

CT Radiography RAD 421

4 th year semester 2				
Course	Lecture	Tutorial	Practical	Credit hours
CT Radiography	2	-	1	2

Course Description

The course explores the basic physical and technical principles of CT Scan, related clinical applications , system component image characteristics , quality control methods limitations and advantages and future development .

Prerequisite

None

Course objectives

At the completion of this course the students will be able to :

- describe the basic principles and concepts of computed tomography.
- incorporate scanning techniques learned to best demonstrate anatomy and disease.
- describe techniques in manipulating CT parameters to optimize image quality.
- recognize CT artifacts and describe techniques to minimize their occurrence.
- compare the advantages and disadvantages of various CT scanner configurations.

Reading List:

1-Euclid Seeram computed tomography physical principal, clinical application ,quality control and radiation dose.

2-Stewart C.C.Bu shong,Computed Tomography 2003

Topics Covered

Lecture 1

Introduction, Course over view.

Lecture 2

Historical perspective(Radiography, conventional tomography, discovery of CT, principle of CT operation, advantages of CT over conventional radiography/ tomography .

Lecture 3

Operational mode (First generation, second generation, third, fourth, fifth, sixth generation.

Lecture 4

Components of CT scanners (gantry-ray tube detectors, gas detectors, scintillation detectors photodiode, photomultiplier.

Lecture 5

Component of Ct scanners (collimator, cradles, couch, high tension, filters, computer system ,multiform at camera, laser printer ,image storage system, magnetic tape, floppy disc, optical disc.

Lecture 6

Image Reconstruction(Algorithm, back projection, atterative technique, foriour transform.

Lecture 7

Image Manipulation(windowing, WW,WL, MPR,MIP,SSD,3D virtual endoscope)

Lecture 8

Test No 1

Lecture 9

Spiral CT(single slice, multi slice, pitch, beam pitch)

Lecture 10

Image Quality (Contrast resolution, spatial resolution ,image noise linearity uniformity).

Lecture 11

Image artifacts(Motions, metal artifacts, beam hardening ,partial volume artifact)

Lecture 12

Radiation ALARA , personal radiation dose Safety (patient radiation dose ,approximate patient dose.

Lecture 13

Clinical application (Cranial CT Brain ,orbits ,pituitary maxillary sinus)

Lecture 14

Clinical application(CT chest, HRCT, Neck)

Lecture 15

Clinical application(CT abdomen and Pelvis)and Limbs

Contribution of Course to Meeting Professional Component

Radiologic Technology 2 credit hours

Relationship of course to program outcome

This course will enhance students the ability to understand and identify the CT Physics, instrumentation and introduction to the technical procedures

Prepared by

Dr Hussen Ahmed Hassan

Date of Preparation

June 2010

MRI Radiography RAD 422

4 th year semester 2				
Course	Lecture	Tutorial	Practical	Credit hours
MRI Radiography	2	-	1	2

Course Description

The course explores the basic physical and technical principles of MRI Scan, related clinical applications , system component image characteristics , quality control methods limitations and advantages and future development

Prerequisite

None

Text Book

MRI made easy

MRI in Practice.

MRI Principle. (Catherine West Broke).

Course Objective

At the completion of the course the student will be able to :-

- 1- Explain and review the basic principle of magnetic resonance imaging
- 2- Mention MR pulse sequence used in clinical imaging.
 - 1- Apply safety consideration related to the biological effects when working in MR environment.
 - 2- Determine the MRI parameters (internal and external) to optimize image Quality .
 - 3- Explain the proper selection and usage of MR coils to optimize the image quality .
 - 4- Explain the physical principal of MRI.
 - 5- Describe MRI component (block diagram)

6- Apply the care of patient (before, during, after) MRI scanning.

Topics Covered

Lecture 1

Introduction and history of MRI

Lecture 2

Basic physical principal

Lecture 3

Longitudinal Magnetization

Lecture 4

T1 and T2 relaxation

Lecture 5

Internal Parameters

Lecture 6

External parameters

Lecture 7

Weighted images

Lecture 8

Pulse sequence

Lecture 9

Test

Lecture 10

Contrast media in MRI and MRA

Lecture 11

Factors influence signal intensity.

Lecture 12

Phase and frequency encoding

Lecture 13

Hard ware of MR ,advantages and disadvantages of MRI , applications

Lecture 14

Safety considerations in MRI, applications (Brain, chest, abdomen, pelvis ,limbs)

Lecture 15

Revision and image interpretation.

Contribution of Course to Meeting Professional Component

Radiologic Technology 2 credit hours

Relationship of course to program outcome

This course will enhance students the ability to understand and identify the MRI Physics, instrumentation and introduction to the technical procedures

Prepared by

Dr Doha Abdo Mohammed Abdo,& Dr Caroline Edward

Date of Preparation

June 2010