MP 6406 Radiation Dosimetry and Protection

Section(s): A, Q

Credits: 4-0-4

Time/Location (Section A): Monday, Wednesday 9:30 – 11:25 am / Boggs 3-50

Virtual (Section Q): http://canvas.gatech.edu

Syllabus Contents

INSTRUCTOR INFORMATION

Instructor	Email	Phone
Professor Shaheen Dewji *(she/her/hers)*	shaheen.dewji@gatech.edu	404-894-5800 (forwards to cell)
Office Hours Tuesday 1:00-2:00 ET or by appointment Boggs 3-15/Teams/Zoom (listed on Canvas)		*To meet students' requirements, needs, and comfort levels, meetings and office hours will be offered in-person or virtually.*

1. TEACHING ASSISTANTS AND ASSOCIATES

Teaching Assistants and Associates will be supporting the instruction of this class. Teaching Assistants will be responsible for assisting with homework grading and serve as a contact for course and homework questions. Teaching Associates will be responsible for conducting in-class lectures and exercises as part of their study program requirement and professional development in pedagogical instruction, while serving as a resource for questions you may have regarding course materials. The Teaching Associates are not graders, nor do they hold any authority over course evaluation methods. All students are expected to attend these lectures, as they are part of the foundational pedagogical coursework (not “guest lectures”). Students will also be expected to facilitate a positive learning environment while sharing constructive feedback to the Teaching Associates to help improve their skill. Contact information for Teaching Assistants and Associates will be provided on Canvas.

2. GENERAL INFORMATION

2.1. Description

Introduction to the calculation of radiation dose, dosimetry, and health physics.

2.2. Course Goals and Learning Outcomes

In completing this course, the student be able to utilize the foundational concepts of radiation dosimetry reinforced in this course with prescribed methods to conduct dose assessment in occupational and medical radiation exposure scenarios.

Assignment	Weight
Participation	10%
Homework	10%
Tests (2)	45% (22.5% each)
Final Project	35%
TOTAL	**100%**

3. DESCRIPTION OF GRADED COMPONENTS

The final course grade will be determined from the following evaluation components. No additional work (extra credit assignments, late assignments for partial credit) are permitted unless accompanied by a university-sanctioned and approved justification.

3.1. Participation

Course attendance and interactive participation have been proven to demonstrate learning reinforcement of course material. Course participation activities will be conducted in the form of in-class interactive activities and review sessions. These may not be announced in advance. Missed activities for participation only will be permitted make-up with the permission of the instructor; students may be requested to provide a university-sanctioned excuse if delinquent.

3.2. Homework

Homework will be split amongst approx. weekly assignments. Homework will be assigned as given in Proposed Schedule. All assignments will be uploaded, by the student, in PDF format in a single file and in the requested filename format to Canvas **before the listed deadline**. Therefore, ensure that you have scanned your homework into Canvas before the deadline when homework is due. Incomplete submissions to Canvas will be considered an incomplete assignment. Late submissions made due to upload or technology errors will not be accepted and considered incomplete.

3.3. Tests

Two midterms will be given in class. Distance education (Q) students will have until Sunday 11:59 pm of the week of exam date to complete the exam and have your designated proctor organized by Distance Learning to scan and return to the instructor. Instructions will be provided prior to the exam on Canvas. All exams are cumulative and will cover all required reading (textbook, Canvas, course notes) and homework.

3.4. Project

A final project will be assigned on a topic of dose reconstruction (e.g. from an accident, treatment/diagnostic scenario, popular culture). The final project consists of two parts: The first part emphasizes critical analysis through the development of a review paper reinforcing research methods and reinforcement exercises on a coherent topic area on a forefront topic in radiation protection research. Aligned with the topic of the review paper, the second part comprises of a dose reconstruction calculation using computational methods (e.g., Monte Carlo using PIMAL or internal dose models coded from first principles), verified by hand calculations. Students are expected to have access to compatible computing and will be responsible for installing appropriate software themselves. Project expectations and additional work periods will be given in class.

3.5. Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

See http://registrar.gatech.edu/info/grading-system for more information about the grading system at Georgia Tech.

4. COURSE MATERIALS

4.1. Course Text

The primary course texts that will be employed are:

- Introduction to Radiological Physics and Radiation Dosimetry, F. H. Attix, Wiley, 1986/2004.
- Advanced Radiation Protection Dosimetry, S. Dewji and N. Hertel, CRC Press, 2019.
- Primary sources for the class will be the publications of regulatory agencies and papers from the scientific literature assigned in class. These required materials will be posted for all students to access on Canvas.
- Encyclopedia of Nuclear Energy, ed. Ehud Greenspan, Volume 2 Section 7: Radiation Protection, Elsevier, 2021 *This is available electronically for free download to GT students via library.gatech.edu (direct link: here).*

4.2. Additional Materials/Resources

Several references might be useful to consult during this course, especially for students requiring remediation (non-nuclear background, or need a refresh), including:

- Atoms, Radiation and Radiation Protection, Third Edition, J. Turner, Wiley, 2007 (2022 version is published, but 2007 is perfectly appropriate).
- Physics for Radiation Protection, Third Edition, J. E. Martin, Wiley, 2013.

Other supplementary resources:

- Radiation Protection and Dosimetry, M. Stabin, Springer, 2008.
- Introduction to Health Physics, Cember and T. Johnson, McGraw-Hill 2008 (or newer).

5. COURSE WEBSITE AND OTHER CLASSROOM MANAGEMENT TOOLS

5.1. Canvas

This course will use Canvas to post course content, collect homework, and to conduct selected evaluations. To log into Canvas:

- You can log in to Canvas to access using your GT credentials at https://gatech.instructure.com/ (or http://canvas.gatech.edu). Once you log in, you will see the course listed on the main dashboard.
- You may also access Canvas on your phone; simply download the “Canvas” app in the Google Play or iOS App Store.
- If you are having problems accessing Canvas, you can get 24/7 help by clicking the “Help” button in Canvas. Learn more at https://canvas.gatech.edu/247-canvas-help-desk.
- For general information about Canvas, visit http://canvas.gatech.edu.

5.2. Exam Proctoring

All Section A examinations will occur during the scheduled class period. All Section Q examinations will occur during the permitted exam timeframe from the date listed on the syllabus under the supervision of a live approved proctor. Distance Education will provide instructions to all Section Q students regarding how to identify and report an approved proctor, and instructions for the proctor to transmit exams.

6. COURSE EXPECTATIONS AND GUIDELINES

6.1. Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or http://www.catalog.gatech.edu/rules/18/.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

6.2. Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404) 894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible to set up a time to discuss your learning needs. Disability accommodation must be presented to the instructor **in advance** of assignment deadlines or examinations. **If you are unsure if you need evaluation from the Office of Disability Services, I highly recommend you consult with them at the beginning of the semester and to file your accommodation (which you can choose to use), or as soon as your condition is known.**

6.3. Attendance and/or Participation

Regular attendance is expected during scheduled course hours for in-person students and material kept up-to-date weekly by all (in-person and distance education) students. Participation assignments are expected to be completed in-class or within one week of assignment.

6.4. Collaboration and Group Work

Honesty and transparency are important features of good scholarship. On the flip side, plagiarism and cheating are serious academic offenses with serious consequences. If you are discovered engaging in either behavior in this course, you will earn a failing grade on the assignment in question, and further disciplinary action may be taken.

For a clear description of what counts as plagiarism, cheating, and/or the use of unauthorized sources, please see the Student Code of Conduct: http://www.catalog.gatech.edu/rules/19.

Working in groups is permitted and encouraged. However, but all assignments must be completed **individually**. Please make sure to reference all information correctly; this includes information from each other.

For more information about Georgia Tech's standards with respect to academic integrity, you can also check out the following link: http://honor.gatech.edu/

6.5. Use of AI

The Student Code of Conduct is the governing paradigm for academic integrity. However, recognizing the capabilities that artificial intelligence (AI) tools can bring to the learning environment, students can utilize such tools as a supplemental learning tool. Institute guidance is given here: https://oit.gatech.edu/ai/guidance.

Instructor note: Students are expected to utilize the concepts, mathematical frameworks, and variables employed in the lecture material in their evaluation assignments. As a cautionary note, I have found that inputting representative numerical homework questions in ChatGPT (unaltered) almost all yielded incorrect results. If you require clarification regarding appropriate use of AI tools, reach out to the instructor.

Any use of AI to natively produce course deliverables will be considered a violation of student integrity and will be reported.

6.6. Use of Recording Devices

To ensure a respectful and productive learning environment, recording of class sessions, whether in person or via distance education, is strictly prohibited unless prior written permission is obtained from the instructor. This includes but is not limited to audio and video recordings. Screen captures are allowed only for personal use related to this class and must not be distributed or used outside of this class.

Additionally, all class materials, including lecture notes, presentations, assignments, and any other course content, are intended solely for the use of students enrolled in this class for the current semester. Reproduction, distribution, or reuse of these materials outside of this class, including for the creation of memes or other non-academic purposes, is strictly prohibited without explicit written consent from the instructor. Materials must not be uploaded or shared on websites such as *CourseHero, Chegg*, or similar platforms, nor should they be input into any AI tools or applications to protect copyright. This policy is in place to protect the integrity of the course content and the privacy of all participants. Violations of this policy will be considered a breach of academic integrity and may result in disciplinary action in accordance with university regulations.

6.7. Extensions, Late Assignments, and Re-Scheduled/Missed Exams

Late assignments will not be accepted and missed exams will not be rescheduled without an Institute approved absence (e.g., field trips, military service/training, university-sanctioned and documented athletic events, documented medical). Students with medical or family emergencies should contact the Dean of Students for approval and documentation. See http://catalog.gatech.edu/rules/4/ for an articulation of the Institute rules.

6.8. Student-Faculty Expectations Agreement

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See http://www.catalog.gatech.edu/rules/22/ for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

6.9. Classroom policy for laptop computers and mobile devices

Mobile devices and computers should be switched on a silent mode during the lectures. Inappropriate or disruptive use of mobile devices that is disruptive to the class may result in a disciplinary action by the instructor.

6.10. Campus Resources for Students

Dean of Students Office, CARE Center, Counseling Center, Stamps Health Services, and the Student Center:

The CARE Center and the Counseling Center, Stamps Health Services, and the Dean of Students Office will offer both in-person and virtual appointments. Student Center services and operations are available on the Student Center website. For more information on these and other student services, contact the Dean of Students or the Division of Student Life.

7. PROPOSED SCHEDULE

See addendum. Any changes in the schedule will be announced via Canvas. Students are responsible to check Canvas at least weekly for updates to the Course Schedule, even if not formally announced. Students are responsible to check Canvas prior to each class for updates, even if not formally announced. (N.B. The Canvas app will push notifications for new assignments or announcements made in Canvas only, not if new documents are uploaded).