



Course Specification of CT scan & MRI physics

Faculty: Faculty of Medicine and Health Sciences

Department: Health Sciences

Program: Bachelor in Radiologic Technology & Medical Imaging

I. General information about the course instructor :							
Name	Dr. Abdullah Taher	Office Hours (2 Hours Weekly)					
Location & phone number	UST- 715989708	Sat	Sun	Mon	Tue	Wed	Thu
E-mail	A.taher2@ust.edu	√					

II. General information about the course:						
1.	Course Title :	Nuclear Medicine Equipment and Technique				
2.	Course Code and Number :	BMI413				
3.	Credit Hours :	Credit Hours				Total
		Theoretical	Seminar/Tutorial	Practical	Training	
		2	-	-	-	2
4.	Study Level and Semester:	4 th Year/ 1 st Semester				
5.	Pre-requisites:	BMI111				
6.	Co-requisites:	None				
7.	Program in which the course is offered:	Bachelor in Radiologic Technology & Medical Imaging				
8.	Teaching Language:	English				
9.	Instruction location:	University of Science and Technology, Sana'a, Yemen				

III. Course Description

This course provides student with the physics principles of computed tomography and magnetic resonance imaging, as well as the relevant applications. The course topics will cover and focus on: computed tomography operation principles, system components and its functions, image characteristics, image resolution, image quality, scan design for spiral computed tomography, nuclear magnetism, precession of nuclei, production of the nuclear magnetic resonance signal, nuclear magnetic resonance pulses, nuclear magnetic resonance decay, production of the magnetic resonance image, magnetic resonance imaging equipment, image quality, image contrast, paramagnetic contrast agents, safety, and biological hazard. The course carried out using: lectures, self-learning, seminar, Brainstorming session, assignments and other activities to teach this course materials. The assessment strategies include presentation, assignment evaluation and written exams

عميد الكلية:
د. عبدالله المخلافي

رئيس القسم:
د. عبد الحبيب القباطي

المراجع:
د. د/ اسماعيل الشرعي

الموصف:
د. عبدالله ظاهر

IV. Course Aims:

1. Provide the students with basic knowledge about physical aspects of computed tomography and resonance imaging.
2. Learn the student to describe the role of computed tomography and magnetic resonance in medical diagnostic.
3. Assist student to investigate the effectiveness of physical parameters on CT scan and MRI operation and image quality.
4. Enable the student to use CT scan and MRI technology skills in relevant diagnosis imaging applications.

V. Course Intended Learning Outcomes (CILOs) :

1. State the physical principles of computed tomography and magnetic resonance imaging.
2. Outline the optimal procedures and techniques for computed tomography and resonance imaging.
3. Interpret the effect of physical factors and software components in the enhancement of computed tomography and magnetic resonance imaging.
4. Demonstrate the role of CT and MRI protocols in acquiring high quality diagnosis image according to QA standards.
5. Manipulate physical factors for CT scan and MR imaging professionally to produce optimal medical images.
6. Demonstrate the ability to provide a safety and effective care to the patient.
7. Manage CT scan & MR imaging facilities and learning resources with health team members effectively.



المراجع :
ا.د/ اسماعيل الشرعبي
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الموصف :
د. عبدالله طاهر

VI. Course Contents				
Theoretical Aspect:				
No.	Course Units	Sub-topics	Week due	Contact Hours
1	Chapter 1: CT principles and Data acquisition system	Course objectives and syllabus Terminology and CT generations CT components and it's functions CT Detector Physical principles operation for computed tomography Phases of CT imaging and processes Scan design Measurement of transmitted beam Attenuation CT numbers (Hounsfield units) CT immobilization devices	1 st – 2 nd	4
2	Chapter 2: Factors controlling CT image appearance & Quality Control	Anatomical structures Selectable scan factors Artifacts Contrast resolution (window width) Gray scale manipulation (window level) CT Image Quality: Scanning parameters Image reconstruction Image accuracy features Spatial resolution Contrast resolution Artifacts Distortion Noise	3 rd – 6 th	8
3	Chapter 3: Radiation Protection	Methods for reducing radiation dose to the patient. Reducing the radiographer's exposure to scatter radiation. Dose measurement in CT	7 th	2
4	Midterm Exam	Midterm Exam	8 th	2
5	Chapter 4: MRI principles	Physical principles operation MRI system Instrumentation and it's functions Resonance and signal generation Relaxation Times The MR signal	9 th – 10 th	4

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