast, lag, distortion. • Multiple field image intensifier. • Large Field of view image intensifier. 	
2	<i>Viewing and recording the fluoroscopic image</i>	<ul style="list-style-type: none"> • <i>Closed circuit television and television camera.</i> • <i>Video Signal.</i> • <i>Television monitor & T.V. Scanning.</i> • <i>Television image quality: resolution, contrast, lag.</i> • <i>Automatic gain control.</i> • <i>Automatic brightness control.</i> • <i>Fluoroscopic image recorders : Spot film recorder, spot film camera, cine fluoroscopy, cine camera.</i> • <i>T.V. image recorders : tape recorders, magnetic disc recorders, optical discs.</i> 	
3	Tomography	<ul style="list-style-type: none"> • Definition and terminology. • Basic methods of tomography. • Types of tube motion. • Blurring: <ul style="list-style-type: none"> ○ Definition. ○ Width of plane and factors affecting it. ○ Blur margin • Section thickness. • Narrow versus wide angle tomography. • Circular tomography: advantages & disadvantages. • Complex tomographic motion. • Phantom images. • Determination of tomographic angle. • Pan tomography. 	
4	stereoscopy	<ul style="list-style-type: none"> • Physiology of depth perception: monocular depth perception. • Stereoscopic filming. 	

		<ul style="list-style-type: none"> • Stereoscopic viewing and viewing systems. • Advantage and disadvantages. 	
5	xeroradiography	<ul style="list-style-type: none"> • General principles. • Photo conducting. • Xeroradiography plate. • Exposure of charged plate. • Xeroradiography undercutting. • Powder development. • Sensitometer of developed image. • Quality of xeroradiography image. • Automatic xeroradiography system. • Patient exposure from film xeroradiography mammography). 	
6	Mammography & Breast imaging	<ul style="list-style-type: none"> • Imaging requirements. • Modern mammography. • Screen – film techniques & x-ray tube, compression, grids, screen combination. • Film processing. • Image features and dosimetry: magnification mammography, viewing mammogram imagequality breast dose, radiation risk versus benefits. • Alternative breast imaging modalities • Xeromammograhay. • Xeroradiography versus screen – film • Ultrasound and Breast imaging. • MRI. 	
7	Effect of KVP and MAs on the image	<ul style="list-style-type: none"> • Effects of Increased KVP. • Effect Of mAs. 	

Teaching Methodology:

1. Lectures.
2. Discussion & Quizzes.
3. Demonstration & Home works

Text Books & References:

1. Farr's Physics for Medical Imaging 2nd Edition Authors: Penelope Allisy-Roberts Jerry Williams ,2007
2. Principles of Radiographic Imaging: An Art and A Science ,5th Edition Richard R. Carlton | Arlene McKenna Adler , 2013
3. Review of Radiological Physics Walter Huda; Richard M. Slone. Published by Lippincott Williams & Wilkins, 2002.
4. Christensen's Physics of Diagnostic Radiology Fourth Edition by Thomas S. Curry III MD (Author), James E. Dowdey PhD (Author), Robert E. Murry Jr. PhD (Author).