

Specialization	Radiologic Technology
Course Number	020810152
Course Title	Principles of Exposure (1)
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)

Brief Course Description:

- The course provides the Students with the essential knowledge about the structure and components of the imaging system like x-ray tube, x-ray film, and others and how to deal with them.
- It also provides the students with the basic information about the chemical structure of processing solutions and x-ray film processing, enabling the student to know the process of imageformation.

Course Objectives:

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

1. Know the design of x-ray tube and x-ray emission.
2. Know the factors affecting image quality.
3. Know the construction of grid, x-ray film and imageformation.
4. Know the mechanism of chemical processing solutions, action.
5. Know the mechanism of beam restricting devices.

Unit Number	Unit Name	Unit Content	Time Needed
1	Introduction	<ul style="list-style-type: none"> • X-ray production and x ray tubecomponents. • X-rayquality. • X-rayquantity. • Space charge and charge effect. • Focusingcup. • Tungsten and its characteristics. • Focalspot. • Heatdissipation. • Factors limiting the life of rotatinganode. • Gird controlled x-raytubes. • Metal/ceramic x-raytubes. • Saturationvoltage • Heeeffect. • Tube ratingchart 	
2	Interaction Of Electron Beam With X-Ray Tube Target And Matter	<ul style="list-style-type: none"> • Atomic structure and binding forces. • Process of x – raygeneration: <ul style="list-style-type: none"> ○ General radiation (bremsstrahlung). ○ Characteristicradiation. □ Molybdenumtarget. □ Interaction of x-ray with matter. 	
3	Rachigraphic film	<ul style="list-style-type: none"> • Structure of the film(layers). • Latentimage. • Photographic effect direct absorption ofx-ray. • Sensitivity of the film to direct x-ray exposure. • Film types. • Screen type and non-screen typefilm. • Handling of thefilm. • Film storageconditions. 	
4	Intensifying Screen and Cassette	<ul style="list-style-type: none"> • Construction. • Intensifying action ofscreen. • Intensificationfactor. • ScreenTypes. • Care of thescreen. • Structure of thecassette. 	
5	Processor of Latent Image	<ul style="list-style-type: none"> • Stages of processing: Development, replenishment, Fixing, Washing, Drying. 	

		<ul style="list-style-type: none"> • Contents of developing solutions, and their characteristics. • Automatic Processing. • Factors effecting development and fixation. • Dark room design (Configuration) 	
6	Photographic Characteristics of x-ray film	<ul style="list-style-type: none"> • Photographic density. • Photographic contrast and factors affecting film contrast. • Characteristic curve of the film. • Film speed and speed class system. • Film latitude. 	
7	Radiographic Image Quality	<ul style="list-style-type: none"> • Radiographic contrast and radiation quality. • Fog and scatter: Definition and factors affecting them. • Image quality and radiographic mottle • Speed versus noise. • Sharpness. • Artifacts 	
8	Geometry of The Radiographic Image	<ul style="list-style-type: none"> • Magnification: Definition and factors affecting it. • Distortion : Definition and factors affecting it. • Penumbra : Definition and factors affecting it. • Un sharpness: Causes & classify resolution. 	
9	Beam Limiting devices (restrictors)	<ul style="list-style-type: none"> • Classification: <ul style="list-style-type: none"> ▪ Aperture diaphragm. ▪ Cones & cylinder. ▪ Collimators • Function of restrictors. • Factors affecting scattered radiation. 	
10	Grids	<ul style="list-style-type: none"> • Definition and structure. • Grid patterns. • Evaluation of grid performance. • Bucky factor. • Lead contents. 	

		<ul style="list-style-type: none">• Grid cutoff.• Moving grids.• Gridselection.• Air gaptechnique.	
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Teaching Methodology:

1. Lectures.
2. Demonstrations andHomework.
3. Discussion &Quizzes.

Text Books & References:

1. Farr's Physics for Medical Imaging2nd EditionAuthors: Penelope Allisy-Roberts Jerry Williams,2007
2. Principles of Radiographic Imaging: An Art and A Science ,5th EditionRichard R. Carlton | Arlene McKenna Adler , 2013
3. Review of Radiological PhysicsWalter Huda; Richard M. Slone.Published by Lippincott Williams & Wilkins, 2002.
4. Christensen's Physics of Diagnostic Radiology Fourth Editionby Thomas S. Curry III MD (Author), James E. Dowdey PhD (Author), Robert E. Murry Jr. PhD (Author).