



TECHNICAL COLLEGE  
OF THE LOWCOUNTRY

**RAD 201**  
**Radiation Biology**

**COURSE DESCRIPTION**

RAD 201 Radiation Biology - Lecture 2 Lab 0 Credit 2

This course is a study of the principles of radiobiology and protection. It emphasizes procedures that keep radiation exposure to patients, personnel, and the population at large at a minimum.

Prerequisites: RAD 165, RAD 230. Co-requisites: RAD 115, RAD 176.

**COURSE FOCUS**

This course is a study of the principles of radiobiology and protection. It emphasizes procedures that keep radiation exposure to patients, personnel, and the population at large at a minimum.

**REQUIRED TEXT AND REFERENCES:**

Sherer, M.A., Visconti, P.J., Ritenour, E.R., (2018) *Radiation Protection in Medical Radiography*, (8th ed.). St. Louis: Mosby

*\*\*The student is responsible to have required textbook materials prior to the course's start date.*

**TEXT AND REFERENCES**

No Purchase Necessary. Beginning Fall 2021, TCL implemented a new textbook model called First Day Complete (FDC). With FDC, a per credit hour book fee was added to your tuition at the time of registration. Please check your *new* TCL email account where you have been sent a link to reserve your books with the TCL College Store. Refer to this link for all details concerning FDC <https://www.tcl.edu/first-day-complete-textbook-program/>

**PPE REQUIREMENTS**

Until further notice, there is a mask mandate in place indoors at TCL. Failure to adhere to the mask requirement will result in the following:

- First Offense: Verbal Warning
- Second Offense: You will be asked to leave class with an absence for that day.
- Third Offense: You will be asked to leave class and must meet with Associate Vice President Rodney Adams in Building 2 room 203 prior to returning to class.

In addition, all students will be required to wear PPE as deemed appropriate and necessary per clinical facility for the duration of the clinical experience. Students may also be required to wear additional PPE while participating in “on campus” lab activities to provide an environment that is representative of the program’s clinical facilities. Failure to adhere to this mandate will render

the student ineligible to participate in clinical rotations or “on campus” activities, and therefore unable to progress in the program.

## **COURSE GOALS**

The following list of course goals will be addressed in the course. (\*designates a CRUCIAL goal)

1. describe principles of cellular biology
2. differentiate between ionic and covalent molecular bonds
3. identify sources of electromagnetic and particulate ionizing radiations
4. clarify effective radiation protection\*
5. define key terms and concepts\*
6. state ALARA principle\*
7. recognize the clinical significance of lethal dose (LD)
8. differentiate between somatic and genetic radiation effects
9. differentiate between stochastic (probabilistic) and nonstochastic (deterministic) effects
10. justify radiologic procedures
11. list radiation sources
12. describe photon interactions\*
13. express absorption process
14. name x-ray photon transmission types
15. discuss radiation exposure risks\*
16. calculate effective dose
17. scrutinize subvert measurement unit
18. illustrate tissue weighting factor
19. explain radiologic responsibilities
20. characterize cell structure and functions
21. identify human cell ionization consequences
22. describe target theory
23. characterize radiation energy transfer determinants
24. characterize cell radio sensitivity factors
25. diagram acute radiation syndrome response stages
26. identify radiation dose response curve drawings
27. distinguish major radiologic organizations
28. explore occupational dose limits\*
29. explore non-occupational dose limits
30. explain equivalent and effective dosing concept
31. compare CT procedure doses
32. contrast routine diagnostic procedure doses
33. wear personnel dosimeter\*
34. identify radiation survey instruments
35. employ radiographic precautions
36. validate medical management

## **STUDENT CONTRIBUTIONS**

Students will complete any assignments and turn them in to the instructor prior to the start of each class session. Classes are designed to employ a variety of teaching techniques. To maximize learning, required readings should be done ***prior*** to class. If a student is falling behind in clinical performance and/ or academic achievement, it is imperative to seek immediate assistance from the instructor.

1. **Attend all classes**
2. **Come to class prepared**
3. **Maintain a positive attitude**
4. **Be enthusiastic**
5. **Participate in class**
6. **Ask questions**
7. **Help fellow classmates**

### COURSE EVALUATION

Review Questions (15)	10%
Worksheets (7)	5%
Exams (5)	25%
Assignments (Chernobyl Worksheet, Response to Atomic Bombings, etc.)	10%
<u>Final Exam</u>	<u>25%</u>
Total	100%

**\*\*CHAPTER REVIEW QUESTIONS** are due on respective Thursdays at the start of class. **A 10 point deduction will apply for each late submission (per chapter).**

**\*\*WORKSHEETS** are due on respective Thursdays at the start of class. These will count as a participation grade. **No late submissions will be accepted. Any incomplete work will receive half credit—all questions must be attempted in order to receive full credit.** Worksheets will be returned to student and reviewed at the end of class.

**\*\*EXAMS 1-4** will be held in class on their scheduled Thursdays.

**\*\*EXAM 5** will be available via Blackboard.

**\*\*It is the student's responsibility to email the course instructor if he/she has questions about course material. The student may also make an appointment for additional review.**

### Assignments

Assignments, worksheets, and course reviews may be available on the Blackboard platform for student completion and review. If an online review is given, TCL utilizes the online test proctoring service ***Honorlock***. Each student must meet the requirements for Honorlock to complete any online clinical assignments such as film reviews and/or course reviews.

- Honorlock Online Proctoring and Technology Requirements  
TCL uses an online test proctoring service called Honorlock to monitor some online tests as an alternative to in-person proctoring. Your instructor may elect to have some of your tests proctored using Honorlock. If so, you will need to make sure that you have access to the necessary equipment in order to take your online-proctored tests:
  - A computer with access to a high-speed Internet connection
  - A webcam and microphone. A functioning webcam and microphone are required to complete proctored online tests.
  - Microsoft Office. Microsoft Office can be downloaded for free by accessing the Office 365 link in your TCL email account.
  - The ability to install the Honorlock extension on Google Chrome.

**During examinations and quizzes (including film reviews), students must remove watches and place all belongings including electronic devices in the back of the classroom. Students must also remove head gear (hats) while testing takes place.**

**During on-campus examinations, only answers transferred and completed on Scantron sheets will be graded electronically to count towards the test score.**

**Students enrolled in classes taught online or have an online component are expected to attend on campus activities, such as testing, labs, and/or presentations as determined by program faculty and is given on the course outline.**

**Attendance in an online course, or any online component is defined by; at least once weekly course access and by completion of assignments as required by the instructor. Each student will be expected to access the web class at least once a week and complete weekly assignments on time. Additional access is encouraged and may be necessary for successful completion of classes.**

## **ATTENDANCE**

The College's statement of policy indicates that students must attend ninety percent of total class hours or they will be in violation of the attendance policy.

1. Students not physically attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
2. **Students taking an online/internet class must sign in and communicate with the instructor within the first ten calendar days from the start of the semester to indicate attendance in the class. Students taking an online class will have an assignment due within the first ten days to count as attendance in the course.** Students not attending class during the first ten calendar days from the start of the semester **must be dropped** from the class for NOT ATTENDING. The instructor will drop the student from the **course if the initial assignment is not completed. Instructors will withdraw students from** class when 90% attendance is not maintained. Attendance in an online course is defined by weekly course access and by completion of assignments as required by the instructor. Each student will be expected to access the web class at least once a week and

complete weekly assignments on time. Additional access is encouraged and may be necessary for successful completion of classes

3. Reinstatement requires the signature of the Division Dean.
  - a. In the event it becomes necessary for a student to withdraw from the course ***OR if a student stops attending class, it is the student's responsibility to initiate and complete the necessary paperwork.*** Withdrawing from class may have consequences associated with financial aid and time to completion. Students are strongly encouraged to consult with Financial Aid prior to withdrawing from any class, particularly if the student is currently on a warning or probation status.
  - b. When a student exceeds the allowed absences, the student is in violation of the attendance policy. The instructor **MUST** withdrawal the student with a grade of "W", "WP", or "WF" depending on the date the student exceeded the allowed absences and the student's progress up to the last date of attendance  
***Or***
  - c. Under extenuating circumstances and at the discretion of the faculty member teaching the class, allow the student to continue in the class and make-up the work. This exception must be documented at the time the allowed absences are exceeded.
  - d. Absences are counted from the first day of class. There are no "excused" absences. All absences are counted, regardless of the reason for the absence.
4. A student must take the final exam or be excused from the final exam to earn a non-withdrawal grade.
5. Students are expected to be in **class /clinic on time**. Arrival to **class/clinic** after the scheduled start time or leaving **class/clinic** prior to dismissal or scheduled end time, counts as a tardy. (If a student arrives *even 1 minute* after the class's start time, he/she will be considered tardy.) **Three tardies and/or early departures are considered as one absence unless stated otherwise.** Any absence that exceeds the 10% maximum allowed for the clinical course, may be grounds for dismissal and will be at the discretion of program faculty.
6. It is the student's responsibility to sign the roll/verify attendance with instructor upon entering the classroom. Failure to sign the roll/verify attendance results in a recorded absence. In the event of tardiness, it is the student's responsibility to ensure that attendance is marked. **The student is responsible** for all material/ announcements presented, whether present or absent.
7. If a student will miss a clinical day, or will be late, he/she must:
  - Call and leave a message with the Clinical Coordinator, the Division of Health Sciences Administrative Assistant, and the clinical facility **(at least 30 minutes prior to your start time)**. The student will leave the following information on the phone message: reason for your absence, the clinical site you are scheduled at, and the phone number where you can be reached.

- If these steps are not followed, then the student will fall under the “**NO CALL/ NO SHOW**” **category and will be dismissed from the program**
8. Absences from the clinical area are strongly discouraged. The attendance policy applies to all clinical activities **regardless** of start-time. A “**No Call/No Show**” for any clinical rotation is unprofessional conduct, and the student **will be withdrawn from the program.**

**\*Please refer to the Division Handbook for clarification of the No Call/No Show policy.\***

**A copy of TCL’s STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL) is on file in the Division Office and in the Learning Resources Center.**

### **STUDENT CONTRIBUTIONS:**

#### **Recording Devices / Cell Phones**

Students are not allowed to use recording devices during any lectures, lab, or clinical periods. Moreover, students must have cell phones **turned off** (not on vibrate) during lectures and lab times. If for any reason a cell phone rings or vibrates during lecture or lab, the student will receive a grade reduction per occurrence after the **first** warning. Students **are not allowed** to have their cell phone, iPod, or any other electronic device at their clinical rotations. Violation of the rules/requirements listed above **will be reason for dismissal from the Radiologic Sciences program.**

### **ACADEMIC DISHONESTY**

Health care professionals hold the public trust. Academic misconduct by health science students calls that trust into question and academic integrity is expected. Academic misconduct may result in withdrawal for related health science courses. Also, depending on the severity of the student’s academic misconduct, the student will not only be withdrawn from the program, but will not be allowed for re-entry and/or reapplication to **all** Health Science programs. It is a fundamental requirement that any work presented by students will be their own. Examples of academic misconduct include but are not limited to:

1. Copying the work of another student or allowing another student to copy working papers, printed output, electronic files, quizzes, tests, or assignments.
2. Completing the work of another student or allowing another student to complete or contribute to working papers, printed output, electronic files, quizzes, tests, Scantron, or assignments.
3. Viewing another student’s computer screen during a quiz or examination.
4. Talking or communicating with another student during a test.
5. Violating procedures prescribed by the instructor to protect the integrity of a quiz, test, or assignment.
6. Plagiarism in any form, including, but not limited to: copying/pasting from a website, textbook, previously submitted student work, or any instructor-prepared class material;

obvious violation of any copyright-protected materials. Safe Assignment is used to detect plagiarism.

7. Knowingly aiding a person involved in academic misconduct.
8. Providing false information to staff and/or faculty.
9. Entering an office unaccompanied by faculty or staff.
10. Misuse of electronic devices (including, but not limited to: cell phones, laptops, tablets, smart watches, etc.)

## GRADING POLICY

Grading scale	
93% - 100% A	W withdraw
85% - 92% B	WP withdraw with passing grade
78% - 84% C	WF withdraw with failing grade
70% - 77% D	I Incomplete
Below 70% F	

**Grading Methodology.** The final grade must be **78.000** or more **to pass the course successfully and progress in the program.** Students absent during *didactic coursework* must notify the instructor via email and telephone before the absence occurs. Students absent from an examination or presentation will receive a “0” grade for the examination unless other arrangements are made with the individual instructor *prior to* the examination or presentation day. It is the responsibility of the student to contact the appropriate instructor to arrange via email to arrange an appointment to make up the examination. If the instructor is unavailable, arrangements may be completed by telephone. A message should be left on the instructor’s voice mail. It is the instructor’s discretion of time allotted for make-up examinations on an individual basis. Messages sent by other students are unacceptable and will not be involved on the student’s behalf. The student is responsible for notifying the instructor, via email, for the reason of the absence. Grades are distributed to students within one week of administration of tests and examinations. Students are encouraged to make appointments with course instructor for evaluation of individual student performance and tutoring resources.

The ***student must*** make an appointment with the course instructor if an examination score falls below 78%.

**Students must maintain a 2.25 GPA to continue in program.**

## EXPECTATION OF STUDENT TO FULFILL RADIOLOGIC TECHNOLOGY COURSE REQUIREMENTS

**Radiologic Technology students are expected to adhere to all policies outlined in the college catalog/handbook as well as the Radiologic Technology Student Handbook. Violations of any policies are unacceptable. Failure to adhere to college and radiologic technology program policies may constitute dismissal from the program.**

### **ADA STATEMENT**

The Technical College of the Lowcountry provides access, equal opportunity and reasonable accommodation in its services, programs, activities, education, and employment for individuals with disabilities. To request disability accommodation, contact the counselor for students with disabilities at (843) 525-8242 / (843) 525-8219 during the first ten business days of the academic term.

### **HAZARDOUS WEATHER**

In case weather conditions are so severe that operation of the College may clearly pose a hardship on students and staff traveling to the College, notification of closing will be made through the following radio and television stations: WYKZ 98.7, WGCO 98.3, WGZO 103.1, WFXH 106.1, WWVW 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WL VH 101.1, WSOK 1230 AM, WAEV 97.3, WTOC TV, WTGS TV, WJWJ TV, and WSAV TV. Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. <https://tcl.regroup.com/signup>

### **SYLLABUS SAFETY ADDENDUM**

#### **Purpose:**

The purpose of this safety addendum is to provide each student with safety guidelines during an incident, emergency, or disaster at TCL. In addition, it provides students guidelines for lockdown procedures, evacuation procedures, and active shooter.

#### **Definitions:**

**An incident** is any event, potential or actual, that may impact normal operations but has no immediate health or life-threatening consideration or serious effect on the overall functional capacity of the College. An event of this nature should be reported to the Office of the Vice President for Administrative Services. Also notify the off-site campus administrator if applicable.

**An emergency** is any incident, potential or actual, which may endanger life or health or which affects an entire building or buildings, and will disrupt the overall operations of the College. Outside emergency services will probably be required, as well as major efforts from campus support services. Major policy considerations and decisions will usually be required from the college administration during times of crises. An emergency should be reported immediately by directly using **911** if life or health/injury considerations exist and then to the Office of the President or Vice President for Administrative Services as quickly as possible. Also notify the off-site campus administrator if applicable.

**A disaster** is any event or occurrence that has taken place and has seriously impaired or halted the operations of the College. In some cases, mass personnel casualties and severe property

damage may be sustained. A coordinated effort of all campus-wide resources is required to effectively control the situation. Outside emergency services will be essential. In all cases of disaster, an Emergency Control Center will be activated, and the appropriate support and operational plans will be executed. The disaster should be immediately reported, first by calling **911** and then to the Office of the President or Vice President for Administrative Services. Also notify the off-site campus administrator if applicable.

#### **Types of Emergencies:**

- Hurricane
- Tornado
- Fire
- Biochemical or Radiation Spill
- Explosion/Bomb
- Downed Aircraft (crash which directly impacts campus operations)
- Utility Failures
- Violent or criminal behavior
- Psychological Crisis

#### **Procedures**

##### **Active Shooter:**

Run—Hide—Fight Video

<http://www.fbi.gov/about-us/cirg/active-shooter-and-mass-casualty-incidents/run-hide-fight-video>

##### **Building Evacuation:**

1. Building evacuations occur when an alarm sounds and/or upon notification by Security or the Emergency Director.
2. When the building evacuation alarm is activated during an emergency, individuals should exit according to the building evacuation plan and alert others to do the same.
3. Once outside, individuals should proceed to a clear area that is at least 500 feet away from the affected building. Streets, fire lanes, hydrant areas and walkways should be kept clear for emergency vehicles and personnel.
4. Individuals should not return to an evacuated building unless told to do so by Security or the Emergency Director.
5. Individuals should assist persons with disabilities in exiting the building. Elevators are reserved for disabled persons.

##### **Campus Evacuation:**

1. A uniformed Security Guard, the Emergency Director, or an Emergency Resource Team member will announce evacuation of all or part of the campus grounds.
2. All persons (students and staff) are to immediately vacate the campus, or in the case of a partial evacuation relocate to another part of the campus grounds as directed.

##### **Lockdown:**

1. Clear the halls
2. Report to the nearest classroom/office
3. Assist those needing special assistance
4. Ensure classroom/office doors are closed and locked

5. Turn off lights
6. Stay away from doors and windows (out of the line of sight)
7. BE QUIET and follow instructor's directions
8. Silence cell phones
9. Wait for the "All Clear" before leaving

**A syllabus acknowledgment is included attached below (Page 11). The student is responsible for returning this acknowledgment form to the course instructor to verify beginning attendance and acknowledgment of course syllabus information.**



TECHNICAL COLLEGE  
OF THE LOWCOUNTRY

Technical College of the Lowcountry  
Radiologic Technology Program  
Evidence of Understanding & Course Syllabus Acknowledgement

I, \_\_\_\_\_ have been given a copy of the Syllabus for ***RAD 201 – Radiation Biology***. I understand that it is my responsibility to read the course syllabus in its entirety and to seek clarification if unclear. I also understand that I will be held accountable for upholding all course policies outlined within the RAD 201 Course Syllabus, Rad Tech Student Handbook, Health Sciences Division Student Handbook, and the TCL College Catalog & Student Handbook. I understand that copies of these handbooks are found at <http://www.tcl.edu/programs-of-study/health-sciences/radiologic-technology> and <http://www.tcl.edu/catalog-course-search>

By signing below, I acknowledge that the course instructor has reviewed the course syllabus with me and that I have been given an opportunity to ask questions and seek clarification. I am also attesting to the fact that I have read the course syllabus for RAD 201 and agree to be held responsible for additional policies and procedures outlined in the student handbooks.

Student Name: \_\_\_\_\_  
(Please Print)

Date: \_\_\_\_\_

Student Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Course Instructor: \_\_\_\_\_

Date: \_\_\_\_\_