Survey of Diagnostic Medical Imaging 1

The University of Toledo
College of Medicine and life Sciences
MPHY 6010/8010

Instructor:	Sulaiman D. Aldoohan	**Class Location**:	MH-Conference Room #1192
Email:	Sulaiman.Aldoohan@utoledo.edu	**Class Day/Time**:	Thursday 9:00am – 12:00pm
Office Hours:	By appointment	**Lab Location**:	Imaging Scanning Rooms, MH
Office Location:	MH-Radiology/Room #1231	**Lab Day/Time**:	Thursday afternoon
Instructor Phone:	419-383-4303	**Credit Hours**:	3 credit hours
Offered:	Fall 2021	**Course Website**:	N/A

SPECIAL COURSE EXPECTATIONS DURING COVID-19

Maintaining a safe campus during the ongoing COVID-19 pandemic remains a top priority. UToledo continues to follow the guidance of the U.S. Centers for Disease Control and Prevention and Ohio Department of Health to keep our campus safe.

ATTENDANCE: The University of Toledo has a missed class policy. It is important that students and instructors discuss attendance requirements for the course. Before coming to campus each day, students should take their temperature and complete a self-assessment for symptoms of COVID-19, such as cough, chills, fatigue or shortness of breath. Anyone with a temperature at or above 100.0 degrees Fahrenheit or who is experiencing symptoms consistent with COVID-19 should not come to campus and contact their primary care physician or the University Health Center at 419.530.5549. For more information on the symptoms of COVID-19, please go to https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

COVID-19 testing for sick students is available on both Main Campus and Health Science Campus. Call 419.383.4545 for an appointment. Absences due to COVID-19 quarantine or isolation requirements **are** considered excused absences. Students should notify their instructors and follow the protocols summarized in this document on Navigating COVID-Related Course Concerns. In the event that you have tested positive for COVID-19 or have been diagnosed as a probable case, please review the CDC guidance on self-isolation and symptom monitoring, and report the disclosure to the Division of Student Affairs by emailing StudentAffairs@utoledo.edu or by connecting with their on-call representative at 419.343.9946. Disclosure is voluntary and will only be shared on a need to know basis with staff such as in the Office of Student Advocacy and Support, The Office of Residence Life, and/or the Office of Accessibility and Disability Resources to coordinate supportive measures and meet contact tracing requirements.

FACE COVERINGS: Face coverings are required while on campus, except while eating, alone in an enclosed space, or outdoors practicing social distancing. Students will not be permitted in class without a face covering. If you have a medical reason preventing you from wearing a face covering due to a health condition deemed high-risk by the CDC, submit an online application to request an accommodation through the Office of Accessibility and Disability Resources. Students will need to provide documentation that verifies their health condition or disability and supports the need for accommodations. Students already affiliated with the Office of Accessibility and Disability Resources who would like to request additional accommodations due to the impact of COVID-19, should contact their accessibility specialist to discuss their specific needs. You may connect with the office by calling 419.530.4981 or sending an email to StudentDisability@utoledo.edu.

VACCINATION: Doctors and other health care professionals agree that the best way to protect ourselves and each other is to get vaccinated. Case data clearly show that vaccines remain highly effective at preventing serious illness from COVID, including the highly contagious delta variant. If you have not yet received your COVID vaccine, the University encourages you do so as soon as possible. No appointment is needed to get the shot at the UTMC Outpatient Pharmacy, University Health Clinic or Main Campus Pharmacy. Once you receive the COVID vaccination, please register on the COVID Vaccine Registry site at: https://utvaccinereg.utoledo.edu/.

SPECIAL NOTES: It's important to note, that based on the unpredictability of the COVID-19 virus, things can change at any time. So please be patient and understanding as we move through the semester. I also ask that you keep me informed of concerns you may have about class, completing course work/assignments timely and/or health concerns related to COVID.

CATALOG/COURSE DESCRIPTION*

This course reviews and studies the physical principles of x-ray production, x-ray interaction with matter and basic of different diagnostic medical imaging modalities: radiographic, fluoroscopic, computed tomography imaging systems, Magnetic Resonance Imaging, Nuclear Medicine and Ultrasound imaging..

COURSE OVERVIEW

This course has the following objectives:

1. Understanding of basic physical principles of x-ray production and interaction with matters.
2. Understanding of basic of different diagnostic imaging modalities.
3. Understand the factors affecting image quality in different diagnostic imaging modalities.
4. Understating of image optimization, quality control practice and patient safety in different diagnostic imaging modalities.

STUDENT LEARNING OUTCOMES

Upon successfully completion of the course, students will be able to:

1. Demonstrate familiarity with basic understanding of different type of emitted energies and interactions with matters: X-ray, Gamma radiation, Ultrasound and Magnetic resonance Induction.
2. Developed an understanding of basic instrumentation for Radiographic, Fluoroscopic, Nuclear Medicine, Computed tomography, Ultrasound and MR imaging systems and factors that affect imaging performance.
3. Describe radiation safety and quality control practices for radiographic, fluoroscopic, nuclear medicine and computed tomography imaging.

TEACHING METHODOLOGY

To achieve our objectives of teaching this course, we convey to our students what we know and what they should know about basic principles of different diagnostic imaging modalities. The punitive methodology that we will follow in teaching and communicating with our students will be based on determining and ascertain the following concepts:

-what students know and understand
-what they don't know and don't understand, and
-what they deem they understand but do not really understand perfectly.

We believe this teaching approach will help our students establish a solid foundation of understanding that can better advance to new skill and acquaintance.

PREREQUISITES AND COREQUISITES

Consent of course instructor.

TEXTS AND ANCILLARY MATERIALS

1- J.T. Bushberg, J.A. Seibert., E.M. Leidholdt, & J.M. Boone (2012). The Essential Physics of Medical Imaging (4th edition). Lippincott Williams & Wilkins.

2- Instructor's handouts

TECHNOLOGY REQUIREMENTS

For valuable resorts and useful recourses, all students are encouraged to use the following URL:
http://www.utoledo.edu/dl/students/required-info-online-learners.html

ACADEMIC POLICIES

All graduate students at the University of Toledo are expected to read, understand, and follow the academic policies that govern their attendance at the University. These policies include, but are not limited to, academic dishonesty, academic

grievance, leave of absence, and transfer of credit. All students are expected to use the following URL to read a comprehensive list of academic policies that pertain and apply to their activities in this class and throughout their graduate education at U. of Toledo: http://www.utoledo.edu/policies/academic/graduate/

If you have any questions after reading through the policies, please let me know.

COURSE EXPECTATIONS

Besides expecting that attending students to fully abide by academic integrity as described by UT policies, as described in the URL mentioned above, we also expecting attending students:

- To come to class on time.
- To be focused and engaged in class activities and discussions.
- To refrain from using cell phones during class time.
- To spend an adequate amount of time on the weekly homework, making an effort to solve and understand each problem.
- To engage with both the theoretical and computational sides of the learning material.
- To attempt and seek help when needed.

OVERVIEW OF COURSE GRADE ASSIGNMENT

Well organized course activities are of the *utmost importance* because they will show your level of understanding and actual performance.

Midterm grades are assigned the 8th week of class and are used to assist students to determine their academic standing. Attendance is also recorded during the 8th week to meet state and federal laws regarding financial aid disbursement. Please note, if you are not attending class it could affect your financial aid (scholarships, grants, loans or Federal Work Study).
If you decide you are not going to attend this class (or any other class you have registered for), you must formally withdraw (drop) from the course. You can do this by logging onto the myUT portal, clicking on the "Student" tab, and then under "My Toolkit" click on Register/Drop/Withdraw.

Do your utmost performance during the first half of the course. This performance will show what kind of student you are.

Mid Term Grading:

Your Midterm grade will be calculated as follows:

Quizzes (4-6 quizzes):	20%
Homework:	30%
In Class Activities:	20%
Mid Term Exam (2.0 hours exam):	30%
TOTAL:	100%

Final Grading

Students who do not attend class or stop attending at some point throughout the semester will be given a final grade of "F" which will affect their overall grade point average. To formally withdraw from this course, you need to contact the Registrar's Office.

Determine to do your surpass performance during the second half of the course.

The following is the grading letter system used in the U. of Toledo:

Grade Letter	Total Points
A = 90 – 100%	900 - 1000
B = 80 – 89%	800 - 899
C = 70 – 79%	700 - 799
D = 60 – 69%	600 - 699
F =< 59%	

Your final grade will be calculated as follows:

Assessment Measures	Total Points	Percentage of Final Grade
Mid Term Grade	300	30%
In-class Activities/ Quizzes (3-5 quizzes)	150	15%
Homework	150	15%
Final Exam (2.0 hours exam)	400	40%
Total	1000	100%

UNIVERSITY POLICIES

Policy Statement on Non-Discrimination on the Basis of Disability (ADA)*

The University is an equal opportunity educational institution. Please read The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.
Students can find this policy along with other university policies listed by audience on the University Policy webpage (http://www.utoledo.edu/policies/audience.html/#students).

ACADEMIC ACCOMODATIONS*

The University of Toledo embraces the inclusion of students with disabilities. We are committed to ensuring equal opportunity and seamless access for full participation in all courses. For students who have an accommodations memo from Student Disability Services, I invite you to correspond with me as soon as possible so that we can communicate confidentially about implementing accommodations in this course. For students who have not established affiliation with Student Disability Services and are experiencing disability access barriers or are interested in a referral to healthcare resources for a potential disability or would like information regarding eligibility for academic accommodations, please contact the Student Disability Services Office (http://www.utoledo.edu/offices/student-disability-services/) by calling 419.530.4981 or sending an email to StudentDisability@utoledo.edu.

ACADEMIC AND SUPPORT SERVICES

The university provides a variety of academic and support services on campus to help you succeed and reach your fullest potential. Whether you need to ask a question or find a job or join a club, U. of Toledo is there for you! Just use the following URLs to find the academic support or service you need:

Tutoring: http://www.utoledo.edu/success/lec/
Library: http://www.utoledo.edu/library/
Success Coaching: https://www.utoledo.edu/successcoach/
Student Affairs: http://www.utoledo.edu/studentaffairs/
Career Services: http://www.utoledo.edu/success/career/

SAFETY AND HEALTH SERVICES FOR UT STUDENTS

In addition to the university policies developed to ensure your health and well-being as a student, there are also a number of on and off campus resources available to support you including a food pantry!
Please use the following link to see some additional resources available to you:Campus Health and Safety Contacts
Link to Food Pantry: http://www.utoledo.edu/studentaffairs/food-pantry/.

COURSE SCHEDULE*

FALL 2021

WEEK	DATES	TOPIC	LEARNING OUTCOME(S)	ASSIGNMENTS/HOMEWORKS DUE
1	9/2/2021	X-ray interaction with matters and X-ray device	Define, recite, illustrate, explain and demonstrate deep understanding of the discussed topics	Homework # 1
2	9/9/2021	X-ray tube generators		
3	9/16/2021	Aspects of Radiographic and Fluoroscopic imaging		Homework # 1 due
4	9/23/2021	Basic physics of Digital Mammography	Define, recite, illustrate, explain and demonstrate deep understanding of the discussed topics	Homework # 2
5	9/30/2021	Basic of Digital Breast Tomo-Synthesis		Homework # 2 due
6	10/7/2021	Basic of Ultrasound Imaging	Define, recite, illustrate, explain and demonstrate deep understanding of the discussed topics	Homework # 3
7	10/14/2021	Image QC in Ultrasound		Homework # 3 due
8	To be Determined	Mid Term Exam		
9	10/21/2021	Basic of Computed Tomography CT	Define, recite, illustrate, explain and demonstrate deep understanding of the discussed topics	Homework # 4
10	10/28/2021	CT Image Reconstruction		Homework # 4 due
11	11/4/2021	Basic of Nuclear Medicine Imaging CT/ SPECT & CT/PET Imaging	Define, recite, illustrate, explain and demonstrate deep understanding of the discussed topics	Homework # 5
12	11/11/2021			Homework # 5 due
13	11/18/2021	Basic of MRI	Define, recite, illustrate, explain and demonstrate deep understanding of the discussed topics	Homework # 6
13	11/25/2021	No class		
14	12/2/2021	Image Reconstruction in MRI	Define, recite, illustrate, explain and demonstrate deep understanding of the discussed topics	Homework # 6 due
15	12/9/2021	Final Exam		