MSU TEXAS
MIDWESTERN STATE UNIVERSITY

Gunn College of Health Sciences and Human Services
Shamadzu School of Radiologic Sciences
Bachelor of Science, Radiologic Technology Program
Course Syllabus - Dr. Rodney Fisher

RADS 3513 Radiographic Imaging Equipment

Course Information

Name	RADS 3513 Radiographic Imaging Equipment
Section	301
Credit	3 hours
Term	Summer 2026
Time & Location	**Lecture:** Monday, Tuesday & Wednesday, 8:00 am – 8:50 am Centennial Hall 340 **Lab:** One lab that is two hours per week in the Radiology Lab Mondays & Wednesdays 1:00 – 2:50 pm, & 3:00 -4:50 pm (Students select one day and time)
Dates	June 1, 2025 – August 5, 2026
Time Commitment	Students should expect to spend 3 hours per week in lectures, 2 hours per week in the lab, and at least 9 hours per week studying or completing assignments (10-week summer term).
Prerequisites	None

Professor

Rodney Fisher, Ph.D., R.T. (R) (N) (CT) (BD), CNMT

Assistant Professor / Radiation Safety Officer

E-mail: Rodney.Fisher@msutexas.edu

Phone: (940) 397-4615 **Fax:** (940) 397-4845

Office: Midwestern State University
3410 Taft Blvd, Centennial Hall 430N
Wichita Falls, TX 76309

Office hours: Tuesdays, 10:30 – 11:30 am & 1:00 – 5:00 pm
Appointments always take preference over walk-ins.

Communicating with the Professor

I prefer email so there is a record of the communication, and often, I am away from my desk. Phone calls may be answered by email when appropriate. I will respond to or at least acknowledge all student communications within five (5) business days. If this time period is extended because I am out of town or for another reason, a news item will be posted on D2L for the class. Please always give me the time I have asked for to respond before repeating your request.

Course Description

This course discusses introductory Newtonian and radiographic physics, X-ray circuitry and tube operation, and X-ray production and interaction with matter. It also introduces the first part of informatics for imaging, which will be continued in RADS 3103, Image Acquisition and Processing I, in the fall semester.

Course Objectives

Upon completion of this course, the student will:

- Describe the basic atomic theory and the various forms of energy.
- Describe and apply the basic concepts of electricity and electromagnetism.
- Identify and explain the role of various parts of the X-ray circuit and types of X-ray equipment.
- Discuss the X-ray production process and X-ray interactions with matter.
- Explain how dual-energy X-ray is used in bone densitometry
- Understand introductory CT physics and instrumentation

Teaching Methodology

This course uses a hybrid of cognitive scaffolding and social constructivism methodologies. There will be individual reading assignments; quizzes on the reading material prior to class lectures and discussions; lectures with gamification activities; and lab assignments involving operating X-ray equipment, with a lab final

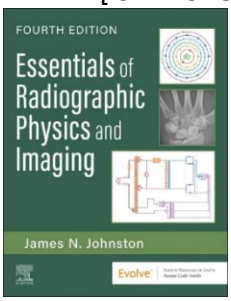
Course Materials

Textbooks

Required

Physics:

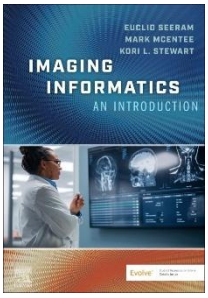
Johnston, J. (2024). Essentials of Radiographic Physics and Imaging (4th Ed.). Elsevier. [ISBN: 978-0323930673]. $118.99 – 157.99 at the MSU Bookstore.



This book will also be used in RADS 3123 Image Acquisition and Processing II

Informatics:

Seeram, E., McEntree, M., Stewart, K.L. (2026). Imaging Informatics: An Introduction: for the Medical Imaging Professional (1st Ed.). Elsevier. [ISBN: 978-0443224256]. $61.99 at the MSU Bookstore.



This book will also be used in RADS 3103 Image Acquisition and Processing I

Computer Requirements

You need access to an up-to-date computer with an internet connection for this course. D2L does not work well with Internet Explorer or Edge. Chrome or Firefox is the preferred browser when working in D2L.

Important Dates

All dates are subject to change as needed

Date	Chapter Lecture or Test	Quiz/Test/Project	Lab
May 30	Physics 1	D2L Opens	
Week 1			
June 01	Physics 1	1st Day of Class Chapter 1 Quiz due 8:00 am	Lab orientation, basic tube/collimator/table operation, X-Ray Twister
June 02	Physics 1		
June 03	Physics 2	Chapter 2 Quiz due 8:00 am	
Week 2			
June 08	Physics 2		X-ray Suite Worksheet due; timed X-Ray Twister
June 09	Physics 3	Chapter 3 Quiz due 8:00 am	
June 10	Physics 3		
Week 3			
June 15	Physics 1 - 3	Module 1 Test	Creating an exam, setting a technique, taking a PA hand, and completing an exam
June 16	Physics 4	Chapter 4 Quiz due 8:00 am	
June 17	Physics 4		
Week 4			
June 22	Physics 4		Appending an exam, angling the tube, and taking an AP foot
June 23	Physics 5	Chapter 5 Quiz due 8:00 am	
June 24	Physics 5		
Week 5			
June 29	No Class - ASRT		Open Labs for Practice
June 30	Physics 5		
July 01	Physics 6 – 7	Module 2 Review Day	

Week 6			
July 06	**Physics 4 - 5**	**Module 2 Test**	**Using a table Bucky, detenting the tube, and taking an AP knee**
July 07	**Physics 6**	**Chapter 6 Quiz due 8:00 am**	
July 08	**Physics 6**		
Week 7			
July 13	**Physics 7**	**Chapter 7 Quiz due 8:00 am**	**Using a wall Bucky, detenting the tube, 40" SID, know how to properly place a marker on a wall Bucky, taking a lateral skull**
July 14	**Physics 7**		
July 15	**Physics 6 – 7**	**Module 3 Review Day**	
Week 8			
July 20	**Physics 6 – 7**	**Module 3 Test**	**Using a wall Bucky, detenting the tube, 72" SID, and taking a PA chest**
July 21	**Informatics 1**	**Informatics 1 Quiz due 8:00 am**	
July 22	**Informatics 2**	**Informatics 2 Quiz due 8:00 am** **Last day to withdraw with a "W"**	
Week 9			
July 27	**Informatics 2**		**Practice for the Lab Final**
July 28	**Informatics 2**		
July 29	**Informatics 3**	**Informatics 3 Quiz due 8:00 am** **Group Lab Report Due**	
Week 10			
August 03	**Informatics 1 - 3**	**Module 4 Test**	**Lab Final: start an exam, draw a body part, set a technique, position the tube and body part to the IR, take the image, and complete the exam**
August 04			
August 05	**Physics 1 – 7;** **Informatics 1 - 3**	**Final Examination 8:00 am – 10:00 am;**	

Evaluation

Grade Scale
A=100-90
B=89-80
C=79-75
D=74-60
F=59 and below

Grading Cycle
All assignments are graded together to maintain greater consistency. Grading begins on the first business day after the due date, outside of university holidays and professional meetings, and is typically completed before the next due date. You may track your progress through the Gradebook in D2L.

Feedback
Feedback varies throughout the course. The News section of the course is where I will send messages to the entire class. It is best to set up your D2L account to receive an email notification (to the email of your choice) when News items are posted, so you do not miss important updates.

1. Click the down arrow in the News section on the 3513-course home page
2. Select Notifications
3. Check the box next to "News - new item available" and then check any other boxes you wish to receive an email notification from.
4. Check the email address you wish to send email notifications. If you need to change this, select "change your email settings" and enter the new email address. This email address should be an email address you check frequently.

You are welcome to email questions to clarify concepts or look for further explanations. If I encounter repeated questions, I will provide feedback or supplementary resources in the course's News section so everyone can benefit. You might look there first because your question may be located there.

Late Work
Online quizzes may not be made up if they are not completed by the due date. Module tests may be administered before the testing date with prior approval. I normally do not give late tests except in extreme emergencies with acceptable documentation from the student. I reserve the right, in this case, to administer a substitute test in a different format that may be more difficult. Lab worksheets, lab reports, and group projects will never be granted extensions. All coursework must be completed in the semester the course is taken. I do not give incomplete grades.

Final Course Grade
This is a progression course in the BSRT program. A final course score of 75% is required to pass. Any grade below 75% will result in the student's dismissal from the program. Any

withdrawal from this course will result in the student's dismissal from the BSRT program. If the student is dismissed, the student will need to reapply for program admission under the rules then in force. This course will have to be repeated. A student is only allowed to repeat this course once.

Radiographic Imaging Equipment Assignment Details

Assignments

There are five types of assignments in this course. The grading will be as follows:

1.	Chapter Quizzes (9)		10%
2.	Module Tests (4)		40%
3.	Lab Grade:		20%
	a) X-ray Suite Worksheet	20%	
	c) Individual Lab Final	50%	
	d) Lab Participation	30%	
4.	Final Examination		30%

Course Modules

Module 1: Introduction and Basic Physics

Physics Chapter 1: Introduction
Physics Chapter 2: Structure of the Atom
Physics Chapter 3: Electromagnetic and Particulate Radiation

Module 2: X-ray Mechanics

Physics Chapter 4: The X-ray Circuit
Physics Chapter 5: The X-ray Tube

Module 3: X-ray Physics

Physics Chapter 6: X-ray Production
Physics Chapter 7: X-ray Interactions with Matter

Module 4: Informatics Part 1

Informatics Chapter 1: An Overview of Imaging Informatics
Informatics Chapter 2: Information Technology: Computer System Components
Informatics Chapter 3: Essentials of Health Informatics

Chapter Quizzes (10%):

Each of the nine chapters will have a 15-question quiz administered through D2L according to the published schedule. Students will have 30 minutes to complete a quiz. Students are encouraged first to read the chapter, then take the quiz with their book and any notes ready. Students should attempt the quiz individually and not work together. The purpose of the pre-lecture quizzes is for students to identify what they do not understand and create a list of questions to be answered during the lecture.

Module Tests (40%):

There are four module tests. These tests will consist of multiple-choice and matching questions. Sources for the questions will include the previous quizzes and module tests, the textbook, chapter PowerPoint slides and lectures, and lab experiments. Module tests typically have 30-75 questions and are completed during the scheduled lecture session.

Lab Grade (20%)

The lab grade consists of an X-ray Suite Worksheet, an Individual Lab Final, and Lab Participation.

X-ray Suite Worksheet (20%)

Each student will be given a worksheet to complete during their first lab session. It will be due at the beginning of the next lab session. The worksheet has complete instructions and requires the student to draw a diagram of an X-ray suite, labeling all the required components.

Individual Lab Final (50%)

The lab final will consist of the student drawing a body part and X-ray (PA hand, AP foot, AP knee, PA Chest, or Lateral Skull), and then demonstrating competency by completing the following:

1. Starting an exam
2. Set a technique
3. Positioning the body part with the correct tube/IR relationship
4. Take a properly collimated image
5. Complete the exam

The student will have 10 minutes to complete the Lab Final once the body part has been drawn.

Lab Participation (30%)

The lab participation grade is determined by how well a student interacts with other students in the lab, stays focused on the assigned tasks, and completes the weekly lab check-off sheet. Because of the limited time available in the lab during the summer semester, any absences will result in a loss of 1/3 of the Lab Participation grade. Tardiness will result in a 1/10 deduction of the total Lab Participation grade. Any tardiness of more than 10 minutes will be treated as an absence. Leaving the lab early without my prior consent will count as an absence for that lab session.

Final Examination (30%):

The Final Examination will cover Physics Chapters 1 – 7 and Informatics Chapters 1 – 3. The exam will consist of 200 multiple-choice and matching questions. Sources for the questions will include the previous quizzes and module tests, the textbook, chapter PowerPoint slides and lectures, and lab experiments. The schedule in this syllabus has the final examination time. Students will have a two-hour final examination period to complete the examination.

Radiographic Imaging Equipment Course Policy Details

Classroom Conduct

Students should come to class prepared for the topic being discussed that day. Students should also take care of any personal matters, including using the restroom, before class begins, so they do not need to leave during class. While there may be times when leaving the classroom is unavoidable, it should be an exception rather than the norm. Phone use during class is not permitted unless cleared with the professor prior to the start of class and only for the most exigent of circumstances. If such exigent circumstances are approved that day, the student should attempt to sit as close to the back door as possible so that leaving the classroom to take a call does not disrupt the class. Leaving the classroom to refill a water bottle or for other inconsequential purposes is not allowed, and the professor may refuse re-entry. The student will be recorded as absent for the day.

Tardiness

Students are expected to be in the classroom before class begins. Students entering the classroom after class has begun disrupts the learning environment for the other students. Any student entering the classroom after class begins will be considered tardy. Three instances of tardiness will count as one absence (see the Attendance policy below). Any student who enters the classroom 10 minutes after class begins will not be admitted and will be considered absent that day. Students who are tardy on the module or final examination dates must complete the exam in the remaining time and will not receive any additional time.

Attendance

Attendance is required for all class sessions. A student may have up to three absences. If a student accumulates more than three absences, the professor may initiate an administrative withdrawal from the course. This will result in the student's dismissal from the BSRT program at the end of the semester. If a student believes there are mitigating circumstances for any absence, the student must provide the professor with documentation prior to the absence or, if not possible, upon returning to class. The professor has sole discretion to determine if an absence should be excused.

Requesting a Withdrawal

The last opportunity to drop this course with a grade of "W" is posted in the class schedule earlier in this syllabus. The student must initiate all withdrawals. After this date, dropping the course results in a grade of "F". Withdrawal from this course will result in the student being dismissed from the BSRT program.

In an emergency or extenuating circumstance, a student may request an incomplete grade before grades are submitted. If the professor grants the incomplete, the student has until thirty (30) days after the beginning of the next long semester to complete the course requirements. If the student does not complete the course requirements by the deadline, the incomplete grade will automatically convert to an "F."

Technical Difficulties

Occasionally, you may experience problems accessing D2L, accessing class files within D2L, connecting to your internet service, or other computer-related issues. Make the professor aware of a technical problem as soon as possible. If a problem occurs on our end, such as D2L failure, then a due date extension will typically be granted**. However, remember that it is your responsibility to have (or have access to) a working computer in this class.** ***Assignments and tests are due by the due date, and personal computer technical difficulties will not be considered grounds for the instructor to grant students extra time to submit assignments, tests, or discussion postings.***

Dropbox assignments that can be attached to an email should be emailed to the professor as soon as a problem is encountered. Failure to do so may result in points being lost, regardless of connection issues.
For help options:

- For D2L issues, go online, go to the Distance Education Helpdesk
- By phone, call the Distance Education office at 940-397-4868 between 8 am and 5 pm.
- Use the D2L help link in D2L.
- Contact your professor.
- For other computer access issues, visit the MSU Information Technology Website online.

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 Services (ODS) provides information and assistance, arranges accommodations, and serves as a liaison for students, professors, and staff. The ODS has assistive devices such as books on tape, recorders, and adaptive software that can be loaned to qualified individuals. A student or employee who seeks accommodations based on disability must register with the Office of Disability Services in the Counseling Center, Clark Student Center, Room 108. Documentation of disability from a competent professional is required.

Individuals with grievances related to discrimination or lack of accommodation due to disability are encouraged to resolve the issue directly with the relevant area. If the matter remains unresolved, the Office of Disability Services will provide advice and/or assistance. The grievance procedure may be found in the Student Handbook and Activities Calendar.

The Counseling Center director serves as the ADA Coordinator and may be contacted at (940)397-4618, TDD (940)397-4515, or 3410 Taft Blvd., Clark Student Center Room 108.

Administrative Process

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

1. Department Chair – Dr. Lynette Watts (940-397-4833)
2. College Dean - Dr. Jeff Killion (940-397-4594)
3. Dean of Students – Matthew Park (940-397-7500)

Honor System

RADS 3513 adheres to the MSU Code of Conduct.

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

All components of RADS 3513 are designed to represent the efforts of each student individually or each student group as appropriate and are NOT to be shared, copied, or plagiarized from other sources. When students submit their efforts for grading, they are attesting they abided by this rule.

An online plagiarism/artificial writing detection service may be used in this course. Student assignments may be uploaded to the service for identification of similarities to other student papers and published works, or the use of artificial writing generators in place of the student’s own work.

Cheating includes but is not limited to

- Use of any unauthorized assistance in taking quizzes, tests, or examinations;
- Dependence upon the aid of sources beyond those authorized by the professor in writing papers, preparing reports, solving problems, or completing other assignments; or
- 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 in 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.

The use of Artificial Writing Generators includes, but is not limited to

- Using any artificial intelligence agent (e.g., Chat GPT) to generate written work that the student uses within their course paper, poster, presentation, or any other project, with or without proper citation, or
- Using any artificial writing generators in place of traditional methods of research to obtain sources and any interpretations about the content of those sources.

Academic dishonesty (cheating, plagiarism, artificial writing generators, etc.) will not be tolerated in this class. Whenever a student is unsure of whether a particular situation will be interpreted as academic dishonesty, the student should ask the professor for clarification. If students are guilty of academic dishonesty, a grade of zero (0) will be given for the quiz, assignment, etc., and the student will not be given an opportunity to resubmit the assignment. Based on the severity of cheating, plagiarism, or the use of artificial writing generators, the professor reserves the right to fail the student in the course and to refer the student to the department chair for further disciplinary action, which could include permanent dismissal from the program. Cases may also be referred to the Dean of Students for possible dismissal from the university and the ARRT as a possible ethics violation.

Students are encouraged to review the tutorials and suggested websites for more information about plagiarism. If you have any questions about what constitutes plagiarism, please consult:

- The University Academic Dishonesty Policy
- The website Plagiarism.Org, or
- The professor

Please Note

By enrolling in this course, the student expressly grants MSU a "limited right" to 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/ project in order to verify originality and authenticity and for educational purposes. Specifically, faculty may submit student papers and assignments to an external agency to verify originality and authenticity and to detect plagiarism or the use of artificial writing generators.

Campus Carry / Active Shooter

Campus Carry

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and open carry of handguns is not allowed on college campuses. For more information, visit Campus Carry.

Active Shooter

The safety and security of our campus are the responsibility of everyone in our community. Each of us has an obligation to be prepared to respond appropriately to threats on our campus, such as an active aggressor. Please review the information provided by the MSU Police Department on options and strategies we can all use to stay safe in difficult situations. For more information, visit Safety / Emergency Procedures.