University of Toledo
College of Medicine
Master of Science in the Biomedical Sciences
Medical Physics Concentration

Course Number: **MPHY6010/MPHY8040**

Course: **Survey of Diagnostic Medical Imaging I**

Course Description: This course considers the physical principles and instrumentation of diagnostic medical imaging systems including x-ray production, x-ray interaction with matter, and radiographic, mammographic, fluoroscopic, and computed tomography imaging systems. Additionally, a brief introduction to magnetic resonance, ultrasound, and nuclear medicine imaging systems is provided.

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Course Schedule: Fall 2017
Thursday 9:00am – 12:00pm

Credits: Three Credit Hours

Instructor: Kerry Krugh, Ph.D.
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419-383-4303

Prerequisite: Consent of instructor.

Objectives: Upon completion of the course, the student will:

1. Have an understanding of basic physical principles relative to x-ray production and interaction.
2. Have developed an understanding of basic instrumentation for x-ray based imaging systems including radiographic, fluoroscopic, mammographic, and computed tomography imaging systems and factors that affect imaging performance.
3. Understand the factors affecting image quality in radiographic, fluoroscopic, mammographic, and computed tomography imaging including artifact identification.
4. Describe radiation safety and quality control practices for radiographic, fluoroscopic, mammographic and computed tomography imaging.
5. Develop a basic understanding of magnetic resonance, ultrasound, and nuclear medicine imaging systems.

Required Text: J.T. Bushberg, J.A. Seibert., E.M. Leidholdt, & J.M. Boone (2012). The Essential Physics of Medical Imaging (3rd edition). Lippincott Williams & Wilkins.

Reference Text: H.E. Johns and J.R. Cunningham (1983). Physics of Radiology. Charles C. Thomas, Inc.

D.R. Dance, et.al. (2014). Diagnostic Radiology Physics: A Handbook for Teachers and Students, International Atomic Energy Agency. http://www-pub.iaea.org/books/IAEABooks/8841/Diagnostic-Radiology-Physics-A-Handbook-for-Teachers-and-Students

A.B. Wolbarst (2005). Physics of Radiology, (2nd edition). Medical Physics Publishing.

Grading Procedure:

Item	Points	Percent of Total Grade
Midterm Exam	100	20%
Final Exam	100	20%
Weekly Homework Assignments	280 (14 @ 20 points)	56%
Classroom Attendance/Participation	20	4%
TOTAL	**500**	**100%**

Course Calendar:

Date:	Topic:	Bushberg Chapters:
8/24/2017	X-Ray Basics and X-Ray Interactions	Chap. 1, 2, 3
8/31/2017	X-Ray Production, Tubes, and Generators	Chap. 6
9/7/2017	Aspects of Image Quality	Chap. 4
9/14/2017	General Radiography	Chap. 7
9/21/2017	General Radiography	Chap. 7
9/28/2017	Mammography	Chap. 8
10/5/2017	Fluoroscopy	Chap. 9
10/12/2017	**MIDTERM EXAM**	
10/19/2017	Computed Tomography	Chap. 10
10/26/2017	Computed Tomography	Chap. 10
11/2/2017	Computed Tomography	Chap. 10
11/9/2017	Diagnostic X-Ray Dosimetry	Chap. 11
11/16/2017	Magnetic Resonance Imaging	Chap. 12, 13
11/23/2017	**THANKSGIVING BREAK**	
11/30/2017	Ultrasound Imaging	Chap. 14
12/7/2017	Nuclear Medicine & PET Imaging	Chap. 15-19
12/14/2017	**FINAL EXAM**	

Disclaimer: “The instructor reserves the right to amend this syllabus as deemed necessary and will communicate such amendment to the students in the course.”