

Fall 2021

Diagnostic Radiological Physics I

ENU 6657; Section 1C98; 3 Credits

CLASS MEETING INFO

9:45-10:35 am; Tuesday, Wednesday and Thursday

Location: Communicore Building C2-33

Demo Lab Sessions in lieu of lectures on certain class days at 9:30 am, 11 am or 12:30 pm

Join Zoom Meeting

<https://ufl.zoom.us/j/95052491149?pwd=UXh1MGNyNWZRaHd2dTV5aDFYbTFrdz09>

CANVAS

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

Lecture slides, homework assignments will be accessed through CANVAS

INSTRUCTORS

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RESIDENT ASSISTANTS

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TEACHING ASSISTANT

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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

PRE-REQUISITES/CO-REQUISITES

None

REQUIRED TEXTBOOK

The Essential Physics of Medical Imaging, 2020, 4th Edition, by Bushberg, Seibert, Leidholdt Jr. and Boone;

COURSE SCHEDULE

8/24/21 Lecture 1: X-Ray Production / LR / Chapters 2,6

8/25/21 Lecture 2: X-Ray Systems I: X-Ray Tubes / LR / Chapter 6

8/26/21 Lecture 3: X-Ray Systems II: X-Ray Generators, Power Ratings and Heat / LR / Chapter 6

8/31/21 Lecture 4: X-Ray Systems III: X-Ray Spectra and Beam Filtration / LR / Chapter 6

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|-------------------------------|---|
| 9/1/21 Lecture 5: | X-Ray Projection Imaging I: Geometric Principles / JB / Chapter 7 |
| 9/2/21 Lecture 6: | X-Ray Projection Imaging II: Photon Interactions and Subject Contrast / LR / Chapter 3 |
| 9/7/21 Lecture 7: | X-Ray Projection Imaging III: Scattered and Primary Photons, Grids, AEC / LR / Chapter 7 |
| 9/8/21 Demo Lab 1: | mA, time, blur Demo |
| 9/9/21 Lecture 8: | X-Ray Detectors: Scintillators and Photoluminescent Phosphors / LR / Chapter 7 |
| 9/14/21 Lecture 9: | X-Ray Image Quality I: Image Quality and Dose Tradeoffs (Diagnostic Reference Levels) / LR / Chapter 4 |
| 9/15/21 Demo Lab 2: | AEC, noise Demo |
| 9/16/21 Quiz 1: | X-ray Systems and Projection Imaging Quiz, Lectures 1-9 |
| 9/21/21 Lecture 10: | Radiography Clinical Exam Performance: Jen Sirera, RT(R),CIIP, BHS/ JS / Chapter 7 |
| 9/22/20 Demo Lab 3: | Radiographic Physics Testing Demo |
| 9/23/21 Lecture 11: | X-Ray Image Quality II: Image Quality Indicators: Noise, Contrast and Spatial Resolution / MA / Chapter 4 |
| 9/28/21 Lecture 12: | General Radiology Clinical Lecture: Eric Thoburn, MD / ET |
| 9/29/21 Lecture 13: | X-Ray Image Quality III: Fourier Transforms and Convolutions / MA / Chapter 4 |
| 9/30/21 Lecture 14: | X-Ray Image Quality IV: MTF, NPS / MA / Chapter 4 |
| 10/5/21 Lecture 15: | X-Ray Image Quality V: DQE / MA / Chapter 4 |
| 10/6/21 Lecture 16: | Pediatric Radiology Clinical Lecture: Bob Dubuisson, MD / RD |
| 10/7/21 Lecture 17: | Digital Imaging I: Basic Concepts / LR / Chapter 5 |
| 10/12/20 Quiz 2: | Image Quality Quiz, Lectures 10-16 |
| 10/13/20 Lecture 18: | Digital Imaging II: Image Processing Algorithms/ LR / Chapter 5 |
| 10/14/20 Lecture 19: | Digital Radiography I: Computed and Digital Radiography / LR / Chapter 7 |
| 10/19/21 Lecture 20: | Digital Radiography II: Digital Radiography Quality Control/LR/Chapter 7 |
| 10/20/21 Lecture 21: | Digital Radiography III: Artifacts in Digital Radiography/ LR / Chapter 7 |
| 10/21/21 Lecture 22: | Informatics/ LR/ new chapter |
| 10/26/21 Quiz 3: | Digital Imaging Quiz, Lectures 17-22 |
| 10/27/21 Lecture 23: | Fluoroscopy I: Image Intensifiers, Cameras/ LR / Chapter 9 |
| 10/28/21 Lecture 24: | Fluoroscopy II: ABC Systems and Fluoroscopic Doses / LR / Chapter 9 |
| 11/2/21 Lecture 25: | Fluoroscopy III: Digital Fluoroscopy and DSA / LR/Chapter 9 |
| 11/3/21 Demo Lab 4: | Fluoroscopy Demo |
| 11/4/21 Lecture 26: | Radiation Protection I: Review / LR / Chapter 21 |
| 11/9/21 Lecture 27: | Radiation Protection II: Radiation Safety / LR / Chapter 21 |
| 11/10/21 Lecture 28: | Radiation Sentinel Event and IR Dose Tracking / JB |
| 11/11/21 | Veterans Day |
| 11/16/21 Lecture 29: | Interventional Clinical Lecture: Sean Wiley, RPA |
| 11/17/21 Quiz 4: | Fluoroscopy Quiz, Lectures 23-29 |
| 11/18/21 Lecture 30: | Mammography I / SL / Chapter 8 |
| 11/23/21 Lecture 31: | Mammography II / SL / Chapter 8 |
| 11/24-26/21 | Thanksgiving Holiday |
| 11/30/21 Lecture 32: | Mammography III / SL / Chapter 8 |
| 12/1/21 Lecture 33: | Mammography IV / SL / Chapter 8 |
| 12/2/21 Lecture 34: | Tomosynthesis / SL / Chapter 8 |
| 12/3/21 Tentative Demo Lab 5: | Mammography Demo |
| 12/7/21 Lecture 35: | Special Procedures in Mammography / SL / Chapter 8 |
| 12/8/21 Lecture 36: | Clinical Mammography Lecture: Julia Marshall, MD |
| 12/14/21 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>