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 3763 Radiation Protection and Biologic Responses

Course Information

Name	RADS 3763 Radiation Protection and Biologic Responses
Credit	3 hours
Term	Fall 2022
Time & Location	Wednesday & Fridays 3:00 pm – 4:20 pm Dillard 178
Dates	August 24, 2022 – December 7, 2022
Time Commitment	Students should expect to spend 3 hours in lecture and at least 9 hours per week on course material (15-week term)
Prerequisites	None

Professor

Rodney Fisher, PhD, 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: Student Specific: Tuesdays & Thursdays 1 pm – 3 pm, and Wednesdays 11 am – 12 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 or at least acknowledge all student communications within five (5) business days. If this time period will be longer because I am out of town or for another reason, a news item will be posted online in D2L for the class. Please always give me the time asked for to respond before repeating your request.

Course Description

This course examines interactions of radiation with matter, biologic effects of ionizing radiation, quantities and units of measurement, dose response curves, and patient and personnel protection.

Course Objectives

Upon completion of this course, the student will:

- Explain the effects of radiation exposure on biological systems.
- Describe the biophysical mechanisms of radiation damage and the somatic and genetic effects of radiation exposure on humans.
- State typical dose ranges for routine radiographic procedures.
- Explain basic methods and instruments for radiation monitoring, detection, and measurement.
- Identify methods for protecting personnel and patients from excessive radiation exposure.
- Apply appropriate radiation protection practices.

Teaching Methodology

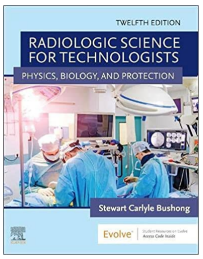
This course is taught using a hybrid of traditional lecture and social constructivism methodologies. There will be individual reading assignments, quizzes over reading material prior to class lectures and discussions, group projects and presentations, and a closed book module tests and final examination.

Course Materials

Textbooks

Required

Bushong, S.C. (2021). *Radiologic Science for Technologists* (12th Ed.). Elsevier. ISBN: 978-0-323-366134-8



This book is approximately $140.99 from the MSU Bookstore.

Computer Requirements

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

Assignments

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

1.	Irradiated Seed Group Project	10%
2.	Radiologic Accident Presentation Group Project	10%
3.	Chapter Quizzes	10%
4.	Module Tests (4)	40%
5.	Final Examination	30%

Course Modules

Module 1: Molecular and Cellular Radiobiology
- Chapter 29: Human Biology
- Chapter 30: Fundamental Principles of Radiobiology
- Chapter 31: Molecular Radiobiology
- Chapter 32: Cellular Radiobiology

Module 2: Whole Body Radiobiology
- Chapter 33: Deterministic Effects of Radiation
- Chapter 34: Stochastic Effects of Radiation

Module 3: Radiation Protection
- Chapter 35: Health Physics
- Chapter 36: Designing for Radiation Protection

Module 4: Radiation Dosimetry

Chapter 37: Radiography/Fluoroscopy Patient Radiation Dose
Chapter 39: Patient Radiation Dose Management
Chapter 40: Occupational Radiation Dose Management

Important Dates

All dates are subject to change as needed

Date	Chapter Lecture or Test	Quiz/Test/Project/Rad Tech Bootcamp
Aug 24, 26	29	Wednesday - First Day of Class! Chapter 29 pre-lecture quiz closes Friday Aug 26, 12:00 pm
Aug 31, Sept 2	30	Chapter 30 pre-lecture quiz closes Wednesday Aug 31, 12:00 pm
Sept 7	31	Chapter 31 pre-lecture quiz closes Wednesday Sept 7, 12:00 pm
Sept 9, 14	32	Chapter 32 pre-lecture quiz closes Friday Sept 9, 12:00 pm
Sept 16	29 - 32	RTBC Assignment #1 Module 1 Test Chapters 29 - 32
Sept 21, 23	33	Chapter 33 pre-lecture quiz closes Wednesday Sept 21, 12:00 pm
Sept 28, 30	34	Chapter 34 pre-lecture quiz closes Wednesday Sept 28, 12:00 pm
Oct 5	33 - 34	RTBC Assignment #2 Module 2 Test Chapters 33 - 34
Oct 7, 12	35	Chapter 35 pre-lecture quiz closes Friday Oct 7, 12:00 pm
Oct 14	36	Chapter 36 pre-lecture quiz closes Friday Oct 14, 12:00 pm No Class, View lecture on-line
Octo 19, 21	36	Finish Chapter 36 in class
Oct 24	---	Last day for “W”, 4:00 pm
Oct 26	35 - 36	RTBC Assignment #3 - #5 Module 3 Test Chapters 35 - 36
Oct 28, Nov 2	37	Chapter 37 pre-lecture quiz closes Friday, Oct 28, 12:00 pm
Nov 4	39	Chapter 39 pre-lecture quiz closes Friday Nov 4, 12:00 pm Guest Lecture
Nov 7	---	Irradiated Seed Poster set-up and Presentation CE Lobby 8:00 am – 9:50 am
Nov 9	39	Finish Chapter 39 in class
Nov 11, 16	40	Chapter 40 pre-lecture quiz closes Friday Nov 11, 12:00 pm
Nov 18	37, 39 - 40	Module 4 Test Chapters 37, 39 - 40
Nov 23 - 25	---	Happy Thanksgiving – No Class
Nov 30	---	Radiation Incident Presentations – Groups 1 - 5
Dec 2	---	Radiation Incident Presentations – Groups 7 - 10
Dec 7	29 – 37, 39-40	Final Examination DB 101 @ 5:45 pm – 7:45 pm

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 as a group to maintain a higher level of consistency. Grading begins on the first business day after a 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 3763 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 come across repeated questions I will provide feedback or supplementary resources in the News section of the course so that everyone can benefit from it. You might look there first, because your question may be located there.

Late Work

The professor normally does not accept late assignments without prior approval and proper documentation for the rationale. In extreme emergencies the professor may grant an extension after the due date has passed with acceptable documentation from the student. Group projects will never be granted extensions. All course work must be completed in the semester the course is taken. The professor does 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 this course. Any grade below 75% will result in the student being dismissed from the program. Any withdrawal from this course will result in the student being dismissed 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.

Radiation Protection and Biological Responses Assignment Details

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

1.	Irradiated Seed Group Project	10%
2.	Radiologic Accident Presentation Group Project	10%
3.	Rad Tech Bootcamp	10%
4.	Chapter Quizzes	10%
5.	Module Tests (4)	30%
6.	Final Examination	30%

Irradiated Seed Group Project (10%):

Students will be in groups with 4-6 members. Each group will be given envelopes with seeds that have been exposed to ionizing radiation. Each group will also have an envelope with control seeds which have not been exposed to radiation. All envelopes will only have control numbers on them and will not say if the seeds have been exposed or if they a part of the unexposed control seeds. The groups will plant the seeds in the potted soil provided and care for them during the semester. The students will chart the progress of their plants taking photographs at assigned times. At the end of the project, each group will identify which of their pots had the control seeds, and which pots had seeds that had been irradiated. The groups will then estimate the radiation dose based on information in this course and information provided to them by the professor. This information including the photographs will be used to produce a poster detailing the experiment. The posters will be set up in the lobby of Centennial Hall for judging.

The posters will be set up in the lobby of Centennial Hall for judging. A group of five professors (not the instructor) will be given a rubric and tasked to grade each project. The students will make a 2-3 minute presentation about their project to the professors in front of their posters. Each group member must have a speaking role in the presentation. Projects will be graded on accuracy, completeness, and artistic creativity of the poster and on the presentations by the students. Each judge will give each project a score between 0 – 100. For each project, the high and low scores will be discarded and the other three scores will be averaged together to determine a final score. This final score will be the grade for the project that each member of the group will receive based on the grading scale in this syllabus. Any group member who is reported by the group as not having participated is subject to receiving a reduced grade or a zero on the project based upon the individual circumstances.

In addition to the normal grade, the top three groups, if they earn a grade of 90% or higher, will receive a bonus which will be described in class. Only the top three groups will qualify for any bonus and only if they earn an “A” on the project.

Radiation Accident Presentation Group Project (10%):

This presentation will be on a radiologic incident/accident from the following database:
http://www.johnstonsarchive.net/nuclear/radevents/#4
Students should use the information from the database to create a 10 minute presentation that includes:

- A description of the incident/accident
- How the accident could have been prevented (if preventable)
- Relate the radiological effects to topics covered in this class

Students may need to do research by finding any articles listed in the reference section of the incident files. Additional articles from Google Scholar or the MSU database may be needed for a complete discussion of the topic. Groups should choose their topics post them in the appropriate discussion board. Only one group may do a particular topic and topics are selected on a first come - first served basis.

Rad Tech Bootcamp (10%):

Each RAD Tech Bootcamp assignment corresponds to what is being currently discussed in class. Students will watch the appropriate videos and take the quiz which follows each video. The points for each assignment is the number of videos in that assignment. Each assignment is graded on an "all or nothing" basis and partial credit is not given. All assignments are due at 12:00 pm on the assigned date. Late submissions will not be accepted.

Assignment #1:
Radiosensitivity (4 Videos and Quizzes)
Assignment #2:
Radiation Biology (8 videos and Quizzes)
Assignment #3:
Radiation Protection (2 Videos and Quizzes)
Assignment #4:
Radiation Units of Measurement (5 Videos and Quizzes)
Assignment #5:
Radiation Detection Devices (6 Videos and Quizzes)

Chapter Quizzes (10%):

Each of the 11 chapters will have a ~15 question quiz that will be taken through D2L according to the published schedule. Students will have 30 minutes to complete a quiz. Students are encouraged to first 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 the student to determine what is not understood and create a list of questions that should be answered through the lecture.

Module Tests (40%):

There are four module tests. These tests will be made up of multiple choice and matching questions. Sources for the questions will be from: the previous quizzes and module tests; the textbook; chapter power points; and lectures. Module tests will typically have 30-75 questions and will be completed in the scheduled lecture session.

Final Examination (30%):

The Final Examination will cover Chapters 29 – 37. 39, 40. The exam will be made up of 200 multiple choice questions. Sources for the questions will be from: the previous quizzes and module tests; the textbook; chapter power points; and lectures. It will be given on the scheduled date published in the university final schedule unless otherwise notified. Students will need to bring a Scantron sheet capable of recording 200 answers. Students will have the two hour final examination period to complete the examination

Technical Difficulties

On occasion, you may experience problems with accessing D2L, accessing class files located within D2L, connecting with your internet service, or you may encounter other computer related problems. 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, keep in mind 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 reason for the instructor to allow students extra time to submit assignments, tests, or discussion postings.***

Dropbox assignments that can be attached in 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 8am and 5pm.
- Use the D2L help link in D2L.
- Contact your professor.
- For other computer access issues, go online to the MSU Information Technology Website.

Attendance

Attendance is required for all class sessions. A student may have up to three absences without penalty. Each absence after the third will result in 10% being taken off the student's semester grade. Should a student be mathematically unable to achieve a semester grade of 75% due to a combination of grades and excessive absences, the professor may initiate an administrative withdrawal of the student from the course. This will result in the student being dismissed from the BSRT program at the end of the semester.

Requesting a Withdrawal

The last opportunity to drop this course with a grade of "W" is 4:00pm on October 24, 2022. All withdrawals **must be initiated by the student**. 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 a grade of "Incomplete" 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 within the deadline, the grade of "Incomplete" will automatically convert into a grade of "F".

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 which can be loaned to qualified individuals. A student/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 based on a disability are encouraged to resolve the problem directly with the area involved. If the matter remains unresolved, the Office of Disability Services for resolution will provide advice and/or assistance. The grievance procedure may be found in the Student Handbook and Activities Calendar.

The Director of the Counseling Center 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 be first addressed between the student and the course professor. 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)

Honor System

RADS 3763 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 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 3763 are designed to represent the efforts of each student individually 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 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.

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.

Academic dishonesty (cheating, plagiarism, etc.) will not be tolerated in this class. Whenever a student is unsure of whether a particular situation will be interpreted as academic dishonesty, he/she 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. Based on the severity of the plagiarism, the professor reserves the right to fail the student in the course and 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" 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/ 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 for plagiarism.

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 has prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit Campus Carry.

Active Shooter

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