Fall 9-1-2017

AHXR 121.01: Radiographic Imaging

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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.
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: 20%
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 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.


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

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](http://evolve.elsevier.com/student) for future log in.
<table>
<thead>
<tr>
<th>Week</th>
<th>READING ASSIGNMENT</th>
<th>Module/ Exam Due</th>
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| 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 Bushong  
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