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Fall 9-1-2017

AHXR 121.01: Radiographic Imaging

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Delaney, Anne, "AHXR 121.01: Radiographic Imaging" (2017). *Syllabi*. 5783.

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MISSOULA COLLEGE UNIVERSITY OF MONTANA

DEPARTMENT OF RADIOLOGY TECHNOLOGY

COURSE SYLLABUS

COURSE NUMBER AND TITLE: AHXR 121 Radiographic Imaging I

DATE REVISED: Autumn 2017

SEMESTER CREDITS: 4 credits

CLASS TIME: Tuesdays 10 -11:50 MC 448

COREQUISITES: AHXR 100 Introduction to Diagnostic Imaging, AHXR 140 Radiographic Methods

Faculty: Anne Delaney, anne.delaney@umontana.edu

Phone: 243-7809

Office: MC 317

Office Hours: by Appointment

RELATIONSHIP TO PROGRAM: Students will gain a clear understanding of how radiological physics directly relates to image quality and an understanding of the how why to manipulate factors to improve image quality.

COURSE DESCRIPTION: Content of the class is designed to establish students with a knowledge base in factors that govern and influence the production and recording of radiographic images.

STUDENT PERFORMANCE OUTCOMES:

Upon completion of this course, the student will be able to:

1. Define potential difference, current and resistance.
2. Define the general components and functions of the tube and filament circuits.
3. Compare generators in terms of radiation produced and efficiency.
4. Discuss fixed and mobile radiographic equipment in terms of purpose, components, types and applications.
5. Demonstrate operation of various types of permanently installed and mobile radiographic equipment.
6. Describe functions of components of automatic exposure control (AEC) devices.
7. Identify the components of diagnostic x-ray tubes.
8. Explain protocols used to extend x-ray tube life.

9. Discuss fixed and mobile fluoroscopic equipment in terms of purpose, components, types and applications.
10. Explain image intensified, flat panel and pulsed fluoroscopy.
11. Indicate the purpose, construction and application of the fluoroscopic monitor
12. Discuss quality control,(QC)
13. Evaluate the results of standard QC tests.
14. Describe fundamental atomic structure
15. Explain the processes of ionization and excitation.
16. Describe the electromagnetic spectrum
17. Describe wavelength and frequency and how they are related to velocity
18. Explain the wave-particle duality phenomena.
19. Identify the properties of x-rays.
20. Describe particulate radiation.
21. Differentiate between ionizing radiation and nonionizing radiation.
22. Describe radioactivity and radioactive decay in terms of alpha, beta and gamma emission.
23. Compare the production of bremsstrahlung and characteristic radiations.
24. Describe the factors that affect the x-ray emission spectrum.
25. Explain the factors that affect the x-ray emission spectrum
26. Discuss relationships of wavelength and frequency to beam characteristics.
27. Discuss the clinical significance of the photoelectric and modified scattering (Compton) interactions in diagnostic imaging.

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

Grading scale:

- 93-100 A
- 90-92 A-
- 87-89 B+
- 83-86 B
- 80-82 B-
- 79-70 C
- 69-60 D

Total grade will be determined by total points received on Online exams, in-class tests, class participation and final exam.

Online exams	40%
Tests	20%
Participation	20%
Final Exam:	<u>20%</u>
	100%

Class requirements: All students are expected to complete the online modules each week that they are due. Students are also required to read and be able to discuss each assigned chapter during the weekly class. On-line exams will be made available, on

Monday, the week prior to the day they are due. You will be given 2 hours to complete exam. Exams are required to be completed by 5:00 pm on the Monday due. All questions should to be asked either through Moodle, on the discussion board or during class so all students can learn from your questions. I am also available almost any time for extra help if you need it.

Class participation will be assessed by your participation in class discussions.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or disciplinary sanction by the University.

Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please speak with me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator.

All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://life.umt.edu/vpsa/student_conduct.php.

Note: Students must pass this course with a “B” (80%) in order to continue with the Radiology Technology Program the next semester.

REQUIRED TEXT: *Radiologic Science for Technologists*: 10th Edition, Stewart C. Bushong.

Online modules and exams can be found on <https://evolve.elsevier.com> , you will need to register for the course and pay through Elsevier.

How students self-enroll into my course.

Simply provide your students the steps below to self-enroll into your instructor-led course on Evolve

1. Go to <http://evolve.elsevier.com/enrollcourseid>.
2. Enter the Course ID, **97278_adelaney6_1004**, in the field provided and click **Submit**.
3. If you are enrolling into a content-protected course, you will be prompted to purchase access or enter your access code at this time. If you are prompted to enter a code and were not aware you would need to do so, please contact your instructor for further information regarding access to the course or if you should proceed with purchasing instant access.

To purchase instant access, select the radio button that states, "**I want to purchase instant access for \$XX.XX**". You will be directed to supply credit card and billing information.

If you have a 12 character access code, select the "**I have an access code**" radio button. Type your code in the field provided, and select **Apply**. *Note: access codes may only be

used one time.

Next, select the **Redeem/Checkout**

4. If you are a returning user enter your Evolve username and password and click **Login**. If you are new to Evolve enter your name, email, desired password, institution information (if applicable), and click **Continue**.
5. Click the **Registered User Agreement** link located at the bottom right. Once you have read this information check the "**Yes, I accept the Registered user Agreement**" box if you agree. Click **Submit**.
6. Your enrolment confirmation will appear on the next page. A confirmation email will additionally be sent to your instructor to inform them of your enrolment. If you are a new user, your Evolve username and password will also be emailed to you.

Click the **Get Started** link to get to your course located in the My Evolve area. Visit and bookmark <http://evolve.elsevier.com/student> for future log in.

AHXR 121 Imaging I, Fall 2016, Subject to change

Week	READING ASSIGNMENT	Module/ Exam Due The Modules for now are not available, I will let you know when they are ready
September 5	Introduction Chapter 1 Bushong Online- Essential Concepts	Module 1 Sept 11
September 12	Chapters 2 & 3 Bushong Online – The Structure of Matter Online – Electromagnetic Energy	Module 2 Sept 18 Module 3
September 19	Chapter 4 Bushong Online –Electricity, Magnetism, and Electromagnetism	Module 4 Sept 25
September 26	Chapter 5 Bushong, test review Online –The x-ray Imaging System	Module 5 Oct 2
October 3	TEST Chapter 1-5	Given in class
October 10	Chapter 6 & 7 Bushong Online – The x-ray Tube Online – X-ray Production	Module 6 Oct 16 Module 7
October 17	Chapter 8 Online – X-ray Emission	Module 8 Oct 23
October 24	Chapter 9, test review Online –X-ray Interaction with Matter	Module 9 Oct 30
October 31	Test Chapters 6 - 9	Given in class
November 7	Chapter 10 & 11 Bushong Online – Concepts of Radiographic Image Quality Online – Control of Scatter Radiation	Module 10 Nov 13 Module 11
November 14	Chapter 14 Bushong Online –Computers in Medical Imaging	Module 14 Nov 20
November 21	Chapter 15 Bushong Online –Computed Radiography	Module 27
November 28	Chapter 16 &17 Bushong Online –Digital Radiography Online –Digital Radiography Technique	Module 16 &17 December 4
December 5	Chapter 18 Bushong Online – Viewing the Digital Radiographic Image In-class review	Module 18 Dec11
Finals Week December 13 -20		

Rev October 17, 2017