



RADS 4743: Advanced Magnetic Resonance Imaging

Robert D. & Carol Gunn College of Health Sciences & Human Services
Department of Radiologic Sciences | Fall 2026

Course Information

Course Name & Section	RADS 4743-X11 Magnetic Resonance Imaging
Credit Hours	3 Credit Hours
Academic Term	Fall 2026
Course Dates	August 24, 2026 – December 4, 2026
Class Meeting Times	Online / Hybrid (D2L): Online students are fully online, and BSRT students meet during seminar days
Time Commitment	Students should expect to spend at least 9 hours per week on course material (15-week term).

Professor

Instructor	Kimberly Onstott, EdD, RT(R)(CT)(MR), MRSO(MRSC™) Assistant Professor, Radiologic Sciences
Office Location	Centennial Hall, Room 430Q Midwestern State University, 3410 Taft Blvd, Wichita Falls, TX 76309
Office Hours	Mondays & Wednesdays, 11:00 AM – 1:00 PM Fridays, 11:00 AM – 12:00 PM (Please email to schedule appointments; Zoom or phone meetings available by request.)

Contact Information	Phone: (940) 397-4332 Email: kimberly.onstott@msutexas.edu
Email Communication	Email is the best contact method. Use this format in the subject line: 4743_your last name_topic of the message (e.g., 4743_Smith_Final Exam question). Note: If I have not responded within 72 hours, please email me again.

Course Description

This course explores the basic physical and technical principles of MRI scanning. Related clinical applications, system components, image characteristics, quality control methods, limitations, and future developments are introduced.

Course Objectives

Upon completion of this course, the student will:

- Recognize radiofrequency coils and other components of the MRI scanner.
- Define the parts of the atom and explain how the parts of the atom are used in MRI.
- Describe the effect of intrinsic and extrinsic parameters on MRI scanning, the patient, and image quality.
- Differentiate between pulse sequences and identify the strengths and weaknesses of each one.

Course Materials

Required Textbook: Westbrook, C., Roth, C.K., & Talbot, J. (2019). MRI in Practice. (5th Ed.). Oxford: Blackwell Publishers. [ISBN-13: 978-1119391968] (Access code not required, but recommended).

Recommended Resource (Free to MSU students): MedOne Radiology is a comprehensive online reference library. Access it for free through the Moffett Library online databases (log in to the MSU portal -> Library Resources -> Research Databases -> Health Sciences -> MedOne).

Suggested Reference Material: American Psychological Association. (2020). Publication manual of the American Psychological Association (7th ed.). Washington, DC. ISBN: 978-1-4338-3216-1.

Additional Study Resources (for registry preparation):

- Review Questions for MRI by Carolyn Kaut Roth & William Faulkner (Wiley-Blackwell, 2nd ed. 2013).

- American Registry of Radiologic Technologists (ARRT) MRI Certification & Examination Requirements.
- American College of Radiology (ACR) Manual on MR Safety & Contrast Media (2024).
- ASRT Magnetic Resonance Practice Standards & Scope of Practice.
- ASRT Magnetic Resonance Curriculum Guidelines.

Computer Requirements

Taking an online class requires consistent, reliable access to a computer with high-speed internet, a functional webcam, and a microphone. It is your personal responsibility to secure access to a working computer for the duration of this class.

Important Accessibility & Software Warnings:

- **Chromebooks will NOT work:** Chromebook operating systems do not support the locked assessment and browser security protocols required for this course.
- **Web Browsers:** D2L is not fully compatible with legacy browsers like Internet Explorer. Use an updated browser (such as Chrome, Firefox, or Safari) to ensure course content loads properly.
- **Document Submission Formats:** Only Microsoft Word documents (.doc or .docx) will be accepted for assignment submissions. Submissions in Apple file formats (such as .pages or Keynote) will not be accepted. MAC users must explicitly save documents as Microsoft Word files before uploading.

Teaching Methodology/Class Activities and Assignments

This course utilizes a variety of educational methods to support your learning, including independent reading assignments, interactive Desire2Learn (D2L) modules, PowerPoint presentations with interactive animations, weekly professional resource navigation logs, two clinical case study care plans, virtual branching laboratory simulation scenarios, open-book module quizzes, and a comprehensive, closed-book proctored final exam.

On-Campus Seminar Requirements (BSRT Hybrid Students Only)

For hybrid BSRT students, there are three mandatory seminar days scheduled around your clinical education seminars. These sessions provide essential opportunities to discuss your clinical progress and ask questions about the course material. You must be present for the entire duration of all three seminar days—please coordinate your work and clinical schedules accordingly as no automatic excuses are granted.

Attendance is strictly mandatory, and a 5% penalty will be applied to your final semester grade for each missed session. Additionally, missing the specific session during which you are scheduled to present your clinical case study will result in a zero (0) for that portion of your clinical case study project. Hybrid students are expected to dress professionally for these on-campus seminars (official MSU scrubs or business casual attire are acceptable).

Registered technologists in the BSRS classification (fully online students) do not attend these seminars.

Important Dates and Course Schedule

The following schedule lists course milestones. Note that all assignments, quizzes, and clinical logs open on August 24, 2026. Weekly and modular activities are strictly due by 23:59 (11:59 PM) Central Standard Time (CST) on the designated dates below.

Week & Dates	Active Chapter & Topic Focus	Weekly Quiz (Tuesdays)	Resource Navigation Log (Tuesdays)	Simulations & Projects
Week 1 Aug 24-30	Ch 10: MRI Safety (EM Fields & Forces)	Chapter 10 Quiz (Part 1)	ACR Safety Ch 1 & 2 Log: Personnel & Zone Boundaries	Clinical Safety Gate Check (100% or 5 attempts at 80% required to progress to module 2. See course instructions)
Week 2 Aug 31-Sep 6	Ch 10: MRI Safety (Screening & Control)	Ch_ 10 (Part 2) & ACR MR Safety Quiz	mrissafety.com & ARRT Log: Implant Search & Remote Scan Ban	 START Simulation 1: MRI Safety
Week 3 Sep 7-13	Ch 1: Basic Principles (Alignment & Precession)	Chapter 1 Quiz	ACR Safety Pregnancy Log: Fetal & Occupational safety	N/A
Week 4 Sep 14-20	Ch 2: Image Weighting (T1, T2, PD & TR/TE)	Chapter 2 Quiz	ASRT Standard 1 Log: Patient Pre-Scan Assessment	 LAUNCH Case Study 1 (Neurological Care Plan - Brain MRI)
Week 5 Sep 21-27	Ch 3: Spin-Echo (Conventional, FSE, DRIVE)	Chapter 3 Quiz	ASRT Standard 2 Log: Parameter Adaptation for Patient	N/A
Week 6 Sep 28-Oct 4	Ch 4: Gradient-Echo (Steady-State, Coherent/Spoiled)	Chapter 4 Quiz	ASRT Med Admin/ACR Contrast Log: IV Injection Scope & Reactions	 START Simulation 2: MRI Sequences  SUBMIT Case Study 1 (Neurological Care Plan) Report
Week 7 Oct 5-11	Ch 5: Spatial Encoding (Slice, Freq, Phase)	Chapter 5 Quiz	ARRT Clinical Rules Log: Signature Tasks & Clinical Competency	N/A

Week & Dates	Active Chapter & Topic Focus	Weekly Quiz (Tuesdays)	Resource Navigation Log (Tuesdays)	Simulations & Projects
Week 8 Oct 12-18	Ch 6: k-Space (Data Storage & Filling)	Chapter 6 Quiz	⊘ NO LOG ASSIGNED (Log assignments suspended)	N/A
Week 9 Oct 19-25	Ch 7: Protocol Optimization (Image Quality Trade-offs)	Chapter 7 Quiz	⊘ NO LOG ASSIGNED (Log assignments suspended)	 LAUNCH Case Study 2 (Orthopedic & Artifact Plan)
Week 10 Oct 26-Nov 1	Ch 8: MRI Artifacts (Aliasing, Susceptibility)	Chapter 8 Quiz	⊘ NO LOG ASSIGNED (Log assignments suspended)	N/A
Week 11 Nov 2-8	Ch 9: Instrumentation (Hardware & Eco-Systems)	Chapter 9 Quiz	⊘ NO LOG ASSIGNED (Log assignments suspended)	 START Simulation 3: Instrumentation & Artifacts  SUBMIT Case Study 2 (Orthopedic & Artifact Plan) Report
Week 12 Nov 9-15	Ch 11: Glossary (Board Review: Terms A-G)	Chapter 11 Quiz (Part 1)	⊘ NO LOG ASSIGNED (Log assignments suspended)	 SUBMIT Compiled Worksheet: rads-4743-virtual-worksheet.docx (Due Tuesday, Nov 17)
Week 13 Nov 16-22	Ch 11: Glossary (Board Review: Terms H-N)	Chapter 11 Quiz (Part 2)	⊘ NO LOG ASSIGNED (Log assignments suspended)	N/A
Week 14 Nov 23-29	Ch 11: Glossary (Board Review: Terms O-Z)	Chapter 11 Quiz (Part 3)	⊘ NO LOG ASSIGNED (Log assignments suspended)	 Final Exam Window Opens (Tuesday, Nov 24)
Week 15 Nov 30-Dec 4	Final Exam Prep	N/A	⊘ NO LOG ASSIGNED (Log assignments suspended)	 CLOSE Final Exam (Exam Closes Friday, Dec 4)

Changes in this syllabus, assignments, and schedule may be made at the discretion of the instructor with advance notice.

Evaluation

Grade Distribution

Assessment Category	Weight toward Final Grade
Module Quizzes (weekly randomized, timed quizzes on D2L covering textbook chapters)	15%
Case Study 1: Neurological Care Plan (Brain MRI) Report (detailed clinical scenario and care plan for an acoustic neuroma)	15%
Case Study 2: Orthopedic & Artifact Care Plan Report (detailed scanning parameter adaptations and artifact remedies for metallic implants)	15%
Virtual Scenarios Assignment (Scenario 1-3 story-based interactive laboratory simulations and compiled worksheet)	15%
Professional Resource Navigation Logs (Weekly Logs 1-7 in first 7 weeks)	10%
Comprehensive Final Exam (proctored, closed-book registry-style review exam)	30%

Grade Scale

Final Course Average	Letter Grade Assigned
90% – 100%	A
80% – 89%	B
70% – 79%	C
60% – 69%	D
59% and below	F

CRITICAL RADIOLOGY PROGRAM GRADE REQUIREMENT:

Students must maintain a final course average of 'C' (70%) or above to receive credit in the Radiologic Sciences program. A letter grade of 'D' or 'F' cannot be used for graduation and will require the student to repeat this course in accordance with the current department and program policies.

Course Assignments & Project Guidelines

This course consists of several key projects, assignments, and structural criteria designed to prepare you for clinical excellence and success on your national registry examination. Please review these core guidelines:

- **Unit Quizzes (15%):** Timed, randomized weekly quizzes on D2L covering textbook chapters (14 quizzes plus the ACR Safety Manual quiz). To support mastery, you are permitted up to two attempts on each quiz, with your scores being averaged. Ensure you study before attempting as quizzes are strictly timed.
- **Case Study 1: Neurological Care Plan (Brain MRI) (15%):** Launched in Week 4 and due in Week 6 (Tuesday, October 6). You will research and write a detailed neurological care plan centered on a brain MRI for an acoustic neuroma.
- **Case Study 2: Orthopedic & Artifact Care Plan (15%):** Launched in Week 9 and due in Week 11 (Tuesday, November 10). This plan focuses on clinical parameters, patient setup, and artifact remedies for a lumbar spine MRI of a patient with metallic orthopedic implants.
- **Virtual Scenarios Assignment (15%):** Interactive, story-based simulations completed in Weeks 2, 6, and 11. You will step into the shoes of an MRI technologist to make safety and scanning decisions. You must fill out the scenario tables and reflections on your worksheet and submit the compiled document (**rads-4743-virtual-worksheet.docx**) in Week 12 (Tuesday, November 17).
- **Professional Resource Navigation Logs (10%):** Active during the first 7 weeks of the term (Logs 1-7). These logs serve as direct study and site-navigation guides for professional documents from the ACR, ASRT, ARRT, and mrisafety.com. To minimize busywork, navigation logs are completely suspended starting in Week 8.
- **Comprehensive Proctored Final Exam (30%):** A closed-book, timed (2 hours, 100 questions registry practice / 50 questions final) exam proctored via Respondus LockDown Browser with WebCam. All coursework, simulation worksheets, and quizzes must be completed before the final exam window closes strictly on Friday, December 4, at 23:59 CST.

Grading Cycle

All assignments are graded as a collective cohort to guarantee maximum evaluation consistency. Grading begins on the first business day following a scheduled due date (excluding university holidays and academic/professional conferences) and is typically finalized prior to the next course milestone. Progress can be monitored via the D2L Gradebook.

Extra Credit Policy

In accordance with standard program equity guidelines, no extra credit assignments, alternative assessments, or bonus-point tasks are offered in this course. Your grade is based strictly on the evaluated criteria outlined above.

Student Feedback

Course-wide guidance and feedback will be regularly distributed via the News section of D2L. It is your responsibility to configure your D2L settings to receive instant notifications of newly posted course announcements. Direct, individualized inquiries are welcome via email. Common

or repetitive student inquiries will be addressed and archived in the D2L News feed so the entire class can benefit from the clarification.

Attendance Policy

This is an entirely online course. Traditional physical attendance is not tracked. Instead, attendance is evaluated by your active, weekly engagement with the course: specifically, regular logins to D2L, completion of modules, and active communication. Missing deadlines, failing to participate in discussions, or remaining inactive in D2L for consecutive days may negatively impact your final grade, or result in an administrative drop following a formal academic warning from the instructor.

Late Work

Due Dates

Course deliverables must be uploaded on Tuesdays (with exceptions noted on the syllabus) by 23:59 (11:59 PM) CST. Missed deadlines without prior approval will receive an immediate grade of zero (0) for that assignment.

Progression

Each assignment in this course is built on the previous assignment. Therefore, if you have not completed an assignment, you must consult with the professor if you miss an assignment due date.

Emergency Extensions

If you experience an emergency or a major, documented life disruption (such as hospitalization, severe personal illness, or a death in the immediate family), contact the professor via email (kimberly.onstott@msutexas.edu) as soon as possible, on or before the due date. Standard emergency extensions typically grant up to one (1) week of additional time with no penalty. After that one-week window has expired, a deduction of ten (10) points per day will apply. To maintain compliance with institutional reporting requirements, all course submissions must be finalized at least one full week prior to the official end-of-semester grade posting deadline.

Alternate Discussion Assignments

If emergency circumstances completely prevent your participation in collaborative, time-sensitive D2L discussion boards, the instructor may, at their discretion, assign an alternate individual research project of equal weight.

Submission Policy

All student uploads to the D2L Dropbox are evaluated as final submissions. It is your sole responsibility to ensure that the correct, completed, and uncorrupted document file has been

uploaded. If you upload an incomplete draft, an incorrect file, or an unapproved file format, the document will be graded exactly as submitted.

Technical Difficulties

If you encounter an unexpected system-wide glitch (such as a documented, university-wide D2L server outage), the instructor will announce a course-wide extension. However, localized, personal computer problems (such as home internet loss, a frozen computer, or broken devices) are not acceptable excuses for missing a deadline. You must utilize backup access routes (including campus computer labs, mobile hotspots, or alternative public internet locations) to submit your assignments. If an emergency computer problem occurs, email your completed assignment to the instructor's personal inbox immediately to establish a date-stamp before the deadline passes.

HIPAA Requirement

Confidentiality and Student Compliance: To remain compliant with federal law, you must protect patient privacy. Under no circumstances should any actual patient name, medical facility name, or identifying information appear on your coursework. Any proper name, institution name, or patient identifier other than your own name will be flagged as an immediate HIPAA violation. Depending on the severity, violations will result in an immediate drop in the assignment grade, potentially to a permanent grade of zero (0).

Honor System

Students enrolled in RADS 4743 are expected to maintain the highest standards of academic honesty and ethical conduct. Any student work submitted in this course must represent that student's own individual intellectual effort. Cheating, unauthorized collaboration, or acquiring course exams/materials without express permission from the faculty will be treated as direct violations of the Midwestern State University Code of Student Conduct, subject to administrative referral and disciplinary action.

Plagiarism

Plagiarism in any form—including paraphrasing or quoting source material without clear, accurate text citation and reference lists, submitting papers purchased from writing services, or recycling work previously submitted for credit in other courses—is strictly prohibited. All coursework is subject to automated similarity analysis using an online plagiarism service. Assignments containing plagiarized material will receive an immediate, non-negotiable grade of zero (0) for the task, and serious or repeat offenses will be forwarded to the Dean of Students for university-wide disciplinary review and potential suspension.

Artificial Intelligence (AI) Usage Policy

The use of generative Artificial Intelligence tools (such as ChatGPT, Claude, Gemini, or similar software) is permitted in this course only under the following strict conditions:

- **Research & Sourcing Limitations:** AI tools may be used solely for preliminary brainstorming and topic exploration. To ensure scholarly rigor, at least 50% of the sources cited in any assignment must be retrieved directly from the MSU Moffett Library peer-reviewed databases.
- **Writing & Content Restrictions:** AI usage in the writing phase is strictly limited to spelling, grammar, and syntax correction. AI tools are absolutely prohibited from generating content, arguments, analytical paragraphs, or the body text of any writing assignment, discussion board contribution, or course project.
- **Source Verification Protocol:** To verify research authenticity, students must be prepared to submit full PDF copies of all cited sources upon request. For specific assignments, you will be required to copy and paste the precise source text and page numbers from which your information was derived.
- **Academic Consequences:** Any violation of these guidelines will be treated as a major violation of academic integrity, resulting in an immediate grade of zero (0) for the assignment. Egregious or repeat offenses may result in a failing grade ('F') for the overall course.

Classroom Recording Policy

Recording Policy: Recording class lectures, virtual discussions, or course presentations is strictly prohibited without the instructor's explicit, prior written permission. When authorized, recordings are for the student's personal educational use only and may not be uploaded to the internet, published, or shared. Students with approved ADA accommodations from Disability Support Services may record classes following DSS procedures, but these recordings must also remain private and unshared.

Intellectual Property

Intellectual Property rights: By enrolling in this course, students grant Midwestern State University a limited, non-exclusive right to all student-created coursework. This includes the right to reproduce and submit assignments to external verification services to authenticate originality and detect plagiarism.

Student Well-Being & Support Resources

Your physical health, mental well-being, and access to basic needs are critical to your success in this course. College life can be highly demanding, and unexpected personal setbacks happen. I strongly encourage you to prioritize self-care and reach out to me, your academic advisor, or other campus experts as soon as a challenge arises so we can help you find pathways to succeed.

The following dedicated student support services stand ready to assist you:

Mental Health & Counseling Support

- **Counseling Center:** Professional, confidential mental health services are available on campus. Call (940) 397-4618 to schedule an appointment.
- **BetterMynd:** Free virtual counseling sessions are available for students seeking mental health support, including convenient evening and weekend appointments.

Basic Needs & Emergency Aid

- **Basic Needs Emergency Aid:** If you experience sudden, unexpected challenges meeting your basic needs—such as housing, food, utilities, transportation, healthcare, technology, or textbooks—emergency support programs may be available. Visit the Student Emergency Support and Resources webpage to explore options.
- **Office of Student Affairs:** For help navigating emergency aid and basic needs support, contact the Office of Student Affairs located in the Clark Student Center, Room 108. Phone: (940) 397-7500 | Email: student.affairs@msutexas.edu.

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University is committed to providing equal educational opportunities and reasonable accommodations for qualified students with disabilities.

Students requiring accommodations must register with Disability Support Services (DSS), located in the Student Wellness Center. To initiate services, contact DSS at (940) 397-4140 to schedule an intake. Current professional documentation of a disability is required to establish accommodations, and each student request is reviewed individually to ensure appropriate, customized support is provided.

Moffett Library Resources

Moffett Library provides essential research resources and academic services to support your coursework. Students can access academic books, peer-reviewed journals, scholarly databases, and multimedia materials both on campus and remotely. The library also provides media equipment checkouts, reservable group study rooms, and individual research assistance from professional librarians. Visit the Moffett Library webpage to learn how to access and utilize these resources.

Administrative Process

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

- **Department Chair:** Dr. Lynette Watts | Phone: (940) 397-4833
- **College Dean:** Dr. Jeff Killion | Phone: (940) 397-4594

- **Dean of Students:** Matthew Park | Phone: (940) 397-7500

Administrative Policies, Grade Appeals, & Schedules

Grade Appeal Process

Students who wish to formally appeal an evaluated course grade must consult the guidelines and procedural deadlines published in the official Midwestern State University Undergraduate Catalog.

Change of Schedule Policy

A student who drops a course (but does not fully withdraw from the University) within the first twelve (12) class days of a regular semester, or within the first four (4) class days of a summer term, is eligible for a 100% refund of applicable tuition and fees. Drop deadlines are published in the University Schedule of Classes each semester.

Refund and Repayment Policy

Students who withdraw or are administratively withdrawn from the University may be eligible for a full or partial refund of tuition, fees, and room/board. However, students receiving federal, state, or institutional financial aid (including grants, student loans, or scholarships) may have a portion of their refund returned directly to the financial aid programs under federal and state compliance formulas. Detailed refund calculation examples are available from the university upon request.

Senate Bill 11 / House Bill 1927 (Campus Carry)

Campus Carry

Effective August 1, 2016, Texas Senate Bill 11 allows licensed individuals to carry a concealed handgun in public university buildings, except in designated prohibited zones established by the University. Under current Texas law, concealed carry requires a valid License to Carry (LTC) permit. The open carrying of handguns is strictly prohibited on college campuses. For complete guidelines and prohibited areas, visit the MSU Campus Carry webpage.

Active Shooter Emergency Response

The safety of our campus is a shared responsibility. All members of the university community must remain prepared to respond appropriately to active threats. Review the crisis guidelines and training materials provided by the MSU Police Department at MSUReady - Active Shooter. Students are strongly encouraged to watch the 'Run. Hide. Fight.' training video, which can be accessed on the university police website.

If you have questions, concerns, or safety inquiries, please contact MSU Chief of Police Steven Callarman directly at: steven.callarman@msutexas.edu

Campus Closure Policy

In the event of a campus closure due to severe weather, power grid issues, or other unscheduled disruptions, the online course schedule and assignment due dates will remain unchanged. If a major storm or regional power outage prevents you from accessing the internet, utilize whatever emergency communication method is available to contact the professor as soon as possible (e.g., telephone message, email via phone data, or a peer's communication device).

Tobacco, Alcohol, & Drug Compliance Policies

Smoking & Tobacco Policy

University policy strictly prohibits the use of tobacco, e-cigarettes, and vapor products in any building owned, leased, or operated by Midwestern State University. Tobacco use is restricted solely to designated outdoor smoking areas.

Alcohol & Drug Policy

To comply with the Drug-Free Schools and Communities Act of 1989 and subsequent amendments, Midwestern State University strictly enforces policies that prohibit the unlawful possession, use, or distribution of illicit drugs and alcohol on university property or as part of any university-sponsored activity. Violators are subject to severe university disciplinary sanctions and standard legal penalties under local, state, and federal laws.

Communicating with the Professor

Direct contact information is listed at the top of this syllabus. The instructor strongly prefers email communication as it creates a reliable, documented paper trail. Always send messages from your official university account. When there is a need to contact you individually, the professor will use your official MSU email (students.mwsu.edu). The instructor is not responsible for messages missed due to forwarding errors or unchecked personal email accounts.

Official Response Window

The university response policy is 5 working days; however, I will respond to or acknowledge all student emails within 72 hours. Please email me again if I have not responded in 72 hours. If I am away at an academic conference or out of the office, a news announcement will be posted in D2L outlining alternative contact protocols or temporary grading delays. Please respect this 72-hour window before resending your email request.