

IMPORTANT: This syllabus form should be submitted to OAA (gsbs_academic_affairs@uth.tmc.edu) a week before the start of each semester.

NOTE to STUDENTS: If you need any accommodations related to attending/enrolling in this course, please contact of the Graduate School's 504 Coordinator, Natalie Sirisaengtaksin, PhD. We ask that you notify GSBS in advance (preferably at least 3 days before the start of the semester) so we can make appropriate arrangements.

| Term and Year: Spring 2026 Course Number and Course Title: GS02 1053: Radiation Detection, Instrumentation, and Data Analysis Credit Hours: 3 Meeting Location: El Rio Campus (ERD) 8060 El Rio St., Houston 77054 Building/Room#: ERD1.305 WebEx/Zoom Link: N/A | Program Required Course: Yes Approval Code: No Audit Permitted: Yes Classes Begin: January 12, 2026 Classes End: May 1, 2026 Final Exam Week: May 4, 2026 | | | | |
|---|---|-----|------|-----------|--------|
| Class Meeting Schedule <table border="1"><thead><tr><th>Day</th><th>Time</th></tr></thead><tbody><tr><td>Mon / Wed</td><td>3-4 PM</td></tr></tbody></table> | | Day | Time | Mon / Wed | 3-4 PM |
| Day | Time | | | | |
| Mon / Wed | 3-4 PM | | | | |
| Course Director Name and Degree: Mallory Glenn, PhD Title: Assistant Professor Department: Radiation Physics Institution: MDACC Email Address: mcglenn@mdanderson.org Contact Number: 713-563-5410 NOTE: Office hours are available by request. Please email me to arrange a time to meet. | Instructors 1. Stephen Kry, PhD Institution: MDACC Email Address: sfkry@mdanderson.org 2. Rebecca Howell, PhD Institution: MDACC Email Address: rhowell@mdanderson.org 3. Paige Taylor, PhD Institution: MDACC Email Address: pataylor@mdanderson.org 4. Uwe Titt, PhD Institution: MDACC Email Address: utitt@mdanderson.org | | | | |

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10. Mallory Glenn, PhD

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Course Description:

This course explores applications of radiation detection and measurement pertaining to radiation therapy, diagnostic imaging, and nuclear medicine. Students will obtain a base knowledge of principles, technologies, and methods used to detect and measure ionizing radiation.

Textbook/Supplemental Reading Materials (if any)

- Radiation Detection and Measurement. Glenn F. Knoll 4th edition (2010). ISBN: 0470131489
- Introduction to Radiological Physics and Radiation Dosimetry. Frank H. Attix; (1991)
ISBN: 978-0-471-01146-0
- Physics of Radiology. Harold E. Johns and John R. Cunningham
- Radiation Therapy Dosimetry: A Practical Handbook. Arash Darafsheh (2021).
- AAPM Task Group Reports and manuscripts relevant to course topics

Course Objective/s:

Upon successful completion of this course, students will obtain a base knowledge of principles, technologies, and methods used to detect and measure ionizing radiation.

Specific Learning Objectives:

1. Learn the basic theory of several common radiation detectors used in radiation therapy and medical imaging.
2. Learn the clinical considerations for the use of several common detectors.
3. Learn to identify the strengths and limitations of common detectors in order to most appropriately select the detector suited for its application.
4. Understand how to treat patients correctly by using the right detector (see objective 3).

Student responsibilities and expectations:

Students enrolled in this course will be expected to:

1. Attend in-person lectures and laboratories.
2. Prepare written lab reports based upon laboratory exercises.
3. Prepare for and take course quizzes based on course lectures and readings.
4. Contribute to one group project exploring radiation detectors and principles for clinical use.
5. Prepare for and take one midterm and one final examination based on lectures and reading materials.

Students are expected to complete all assigned reading material prior to class. While you may work and discuss all course materials and assignments in groups, all writing assignments must be your own. Plagiarism and failure to properly cite scientific literature and other sources will not be tolerated and are grounds for dismissal from the course and further GSBS disciplinary action. Cheating or engaging in unethical behavior during examinations (quizzes and final) will be grounds for dismissal from the course without credit and further GSBS disciplinary action.

Grading System: **Letter Grade (A-F)**

Student Assessment and Grading Criteria : (May include the following:)

| Percentage | Description |
|------------------------|----------------------|
| Homework & Quiz (10 %) | |
| Class Project (15 %) | |
| Midterm Exam (25 %) | One (1) Midterm Exam |
| Final Exam (25 %) | |
| Laboratory (25 %) | |

CLASS SCHEDULE – Spring 2026

| Date | Time | Location | Instruct. | Topic |
|-----------------------------|----------------|-------------|----------------|--|
| Mon Jan 12, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Introduction & Counting Statistics |
| Wed Jan 14, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Basic Detection and Detectors |
| Mon Jan 19, 2026 | - | - | - | No Class - MLK Day |
| Wed Jan 21, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Ion Chamber Theory |
| Mon Jan 26, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Ion Chambers I |
| Wed Jan 28, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Ion Chambers II |
| Mon Feb 2, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Proportional Counters |
| Wed Feb 4, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | GM Counters and Survey Meters |
| Mon Feb 9, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Taylor / Guan | Microdosimetry I |
| Wed Feb 11, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Taylor / Guan | Microdosimetry II |
| Mon Feb 16, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Kry | Small Field Dosimetry |
| Wed Feb 18, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Kry | Traceability for Dosimetry |
| Mon Feb 23, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Luminescence Theory |
| Wed Feb 25, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | TLD |
| Wed Feb 25, 2026 | 6:00 - 8:00 PM | TBD | Taylor / Gao | Ion Chambers Lab |
| Mon Mar 2, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | OSLD |
| Wed Mar 5, 2026 | 1:00 - 4:00 PM | ERD 1.305 | Glenn | Luminescent Dosimeter Lab |
| Mon Mar 9, 2026 | - | - | - | Spring Break |
| Wed Mar 11, 2026 | - | - | - | Spring Break |
| Mon Mar 16, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Clinical Applications and Novel Dosimeters |
| Wed Mar 18, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn | Exam I |
| Mon Mar 23, 2026 | 3:00 - 4:00 PM | FCT 14.5059 | Titt | Photomultiplier Tubes and Photodiodes |
| Wed Mar 25, 2026 | 3:00 - 4:00 PM | FCT 14.5059 | Titt | Scintillation - Inorganic |
| Mon Mar 30, 2026 | 3:00 - 4:00 PM | FCT 14.5059 | Titt | Scintillation - Organic |
| Wed Apr 1, 2026 | 3:00 - 4:00 PM | FCT 14.5059 | Titt | Solid State Detectors |
| Mon Apr 6, 2026 | 3:00 - 4:00 PM | FCT 14.5059 | Peeler | Diodes |
| Tue/ Wed Apr 7-8, 2026 | 5:00 - 7:00 PM | TBD | Walker | Nal Lab |
| Wed Apr 8, 2026 | - | - | - | No Class |
| Mon Apr 13, 2026 | 3:00 - 4:00 PM | FCT 14.5059 | Wang | Film Dosimetry Principles |
| Tue/ Wed Apr 14-15, 2026 | 5:00 - 7:00 PM | TBD | Walker | Positron Detection Lab |
| Wed Apr 15, 2026 | - | - | - | No Class |
| Mon Apr 20, 2026 | 3:00 - 4:00 PM | TBD | Taylor / Gao | Film Lab |
| Wed Apr 22, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Howell | Neutron Interactions |
| Mon Apr 27, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Howell | Neutron Detection |
| Wed Apr 29, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Howell | Project Presentations |
| Mon May 4, 2026 | 3:00 - 4:00 PM | ERD 1.305 | Glenn / Howell | Exam II |

Course Information and Policies

Class Location

Classes will occur in-person, per GSBS policies. Most classes will be held at the El Rio Campus (ERD), which houses IROC Houston and Radiation Dosimetry Services, located at:

[8060 El Rio Street, Houston, TX, 77054](#)

It is recommended that students commute to the building either via carpooling or utilizing the By Request Shuttle service with MD Anderson. By Request Shuttle hours are Monday through Friday, 8 a.m. to 5 p.m. Call **713-792-2338** to request service. When using the shuttle, request to be dropped off at “El Rio 2.”

Should an extenuating circumstance prevent in-person attendance on a given day, please discuss with instructors to determine if accommodations can be made.

Communications & Class Documents

Updates regarding course content, resources, and scheduling will be available via Microsoft Teams. Important updates and reminders will be shared via Teams and e-mail.

Homework

Homework will consist of problems assigned from the professor(s). Each homework assignment will have an assigned due date. 10 points will be deducted for every day past due date. Please note that not all professors will assign homework.

Quizzes

Quizzes may not be announced. They may cover material from the previous lecture(s) or any reading assignments. Please note that not all professors will give quizzes. In general, there will be no make-up quizzes if absent on the date quizzes are administered.

Exams

Two (2) exams will be given this semester (not comprehensive). Exams will cover all relevant lecture notes, book chapters assigned, class handouts, or other reading assignments. Only in the most extenuating circumstances will make-up exams be administered; arrangements should be made with the professor in advance (see absence policy below).

Class Project

One group project will be administered. Information regarding project objectives will be shared at a later date.

Requests for Grade Corrections/Changes

Any requests for corrections and/or changes concerning grading of quizzes, homework, or tests must be submitted within seven (7) days of the return of the graded work.

Absence Policy

If there is a valid reason for which you must miss a class or assignment due date, please notify the professor teaching the class (via e-mail). It will be at the discretion of each professor to accept/not accept late assignments without penalty or reschedule quizzes/exams.

Class Scheduling Disclosure

Please be aware that all professors participating in class instruction are clinical faculty and have work commitments and responsibilities outside their educational pursuits. Therefore, faculty may occasionally require flexibility in scheduling lectures and labs. All changes to course scheduling will be communicated promptly via email.