

Fall 2023

Diagnostic Radiological Physics I

GMS 6651; Section 12538; 3 Credits

CLASS MEETING INFO

9:30-10:30 am; Tuesday, Wednesday and Thursday

Location: Communicore Building C2-33

Additional 5 Demo Lab Sessions in radiology as scheduled, typically Wednesday 1-2:30 pm

Join Zoom Meeting

<https://ufl.zoom.us/j/94684024510?pwd=R3NtbDFmakd0cm1oZU43MkNZNitFdz09>

CANVAS

elearning.ufl.edu and LOG IN TO E-LEARNING

Lecture slides, homework assignments will be accessed through CANVAS

INSTRUCTORS

Lynn Rill; rillln@radiology.ufl.edu

Office Hours by arrangement, G-089

Stephanie Leon; leons@radiology.ufl.edu

Office Hours by arrangement, G-087

Manuel Arreola; arreom@radiology.ufl.edu

Office Hours by arrangement, G-097

RESIDENT ASSISTANTS

Megan Glassell, mgl0001@radiology.ufl.edu

Ana Heshmat, Anahita.Heshmat@radiology.ufl.edu

EXT.44307, Office Hours by arrangement, G-520

TEACHING ASSISTANT

Benjamin Heggie, bheggie@ufl.edu

EXT.44307, Office Hours by arrangement, AG-117A

DESCRIPTION

X-ray production and spectra. Medical imaging concepts and hardware. Clinical overview of diagnostic imaging: radiography, fluoroscopy and mammography. Basic radiation protection principles. Credits:3

OBJECTIVE

The student will learn the basics and application of projection x-ray imaging, including: x-ray imaging equipment, x-ray production, x-ray interactions within the human body, geometric principles, image receptors, image quality and patient dose. Projection imaging modalities covered in this course will include radiography, fluoroscopy, and mammography.

PRE-REQUISITES/CO-REQUISITES

None

REQUIRED TEXTBOOK

The Foundation for The Gator Nation

An Equal Opportunity Institution

COURSE SCHEDULE

Module 1: X-ray Systems and Projection Imaging

- 8/29/23 Lecture 1: X-Ray Production / LR / Chapters 2,6
8/30/23 Lecture 2: X-Ray Systems I: X-Ray Tubes / LR / Chapter 6
8/31/23 Lecture 3: X-Ray Systems II: X-Ray Generators, Power Ratings and Heat / LR / Chapter 6
9/5/23 Lecture 4: X-Ray Systems III: X-Ray Spectra and Beam Filtration / LR / Chapter 6
9/6/23 Lecture 5: X-Ray Projection Imaging I: Geometric Principles / AH / Chapter 7
9/6/23 Demo Lab 1: mA, time, blur Demo 1-2:30 pm
9/7/23 Lecture 6: X-Ray Projection Imaging II: Photon Interactions and Subject Contrast / LR / Chapter 3
9/12/23 Lecture 7: X-Ray Projection Imaging III: Scattered and Primary Photons, Grids, AEC / LR / Chapter 7
9/13/23 Lecture 8: X-Ray Detectors: Scintillators and Photoluminescent Phosphors / LR / Chapter 7
9/13/23 Demo Lab 2: AEC, noise Demo 1-2:30 pm
9/14/23 Lecture 9: Radiography Clinical Exam Performance: Jen Sirera, RT(R),CIIP, BHS/ JS / Chapter 7
9/19/23 Quiz 1: X-ray Systems and Projection Imaging Quiz, Lectures 1-9

Module 2: X-Ray Image Quality

- 9/20/23 Lecture 10: X-Ray Image Quality I: Image Quality and Dose Tradeoffs (Diagnostic Reference Levels) / LR / Chapter 4
9/20/23 Demo Lab 3: Radiographic Physics Testing Demo 1-2:30
9/21/23 Lecture 11: General Radiology Clinical Lecture: Eric Thoburn, MD / ET
9/26/23 Lecture 12: X-Ray Image Quality II: Image Quality Indicators: Noise, Contrast and Spatial Resolution / MA / Chapter 4
9/27/23 Lecture 13: X-Ray Image Quality III: Fourier Transforms and Convolutions / MA / Chapter 4
9/28/23 Lecture 14 and 15: X-Ray Image Quality IV and V: MTF, NPS, DQE/ MA / Chapter 4
10/3/23 Lecture 16: Informatics/ LR/ Chapter 5
10/4/23 Quiz 2: Image Quality Quiz, Lectures 10-16

Module 3: Digital Imaging

- 10/5/23 Lecture 17: Digital Imaging I: Basic Concepts / LR / Chapter 1
10/10/23 Lecture 18: Digital Imaging II: Image Processing Algorithms/ LR / Chapter 5
10/11/23 Lecture 19: Digital Radiography I: Computed and Digital Radiography / LR / Chapter 7
10/12/23 Lecture 20: Digital Radiography II: Digital Radiography Quality Control/LR/Chapter 7
10/17/23 Lecture 21: Digital Radiography III: Artifacts in Digital Radiography/ LR / Chapter 7
10/18/23 Lecture 22: Pediatric Radiology Clinical Lecture: Robert Dubuisson, MD/ RD
10/19/23 Flex Day
10/24/23 Quiz 3: Digital Imaging Quiz, Lectures 17-22

Module 4: Fluoroscopy

- 10/25/23 Lecture 23: Fluoroscopy I: Image Intensifiers, Cameras/ LR / Chapter 9
10/26/23 Lecture 24: Fluoroscopy II: ABC Systems and Fluoroscopic Doses / LR / Chapter 9
10/31/23 Lecture 25: Fluoroscopy III: Digital Fluoroscopy and DSA / LR /Chapter 9
11/1/23 Demo Lab 4: Fluoroscopy Demo 1-2:30
11/2/23 Lecture 26: Radiation Sentinel Event and IR Dose Tracking / AH
11/7/23 Lecture 27: Radiation Protection I: Review / LR / Chapter 21
11/8/23 Lecture 28: Radiation Protection II: Radiation Safety / LR / Chapter 21
11/9/23 Lecture 29: Interventional Clinical Lecture: Sean Wiley, RPA
11/14/23 Quiz 4: Fluoroscopy Quiz, Lectures 23-29

Module 5: Mammography

- 11/15/23 Lecture 30: Clinical Mammography Lecture: Miriam Hanna, MD
11/16/23 Lecture 31: Mammography I / SL / Chapter 8
11/21/23 Lecture 32: Mammography II / SL / Chapter 8
11/22-23/23 Thanksgiving Holiday
11/28/23 Lecture 33: Mammography III / SL / Chapter 8
11/29/23 Lecture 34: Mammography IV / SL / Chapter 8
11/30/23 Lecture 345: Tomosynthesis / SL / Chapter 8
12/5/23 Demo Lab 5: Mammography Demo 3-5 pm Springhill
12/6/23 Lecture 36: Special Procedures in Mammography / SL / Chapter 8
12/7-8/23 Reading Days
12/12/23 Quiz 5: Mammography Quiz, Lectures 30-36

ATTENDANCE POLICY; CLASS EXPECTATIONS; MAKE-UP POLICY

Attendance is required. Cell phones should not be used during class. Tardiness and lack of participation in lab sessions will be taken into account in the Participation Grade. Make-up exams may be scheduled in advance by arrangement.

Excused absences must be consistent with university policies in the Graduate Catalog and require appropriate documentation:
<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>

EVALUATION OF GRADES

Assignment	Total Points	Percentage of Final Grade
5 quizzes	100	75%
Homework assignments	100	20%
Attendance and Class/ Demo Lab Participation	100	5%
		Total: 100%

GRADING POLICY

Percent	Grade
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
59 & below	E

More information on UF grading policy may be found at: <http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

STUDENTS REQUIRING ACCOMMODATIONS

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565; <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

EVALUATIONS

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

UNIVERSITY HONESTY POLICY

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

SOFTWARE USE

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

STUDENT PRIVACY

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

CAMPUS RESOURCES

Health and Wellness

U Matter, We Care

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to

reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center

352-392-1575; <http://www.counseling.ufl.edu/cwc>

Sexual Assault Recovery Services (SARS)

352-392-1161; Student Health Care Center

University Police Department

352-392-1111 (or 911 for emergencies); <http://www.police.ufl.edu/>

Academic Resources

E-learning Technical Support

352-392-4357 (select option 2); learning-support@ufl.edu; <https://lss.at.ufl.edu/help.shtml>

Career Resource Center

Career assistance and counseling.

352-392-1601; Reitz Union; <https://www.crc.ufl.edu/>

Library Support

Various ways to receive assistance with respect to using the libraries or finding resources.

<http://cms.uflib.ufl.edu/ask>

Teaching Center

General study skills and tutoring.

352-392-2010 or 352-392-6420; Broward Hall; <https://teachingcenter.ufl.edu/>

Writing Studio

Help brainstorming, formatting, and writing papers.

352-846-1138; 302 Tigert Hall; <https://writing.ufl.edu/writing-studio/>

Student Complaints Campus

https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf

On-Line Students Complaints

<http://www.distance.ufl.edu/student-complaint-process>