

**OAKLAND UNIVERSITY**  
**SCHOOL OF HEALTH SCIENCES**  
**Radiologic Technology Program**  
**RAD 4340**  
**Principles of Radiographic Exposure IV**

**COURSE:** Radiographic Exposure IV

**YEAR:** Winter 2018

**INSTRUCTOR:** William Van Dyke BSBA, RT(R)

**CREDITS:** 3

**DAY/TIME:** T Th 1:00-2:45

**CLASS LOCATION:** HHB 5015

**EMAIL:** wvandyke@oakland.edu

**OFFICE HOURS:** T Th 12:00-1:00

**COURSE DESCRIPTION:**

Focus on the application of technical exposure principles to the digital aspect of radiographic image production, processing, and analysis. Elements of a radiology quality assurance program with specific equipment testing methods are presented.

**PREREQUISITES:** RAD specialization standing.

**REQUIRED TEXT:**

Radiography in the Digital Age (2<sup>nd</sup> edition), Quinn Carroll

**ASSIGNMENTS:**

Class assignments to be determined by the instructor. **Retention quizzes** will be given at the instructor's discretion. All material for tests will come from lectures, class discussions, demonstrations, student presentations, the textbook, and additional reading assignments. Students are expected to review material being covered prior to each class. **Tests and quizzes will be available for review for up to two weeks after the exam date.**

**COURSE OBJECTIVES/LEARNING OUTCOMES:**

Students should gain an understanding of the concepts required of a beginning student radiographer. Objectives for each chapter are as followed. Students will be able to:

**Quality Control (Chapter 39)**

1. Discuss the FOCUS PDCA model for quality improvement.
2. Understand the reasons behind specific quality control tests.
3. Identify equipment used for specific quality control testing.

**Alignment and Motion (Chapter 24)**

1. Understand the factors that affect alignment on the image.
2. Discuss the similarities of off centering and off angling.
3. Understand the relationship between the part, image receptor and the beam.

**Analyzing the Radiographic Image (Chapter 25)**

1. Review the variable affecting image quality.
2. Differentiate between absorption penumbra and geometric penumbra.
3. Discuss the importance of spatial and contrast resolution.

**Simplifying and Standardizing Technique (Chapter 26)**

1. Understand the necessity for technique charts and their role in reducing patient exposure.
2. Discuss the advantages of fixed and variable kV charts.
3. Understand how to create a technique chart.

### **Creating the Digital Image (Chapter 29)**

1. Identify the two most important factors regarding image quality.
2. Understand the relationship between pixels and matrices.
3. Discuss basic post-processing operations.

### **CR Image Applications (PowerPoint)**

1. Convert digital numbers to binary and binary to digital.
2. Describe how a histogram is constructed.
3. Explain the use of look-up tables.

### **Capturing the Digital Image (Chapter 34)**

1. Differentiate between CR and DR.
2. Discuss CR image formation.
3. Discuss DR image formation.

**CR/DR Presentations:** You will produce either a CR or DR presentation. This presentation must provide images you have created to demonstrate the properties of CR or DR. Each topic must be approved by me. You may discuss any feature(s) of the modality, how they affect the properties of imaging, how the components function or most anything that you can explain to the class using images and your research. You must have 3 sources other than the textbook and my PowerPoints do not count as a source. These will be graded according to the presentation rubric. **You must submit your completed presentation to me by email one week prior to your presentation date or lose five points for each day late.**

**FOCUS PDCA Presentation** – RAD students are entering a field where they will be expected to assess processes and maximize efficiency. The FOCUS PDCA model is one way to this. By having you use this model to address a real or fictional problem, you should begin to understand that your role in the workplace will also include finding ways to do things better.

You and your team member will select or invent a situation that requires a process improvement and then follow the FOCUS PDCA model. The topic must be approved by me. The presentation must address each step of the model. You may assume that you would have access to the required personnel and funds for your project to be implemented. **The completed presentation will be submitted by email one week prior to the day presented or suffer a five point deduction for each day late.**

**Presentations will be graded according to each Presentation Rubric.**

**Approval request of each topic must be submitted by email. All presentation topics must be submitted and approved by specified due date or suffer a 5 percentage point reduction in grade.**

**Class Kaizen Project** – We as a class will simulate a Kaizen for a fictional medical institution. We will go through steps of assessing opportunities for improvement using the Kaizen process and ultimately develop a course of action. In order for this to be successful, I expect complete participation from all. You will be graded 0-3 on participation for each meeting for a total that will count as a test grade. Additional reading and writing assignments may be given if participation is lacking.

**Journal Club** – For each Journal Club meeting, you will have read and summarized a group of publication/journal articles. Your summaries will be graded based on the Journal Summary Rubric. All summary grades will be averaged for one score and will count as **two** quiz grades. Summaries must be submitted by email one week prior to Journal Club meeting.

**GRADING:** Graded assignments and quiz scores will be averaged to equal one test grade. The tests, individual presentation, team presentation and the final exam will each count as a test grade. All test grades will be averaged for a final grade. A grade of 75% is required to pass this class.

**GRADING SCALE:**

Percent	Grade point	Percent	Grade point	Percent	Grade point	Percent	Grade point
97-100	4.0	85	3.2	74	2.4	66	1.6
96	3.9	84	3.1	73	2.3	65	1.5
95	3.8	80-83	3.0	72	2.2	64	1.4
94	3.7	79	2.9	71	2.1	63	1.3
93	3.6	78	2.8	70	2.0	62	1.2
90-92	3.5	77	2.7	69	1.9	61	1.1
88-89	3.4	76	2.6	68	1.8	60	1.0
86-87	3.3	75	2.5	67	1.7		

**PROJECTS:** When the instructor assigns a project that requires a student to make actual exposures, instructions will be provided as to how the lab should be conducted. The student is required to follow these instructions and to maintain all standard radiation protection practices. Additionally, the student must complete these projects in an area in which a registered radiologic technologist is readily available for consultation. Radiographic rooms must be left clean, neat and non-energized. Students failing to conduct the lab project with carefulness, cleanliness or respect will suffer a 10 percentage point reduction in their grade for the project.

**CLASS POLICIES:**

1. Academic conduct policy: All students are expected to complete their own work unassisted by anyone else, unless specified by the instructor for group assignments.
2. Add/Drops: **Deadline for dropping this class will follow university policy.**
3. Special Considerations: Students with disabilities who may require special considerations should make an appointment with campus Disability Support Services, 106 North Foundation Hall, phone number 248 370-3266. Students should also bring their needs to the attention of the instructor as soon as possible. For academic help, such as study and reading skills, contact the Academic Skills/Tutoring Center, 103 North Foundation Hall, phone 248 370-4215.
4. Attendance policy: Students are expected to attend all scheduled class meetings. One absence is permitted per semester. All other absences will reduce your final grade by 1% for each occurrence. Twenty or more minutes late to class will constitute an absence.
5. Due dates and late submissions: Assignments must be completed on time. Late assignments will receive a 10 percentage point deduction for each day late.
6. Missing of tests or assignments: If you know that you will miss a scheduled test/exam/assignment, contact the instructor for options. Students that miss an exam, but take it before the scheduled date, will not suffer grade reduction. Students that miss a scheduled test/exam may still take the exam, if approved by the instructor. Unannounced quizzes are not taken in advance nor made up afterward. A grade of "0" will be earned for missed unannounced quizzes.
7. Dress code: Students will come to class dressed appropriately.
8. Cell phone policy: Cell phones must be turned OFF while in class or set to vibrate. If a cell phone makes an audible noise other than vibrate during class, the student will immediately leave the class for the remainder of the class period.
9. In order to be successful in this class:
  - a. students must read the material assigned with intent
  - b. students must participate in class lectures or discussions
  - c. students must be engaged in all class exercises or team projects
  - d. students must be respectful to instructors, any guest speakers and other students in class
10. Instructor is available for contact via OU e-mail. I will respond to your e-mails in a timely manner.

## **TENTATIVE COURSE OUTLINE**

*\*\*Subject to change at the instructor's discretion\*\**

<b>Date</b>	<b>Topic(s)</b>	<b>Text</b>
1/4	Syllabus, project descriptions, assignment of teams and topics	
1/9	Quality Control	Carroll Ch. 39
1/11	Quality Control	
1/16	<b>Test</b>	
1/18	Alignment and Motion (Recorded)	Carroll Ch. 24
1/23	Analyzing the Radiographic Image (Recorded)	Carroll Ch. 25
1/25	<b>Test</b>	
1/30	PDCA Exercises	
2/1	1st Kaizen Meeting	
2/6	Simplifying and Standardizing Technique	Carroll Ch. 26
2/8	Creating the Digital Image ( <b>CR/DR topic due</b> )	Carroll Ch. 29
2/13	<b>Test (PDCA topic due)</b>	
2/15	2nd Kaizen Meeting	
2/27	CR Image Applications	PowerPoint
3/1	Capturing the Digital Image	Carroll Ch. 34

3/6	<b>Test</b>
3/8	PDCA Team Meetings
3/13	3 <sup>rd</sup> Kaizen Meeting
3/15	CR/DR Rough Draft Submission and Consultation
3/20	Journal Club
3/22	4 <sup>th</sup> Kaizen Meeting
3/27	Journal Club
3/29	Last Kaizen Meeting
4/3	CR/DR 3
4/5	CR/DR 3
4/10	CR/DR 3
4/12	CR/DR 1 PDCA 2
4/17	PDCA 3
4/19 - 25	Final Exam TBA