Course Syllabus

Second Semester – 2013/2014

General Information

Course name	Course code	Credits	Contact hours
Medical Imaging Systems 1	BMTS472	2 lecture+1 lab	2 lecture+2 lab

Instructors/ Coordinators

	Instructor	Coordinator
Name	Dr. Eid Abdelmunem	Dr. Eid Abdelmunem
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Text Book

Title	Medical Imaging Physics
Author/Year	William Hendee and Russell Ritenour / 2002

Supplemental materials

Recommended Textbooks and Reference Material		
Title	The Essential Physics of Medical Imaging	
Author/Year	Edwin Leidholdt and John Boone / 2002	
Electronic Materials (e.g. Web Sites, Social Media, Blackboard, etc.)		
Web sites	http://en.wikipedia.org/wiki/Ultrasound	http://www.learningradiology.com/medstudents/medstudtoc.htm
	http://en.wikipedia.org/wiki/X-ray_machine	http://www.xraytechnicianschools.net/resources/how-x-ray-machines-work-for-kids/

Specific Course Information

a. Brief description of the content of the course (Catalog Description)

During this course the student will understand the principle of imaging modalities and technologies of different imaging instruments. This course focuses on two imaging modalities: X-ray and ultrasound instrument.

b. Prerequisites (P) or Co-requisites (C)

None

c. Course type (Mandatory or Elective)

Mandatory

Specific Goals

a. Specific outcomes of instruction
By the end of this course, the student should be able to: - Apply the principles of Ultrasound Imaging. (c) - Explain the principles of Doppler Imaging. (a) - Compare the working principles and efficiency of stationary and rotating X-ray tubes. (c) - Illustrate the design of stationary and rotating X-ray tubes. (c) - Recognize the use of fluoroscopy and mammography in imaging. (a) - Translate the studied radiation safety techniques in laboratory and hospital environment in professional ethical and responsible way. (i)

b. Student outcomes addressed by the course

a	b	c	d	e	f	g	h	i	j	k
✓		✓						✓		

Brief list of topics to be covered

Topics	No. of Weeks	Contact hours
Introduction to Biomedical Imaging, Introduction to Ultrasound	1	4
Basic Ultrasound Physics, Basics of Ultrasound Instrumentation	1	4
Real Time Imaging	1	4
Doppler Ultrasound Physics, Doppler Imaging	1	4
History of X-ray, X-ray Properties, X-ray Production	2	8
Focal spot, Anode Heel Effect, X-ray Window, Filter	2	8
Tube envelop and enclosure, radiation shielding, Exposure control & AEC	2	8
X-ray beam energy & quality, Electrical and Thermal rating of Tube, Generator and Control Circuits	2	8
Interactions of X-ray with matter	1	4
Image Intensifier and Fluoroscopy, C-Arm, Mammography, X-ray Dosimeter and Safety	2	8