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**Midwestern State University**
Robert D. & Carol Gunn College of Health Sciences & Human Services
Department of Radiologic Sciences
Revised January 2022

Course Number: RADS 3033 3 credits Spring 2022

Course Title: Image Acquisition & Processing

Faculty: **Jessyca Wagner, Ph.D., RT(R), (She/Her)**
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## Course Overview:

This course will analyze radiographic image qualities and the effects of exposure variables upon these qualities. The course will also study radiographic imaging technique formulation, image quality assurance, and the synthesis of all variables in image production.

## Course Objectives:

Upon completion of this course the students will:

- Define, recognize, and evaluate the qualities of the radiographic image
- Analyze the effects of exposure variables upon each image quality
- Formulate techniques to optimize image quality, minimize patient exposure, and preserve equipment
- Apply methods of image quality assurance
- Adapt technical variables to changing conditions

## Course Resources:

Carter, C. E., & Vealé, B. L. (2019). *Digital radiography and PACS* (3rd ed.). Elsevier Mosby.

Johnston, J. N., & Fauber, T. L. (2020). *Essentials of radiographic physics and imaging* (3rd ed.). Elsevier.

Rad Tech Boot Camp Subscription

## Introduction:

Welcome to RADS 3033 – Principles of Radiographic Imaging. Over the next 15 weeks, you will be introduced to the basic principles of radiographic imaging and an in-depth look at the mechanics of digital radiography. This course will feature one, two-hour lecture period per week, followed by hands-on laboratory experience for two hours once per week. This semester will be extremely fast-paced and knowledge-intensive. You should expect to study at least 20 hours per week if you wish to do well. If you have problems in this class, do not hesitate to seek help. Please do not wait until the last minute, as that will be too late.

## Class Meeting Date and Time:

**Lecture:**
Monday 10:00 AM – 11:50 AM

**Labs:**
Monday 1:00 PM – 2:50 PM
Tuesday 9:30 AM – 11:20 AM
Wednesday 1:00 PM – 2:50 PM
Friday 1:00 PM – 2:50 PM

Please note: Students are only required to register for ONE lab period and the lecture.

## Attendance Policy:

The student has a responsibility to attend all classes/labs at the designated time of that class or lab. If a student does not, they may be classified as tardy or absent. The following criteria of those classifications are solely those of the instructor of this class. Attendance counts as 5% of your overall course grade.

**Tardiness**
Any student that arrives at class/lab after the starting time designated in the university catalog of classes will be considered tardy. If a student arrives tardy, two (2) points will be deducted from his or her attendance grade for each tardy. Three tardies constitute 1 unexcused absence, resulting in five (5) points being deducted from the student's attendance grade.

**Absent from Class**
A student will be considered absent from class/lab if the student does not show up after fifteen (15) minutes have expired. If the student has an unexcused absence, five (5) points will be deducted from his or her attendance grade. Three (3) separate unexcused absences in lecture or lab **will** result in failure of the course and possible dismissal from the program. **There will be no exception to this policy.**

A student will be considered as having an excused absence from class/lab if the following criteria have been established:

1. **Death of an immediate family member.** An immediate family member is considered to be a grandparent, parent, sibling, spouse, in-law, aunt, uncle, or child.
2. **Summons to appear in court or jury duty.** A copy of the summons is required.
3. **Call to military service.** A copy of your orders to report is required.
4. **University-sponsored event.** Members of athletic teams, college bowl participants, etc. will be excused with proper notification.
5. **Debilitating illness or disability.** Will be addressed on an individual basis.

If a student is affected by an illness that is not debilitating, (i.e. COVID, flu, virus infection) which may result in the student missing one or more consecutive class/lab sessions, that student will be marked as unexcused for the number of days missed **unless a doctor's note is provided.** A doctor's note **must** have a statement to the effect that you were seen in the office, or you are cleared to return to classes. It **does not** have to state what you were seen for. **There will be no exception to this policy.**

**Personal Appointments**

Students should refrain from making appointments that will take them out of class/lab. Routine doctor or dentist visits are an example of this. If you leave class/lab early because of an appointment, or for any other reason, the occurrence will be treated with the same regard as tardiness. Doctor visits will be approved only with an accompanying release note.

## Classroom Behavior:

You must respect the right of every student in the classroom to learn. Talking during class, leaving or entering the room repeatedly during class, or any other type of disruptive behavior will not be tolerated and may result in your being asked to leave the classroom. If this should occur, you will not be allowed to return to class that day and it will be treated as an unexcused absence with a 5-point deduction from your final grade. Repeat offenders will be sent directly to the program chair's office. **Cell phones are not to be used in class.** Disruptions due to these devices may result in your dismissal from class and/or the program.

This course requires working in groups. Teamwork is an essential element in the healthcare industry. When in the labs, you must work within the group and **NOT** as an individual.

## Course Requirements:

## Course Modules:

**Module 1 (Approximately 4 weeks)**

- Chapter 8, 9, 11, 12, & 13 – Johnston
- Rad Tech Boot Camp Courses:
    - X-Ray Production (review from Physics) – all lessons
    - X-Ray Interactions with Matter – all lessons
    - X-Ray Beam – all lessons
    - Image Quality Factors – Magnification & Distortion ONLY
    - Primary Exposure Factors – all lessons
    - Advanced Exposure Factors – all lessons
    - Radiography Math Fundamentals – all lessons

**Module 2 (Approximately 4 weeks)**

- Chapter 2, 3, 4, 5, & 6 – Carter
- Rad Tech Boot Camp Courses:
    - Radiation Units of Measurement (review from Physics) – all lessons
    - Fundamentals of Digital Radiography – all lessons
    - Image Quality Factors – all lessons except magnification & distortion

**Module 3 (Approximately 3 weeks)**

- Chapter 7, 8, 9, 10, 11, 12, & 13 – Carter
- Rad Tech Boot Camp Courses:
    - Image Evaluation – all lessons
    - Quality Control – all lessons

## Lecture:

**Weekly Quizzes / Module Exams / Final Exam**

All lecture content will be covered in class and materials will be posted online in D2L. You will also be required to complete videos and quizzes in Rad Tech Boot Camp for each module. Your scores from those assessments will constitute 10% of your total course grade.

Every lecture period you will have a quiz over the content covered the previous week. It will be five (5) short-answer questions. The quizzes will be given the first 10 minutes of class and then the lecture will follow. The grades on these quizzes will constitute 15% of your overall course grade.

There will be three (3) module exams throughout the semester. These module exams will have 50 multiple-choice, short answer, and fill-in-the-blank questions and will count for 30% of your overall course grade. They will be completed online using the

Respondus Lockdown Browser with Webcam in D2L. You will not be required to come to the classroom on exam days.

The final exam will be comprehensive from the entire semester and will have 100 multiple-choice, short answer, and fill-in-the-blank questions. None of the questions will be from previous exams. A final review period has been factored into the course schedule, but remember the course schedule is tentative, so a final review is not guaranteed. The final will count for 20% of your overall course grade and will be administered online using the Respondus Lockdown Browser with Webcam in D2L.

**Research Poster**
You will form partnerships (2 maximum) within the class to create a research poster that you will present to the class. Everyone is required to produce a poster and submit it to the Texas Society of Radiologic Technologists (TXSRT) Annual Meeting competition. It is for a grade and you must follow all course and TXSRT guidelines to receive full credit. Details about the poster are provided in D2L and will be elaborated in class and deadlines for submission are provided in the course schedule. The poster will count for 10% of your overall course grade.

## Laboratory:

The laboratory portion of this course is designed to offer you the opportunity to test and practice the theories and facts discussed in lecture. There will not always be pre-designed experiments or procedures. Instead, the design of this lab is one of discovery. While you must follow all personal and equipment safety procedures, you will use information from lectures along with provided equipment to “discover” if a particular set of rules, guidelines, or theories prove true. You will also be doing scenarios and film critique sessions. The laboratory portion of this course will count for 10% of your overall course grade and will be comprised of the technique chart project and mystery box final.

At the beginning of the semester, you will be put into groups within your lab period. You will work together to create a technique chart for your assigned room throughout the semester. You will be permitted time during lab to work on this but will have no time outside of class to work, so you must use your time wisely. It would be wise to incorporate what you’re doing in positioning with this project to double your class time. Examples and more detailed instructions will be provided in class. **This project will be due the last week of class on your scheduled lab day.**

There is a lab “final” in this course this semester, which is the Mystery Box assignment. You will be required to take a series of images of unknown objects, identify as many items as possible, and explain your process and images to the instructor in a set

amount of time. More information about the final will be given closer to time. The lab final will be held the last week of classes (the week before lecture finals).

## Grading:

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|---|---|
| Attendance | 5% |
| RTBC | 10% |
| Weekly Quizzes | 15% |
| Unit Exams | 30% |
| Final | 20% |
| Poster | 10% |
| Lab (Technique Chart & Final) | 10% |

## Scale:

100 - 90 = A
89 - 80 = B
79 - 75 = C
74 - 69 = D
68 - below = F

**NOTE: You must make a C average (75%) or above to continue in the Radiologic Technology Program. Please be aware, Dr. Wagner does NOT round grades.**

## Special Needs:

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable adjustments in its policies, practices, services, and facilities to ensure equal opportunity for qualified persons with disabilities to participate in all educational programs and activities.

The Office of Disability Support Services (DSS) provides information and assistance, arranges accommodations, and serves as a liaison for students, instructors, and staff. The DSS has assistance devices such as books on tape, recorders, and adaptive software which can be loaned to qualified individuals. A student/employee who seeks accommodations on the basis of disability must register with the Office of Disability Support Services in the Clark Student Center Room 168 or call 940-397-4140 for more information. Documentation of disability from a competent professional is required.

Individuals with grievances related to discrimination or lack of accommodation on the basis of a disability are encouraged to resolve the problem directly with the area involved. If the matter remains unresolved, advice and/or assistance will be provided by

the Office of Disability Services for resolution. The grievance procedure may be found in the Student Handbook and Activities Calendar.

The ADA Coordinator may be contacted at (940) 397.4140, or 3410 Taft Blvd., Clark Student Center Room 168.

## Conduct/Honesty/Honor System:

RADS 3033 adheres to the MSU Code of Conduct. In particular, academic dishonesty, however small, creates a breach in academic integrity. A student's participation in this course comes with the expectation that his/her work will be completed in full observance of the MSU Code of Student Conduct. A student should consult the Student Handbook for answers to any questions about the code.

Students are encouraged to take full advantage of many resources available including Internet sites, handouts, other textbooks & journals, faculty, and peers. This interactive collegial learning environment is conducive to life-long learning.

Specific components of RADS 3033 are designed to represent the efforts of each student individually and are NOT to be shared. Submitting someone else's work as your own or improperly cited work constitutes plagiarism. Please see the Midwestern State University Catalog for further discussion of plagiarism. Plagiarism will constitute in an F for the course and the student will be referred to administration for further action. When students submit their efforts for grading, they are attesting they abided by this rule. ***Quizzes and exams are not to be copied in any form or shared in any form. Students caught engaging in such activity will receive an F for the course and be referred to University administration for dismissal.***

Cheating includes, but is not limited to: (1) use of any unauthorized assistance in taking quizzes, tests, or examinations; (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or completing other assignments; or (3) the acquisition of tests or other academic materials belonging to the university faculty or staff without permission.

Plagiarism includes, but is not limited to: the use of, by paraphrase or direct quotation without correct citation in the text and on the reference list, the published or unpublished works of another person. Students may not submit papers and assignments that they have previously submitted for this or other courses. The use of materials generated by agencies engaged in "selling" term papers is also plagiarism. Students are encouraged to review the tutorials and suggested websites for more information about plagiarism.

*By enrolling in this course, the student expressly grants MSU a limited right in all intellectual property created by the student for the purpose of this course. The limited*

*right shall include but shall not be limited to the right to reproduce the student's work product in order to verify originality and authenticity, and for educational purposes.*

## Administrative Process:

Unresolved issues related to this course should be first addressed between the student and the course instructor. If there is no resolution, students must follow this sequence:

1. Department Chair: Dr. Beth Vealé (940) 397.4611
2. College Dean: Dr. Jeff Killion (940) 397.4594
3. Dean of Students: Matthew Park (940) 397.7500

## Tentative Course Schedule

| Date: | Assignments |
|---|---|
| January 10 | Intro/Syllabus<br>Lecture: Chapter 8 – Johnston (through page 89 only) |
| January 17 | Quiz: Chapter 8 – Johnston (Online)<br>Lecture: Chapter 9 – Johnston (Recording in D2L) |
| January 24 | Quiz: Chapter 9 - Johnston<br>Lecture: Chapter 11 & 13 – Johnston<br>Poster Group & Topic Due 11:59 PM CST |
| January 31 | Quiz: Chapter 11 & 13 - Johnston<br>Lecture: Chapter 12 – Johnston |
| February 7 | Module 1 Exam (Online)<br>RTBC videos and assessments due 11:59 PM CST |
| February 14 | Lecture: Chapter 2 & 3 – Carter |
| February 21 | Quiz: Chapter 2 & 3 – Carter<br>Lecture: Chapter 4 – Carter<br>Poster Application Due to TXSRT |
| February 28 | Quiz: Chapter 4 – Carter<br>Lecture: Chapter 5 – Carter |
| March 7 | Quiz: Chapter 5 – Carter<br>Lecture: Chapter 6 – Carter |
| March 14 | Spring Break |
| March 21 | Module 2 Exam (Online)<br>RTBC videos and assessments due 11:59 PM CST |
| March 28 | Lecture: Chapter 7 & 8 – Carter |
| April 4 | Quiz: Chapter 7 & 8 – Carter<br>Lecture: Chapter 9, 10, & 11 – Carter |
| April 8 | TXSRT Conference<br>Poster Due |
| April 11 | Quiz: Chapter 9, 10, & 11 – Carter<br>Lecture: Chapter 12 & 13 – Carter<br>Easter Break starts 10:00 PM April 13 |
| April 18 | Module 3 Exam (Online)<br>RTBC videos and assessments due 11:59 PM CST |
| April 25 | Final Review (if possible)<br>Lab Final<br>Technique Chart Due 11:59 PM CST |
| May 2 | Lecture Final (Online)<br>Monday, May 2 at 10:30 AM |