SPRING 2022 – XRA 121 RADIOLOGIC SCIENCE 2

Faculty Information:

Instructor: Prof. Jarek Stelmark
Office: A307-K
Office Hours: Thursday (online) 12:15 pm – 1:15 pm
Friday (in person) 10:00 am – 1:00 pm

Phone: (718) 518-4119 *(direct)* or 4123
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Course Description:

The student will identify the advanced concepts of radiographic exposure, preparation, and use of technique charts, and be introduced to radiographic equipment calibration. This course has been designated "Writing Intensive" by Hostos Community College. The requirements include both formal (graded) and informal (non-graded) writing assignments. Both types of writing assignments must be completed in order to satisfactorily complete this course. Grades, while necessary, often inhibit student expression. Therefore by integrating many types of writing, from low stakes (not graded) to high stakes (graded), the students will learn to write on a regular basis so that they can increase their capacity to learn and they will practice communication through writing.

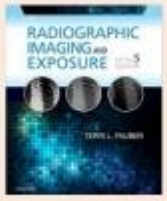
Pre-requisite: XRA 111 Radiologic Science 1

Course Meetings:

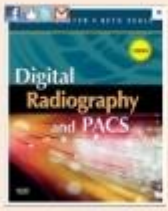
Lectures: Friday (in person) 9 am – 11:30 am

Lab: Friday : 1pm – 4:30 pm

Required Textbooks:



Fauber, T.L. ***Radiographic Imaging and Exposure***
(latest Ed) St. Louis: Elsevier Mosby, Inc.



Carter, C. Veale, B. ***Digital Radiography and PACS***
(latest Ed) St. Louis: Elsevier Mosby, Inc.

Additional Required Course Materials:

The following copyrighted materials are the sole property of the instructor.
They are available on the instructors website and are free for students enrolled in this course only.

Rad science 2 : PPT presentations

Hostos Community College, Radiologic Technology Program

Grading Criteria:

Lecture 70%

Test 1	5%	Quiz 1
Test 2	20 %	Midterm Exam
Test 3	5%	Quiz 2
Test 4	40 %	Final Exam

Lab 30%

Reports	25%	Lab Reports
Portfolio	5%	Semester

A	=	93 – 100	
A-	=	90 – 92	
B+	=	87 – 89	
B	=	83 – 86	
B-	=	80 – 82	
C+	=	77 – 79	
C	=	70 – 76	
D	**=**	**60 – 69**	**= Fail**
F	**=**	**00 – 59**	**= Fail**

Lecture Outline:

1. Fundamentals of PACS
2. Radiographic Quality: visibility and sharpness
3. Geometric Unsharpness
4. Unsharpness Calculations; Spatial and Contrast Resolution
5. Receptor Unsharpness; Acquiring and Forming the Digital Image
6. Motion Unsharpness and Image Display Characteristics

Test 1 - 50 Multiple choice questions

7. Evaluation of Recorded Detail
8. Shape and Size Distortion
9. Brightness
10. Radiographic Advanced Calculations
11. Beam Restriction and Beam Restricting Devices
12. Review for the Midterm Exam

Midterm Exam - 75 Multiple choice questions

13. Student Assessment & Discussion of the Midterm Exam
14. Radiographic and Digital Image Contrast
15. Subject Contrast
16. Radiographic Grid Positioning Errors
17. Image Reconstruction and Processing
18. Digital Image Processing

Test 3- 50 Multiple choice questions

19. Preparing Variable kVp Technique Guides
20. Preparing Fixed kVp Technique Guides
21. AEC Critical Thinking Problems
22. Analog Imaging Artifacts
23. Digital Imaging Artifacts and System Malfunctions

Final Exam – 25 multiple choice questions and one essay chosen from three topics

Lab Outline:

1. Critical Thinking for Digital Systems 1
2. Visibility of Detail
3. Geometric Unsharpness
4. Image Receptor Unsharpness
5. Summary of Recorded Detail
6. Magnification
7. Shape Distortion
8. Contrast Analog vs Digital
9. Window Level and Window Width
10. Focused Grid Errors
11. Automatic Exposure Control (AEC)
12. Preparing Manual Technique Guides
13. Critical Thinking for Digital Systems 2

Course Objectives:

Upon completion of the course, students will be able:

1. List the components of PACS
2. Define geometric unsharpness
3. Explain the process of acquiring and forming the digital image
4. Differentiate between shape and size distortion
5. Understand the difference between density and brightness
6. List beam restricting devices and their advantages
7. List factors that affect analog and digital image contrast
8. Define subject contrast
9. List and explain the grid positioning errors
10. Understand the principles of Sensitometry
11. Calculate film contrast and its base plus fog
12. Explain the process of digital image post-processing and manipulation
13. Prepare variable and fixed technique charts
14. List the components of the CR scanner
15. Understand CR processing stages
16. Explain the principle of the x-ray beam collimation
17. Explain the advantages of using grid
18. Utilize technique charts
19. Explain the principle of the operation of an automatic exposure control system (AEC)
20. Understand the image acquisition process in CR and DR systems
21. Compare and contrast analog, CR, and DR systems
22. List and identify causes of analog image artifacts
23. List and identify causes of digital image artifacts

Teaching Methods:

1. Radiographs
2. Handouts
3. PPT presentations
4. Discussions and demonstrations.
5. Virtual lab activities
6. Multimedia demonstrations
7. Lab reports
8. Homework assignments

Classroom Policies:

1. Cell phones and beepers must be turned off or placed on "vibrate" mode when in the classroom.
2. Students who arrive after the class has begun should enter the classroom quietly without making any unnecessary noise.
3. Unruly and/or disruptive behavior may be subject to disciplinary action.

   Students who create a material or substantial interruption of the educational process will be dismissed from the class and referred to the Disciplinary Committee to determine if additional sanctions - including suspension or dismissal from the program - are warranted

Student Responsibilities:

Students are expected to:

1. Come to class on time
2. Perform all lesson objectives, activities and reading assignments.
3. Complete and hand in all written assignments on or before their due date.
4. Demonstrate proficiency on all homework and written assignments.
5. Demonstrate knowledge and comprehension of the radiographic principles discussed in class as well as all assigned readings.

Use of Electronic Devices:

Cell phone use is not permitted during class time. Cell phones must be placed on "vibrate" mode. Emergency calls must be taken outside the classroom. During examinations, cell phones must be placed in a central location away from the testing area.

A simple, non-programmable calculator is permitted during examinations; students may not use – or have in their possession – a programmable calculator, or one that has advanced memory or logarithm functions.

Attendance Policies:	1. All classes are mandatory 2. If a student is absent from more than 15% of the classes the instructor may lower the grade or fail the student for excess absences. 3. Students who arrive after the lab has begun should enter the laboratory quietly without making any unnecessary noise.
Lateness:	1. Students are required to come to class on time. 2. Students who arrive more than 10 minutes late *(after the lab instructions have been explained to the class)* will NOT be permitted to join the lab groups in progress as they cause a significant risk to property, themselves and others.
Academic Integrity:	Students are responsible for upholding the academic integrity of the program by not participating either directly or indirectly in acts of cheating and by discouraging others from doing so. Students' responsibilities include, but are not limited to, the following: 1. No student shall give or receive any assistance or communicate in any way with another student while an examination is in progress. 2. No student shall use unauthorized notes, books or other materials during an examination. 3. No student shall attempt to obtain or disseminate the content of any examination prior to its distribution by the proctor. 4. No student shall procure or distribute answers to examinations in advance.
Written Assignment Policies:	1. Written assignments must be the product of the student's own research. 2. No student shall submit work that has been written by someone else or copied from an outside source. 3. No student shall submit work that has been previously submitted in either whole or part for academic credit. This is termed “self-plagiarism.” 4. Late assignments may not be accepted; if accepted, points will be deducted. 5. Students who engage in academic dishonesty will receive a grade of zero for the assignment. 6. All violations of the academic integrity policy shall be referred to the Disciplinary Committee to determine if additional sanctions - including suspension or dismissal from the program - are warranted

Examination Policies:

1. No student may remove an exam from the classroom under any circumstances
2. Exams are timed; they must be completed within the stated time frame
3. Students who arrive late for an exam will not receive extra time to complete the exam.
4. No credit will be given for questions left unanswered regardless of the reason.
5. Students are responsible for correctly completing all test answer sheets
6. When using a scantron answer sheet, a number "2" pencil must be used to fill in the bubbles.
7. No credit will be given for incompletely erased answers or blanks on a scantron.
8. Make-up exams are not given for quizzes.
9. Make-up exams will only be considered for major exams in extraordinary circumstances that justify special consideration. ***Verifiable documentation is required***.
10. All requests for make-up exams will be determined by the instructor, based upon the merits of the request, on a case-by-case basis. *Submitting a request for a make-up exam does not guarantee that permission will be granted*.
11. If the instructor grants permission for a make-up exam, *it will be scheduled during the week of final exams*.
12. No student will be granted permission for more than one make-up exam for a course; ***a grade of zero will be given for any additional missed exams***.

Laboratory Policies:

1. Cell phones and beepers must be turned off or placed on “vibrate” mode when in the lab.

2. Students who arrive after the lab has begun should enter the laboratory quietly without making any unnecessary noise.

3. Students who arrive more than 10 minutes late *(after the lab instructions have been explained to the class)* will NOT be permitted to join the lab groups in progress as they cause a significant risk to property, themselves and others.

4. Students must complete all lab homework exercises, activities and reading assignments.

5. Students must demonstrate proficiency in handling radiographic equipment. This includes, but is not limited to, the x-ray table, bucky, ceiling tube mount, control console, automatic film processor and darkroom.

6. Students' lab assessment will include, but not be limited to, their lab preparation, technique calculations, ability to follow instructions, group participation, verbal communication, lab execution, film critique and maintenance of their work area and supplies.

7. Evaluation of homework assignments will include the students' ability to demonstrate their knowledge of the radiologic science principles utilized to perform the lab experiment, analysis of their results, their writing skills and the prompt submission of their work.

8. Unruly and/or disruptive behavior may be subject to disciplinary action. Students who create a material or substantial interruption of the educational process will be dismissed from the lab immediately and referred to the Disciplinary Committee to determine if additional sanctions - including suspension or dismissal from the program - are warranted

Written Lab Assignments:

LABORATORY WRITTEN ASSIGNMENTS/REPORTS - XRA 121

All laboratory assignments are to be handed in one week after completion. Assignments are to be handed in at the beginning of class. Late assignments will not be accepted. If you are absent, the assignment may be turned in the following week. ***Do not turn in written lab assignments if you have not done it with your group.***

The following format *must* be followed for all written assignments. Use only complete sentences when writing. Assignments are to be typed only.

1. Purpose - Write a clear, well-written sentence describing the purpose of the test.

2. Equipment Needed - List equipment used

3. Procedure - Write a step-by-step explanation of the procedure you use in lab. Do not copy the textbook if it does not correspond to what is done in lab.

4. Expected results - Identify the expected results for the lab exercise.

5. Diagram - If possible, diagram the test layout.

6. Evaluation of Results - Evaluate the results of your lab exercise. The most important part of the testing is your analysis of results. Ask yourself - Are the results within acceptable limits? Why not? What recommendations should be made if any? If a problem results, what might be the probable cause? What if any follow-up procedures must be done?

Remember that spelling, grammar and neatness will be factored into the lab grade. If the exercise is not legible or sloppy it will be returned with a zero grade.

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Students with Disabilities:

As required by the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, reasonable accommodations are provided to ensure equal opportunity for students with verified disabilities.

If you have a disability that requires accommodations, contact:

Services for Students with Disabilities (SSWD)

Savoy (D) Building
120 Walton Ave, Room D101P
Bronx, NY 10451
Phone: (718) 518-4467 (Voice)
(718) 518-4454 (Voice/TTY)

If you are already registered with SSWD and have a letter from them verifying that you are a qualified student with a disability, please present the letter to the instructor as soon as possible. The instructor will work with you and SSWD to plan and implement appropriate accommodations.

Please Note:

Students who do not register with the Services for Students with Disabilities office and have their disability verified are not eligible to receive any special accommodations

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