



Technical College of the Lowcountry
921 Ribaut Rd.
Beaufort, SC 29901

Heather Elmquist
Building 4 Room 201
843.470.8402
helmquist@tcl.com

RAD 103
Introduction to Computed Tomography
Spring 2021

Course Description

Lec. 2 / Lab. 0 / Cr. 2

This course provides a detailed study of advanced methods and concepts of imaging. This course is a study of the technological developments behind computed tomography, an overview of scanner components, terminology, data acquisition, digital imaging, image reconstruction, display and manipulations. Current applications will be explored including patient screening, contract utilization and administration, contrast reactions and treatment, pediatrics, conscious sedation and monitoring, and radiation protection.

Prerequisites: PSY 201, RAD 115, RAD 176, RAD 201.

Co-requisites: RAD 205, RAD 210, RAD 256

Course Focus

This course provides an introduction to computed tomography equipment, procedures, and radiation protection during procedures.

Required Text and References

Romans, Lois E., (2018) Computed Tomography for Technologists: A Comprehensive Text (2nd ed.) St. Louis; Wolters Kluwer Health/Lippincott Williams & Wilkins

Romans, Lois E., (2018) Computed Tomography for Technologists: Exam Review (Workbook)(2nd ed.) St. Louis; Wolters Kluwer Health/Lippincott Williams & Wilkins

Technical College of the Lowcountry Radiologic Technology Student Handbook (current edition).

Technical College of the Lowcountry Health Sciences Division Student Handbook (current edition).

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

Reference Text:

Kelley, Lorrie L. & Peterson, Connie M (2013) Sectional Anatomy for Imaging Professionals (3 ed.) St. Louis: Mosby

All students will be required to wear PPE as deemed appropriate and necessary per clinical facility for the duration of the clinical experience. Students will also be required to wear PPE while participating in any “on campus” activities such as labs/lectures. 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. These goals are directly related to the performance objectives. (*designates a CRUCIAL goal)

1. examine accessories of C.T. systems *
2. examine basic instrumentation/computer language*
3. justify importance of spatial resolution
4. realize advantages of computed tomography imaging
5. realize limitations in CT imaging
6. assess layout for C.T. equipment
7. integrate detector technology
8. appreciate historical values of C.T.
9. define CT physics principles *
10. investigate factors affecting image contrast
11. investigate factors affecting image density
12. list basic principles of image reconstruction
13. list bio effects of radiation
14. recognize acquisition of data
15. state understanding of basic computers
16. understand administration of contrast media
17. understand window leveling of C.T. windows*
18. understand window width as it pertains to C.T. windows*
19. appreciate digitization of images
20. describe detector electronics
21. differentiate between types of imaging data
22. differentiate imaging hardware
23. distinguish basic visualization tools
24. distinguish fundamentals of binary digits
25. explain digital imaging processing
26. apply critical thinking
27. discuss generations of C.T. scanners
28. evaluate problems in computed tomography
29. evaluate radiation dose in computed tomography*
30. identify cranial anatomy when seen in axial cross sections*
31. identify neck, thoracic, and abdominal anatomy when seen in axial cross sections*
32. identify both male and female pelvic anatomy when seen in axial cross sections*

33. explain upper and lower extremities scanning and reformatting into coronal or sagittal planes*
34. explain how to complete volume scanning.
35. explain how to complete a three-phase vascular exam of an organ
36. explain the difference between routine and high-resolution thorax imaging techniques

Course Schedule

Location: This is an online course. All coursework will be submitted through the Blackboard platform with online applications. Optional reviews will be held on designated dates given in the course outline as scheduled by the instructor. Scheduled reviews may be subject to change with appropriate notice to students. If a student feels that they are not understanding the course material, they are strongly encouraged to meet with the course instructor for tutoring resources.

Student Contributions

Classes are designed to employ a variety of teaching techniques. In order to maximize learning, required readings and Web enhanced sections should be completed 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. Should a student have a question regarding his or her progress in this course or a grade that is received, the student should make an appointment with the instructor to discuss their progress. **A course outline will be provided; it is strongly encouraged that students follow this outline guide for each course so they are aware of due dates for all assignments.**

Course Evaluation

Exams (5-6)	30%
Chapter Review Questions	20%
Quizzes (5-7)	25%
<u>Final Cumulative Exam (1)</u>	<u>25%</u>
Total	100%

**This is a structured Online Course. The student is responsible to check their emails and Blackboard assignments daily for information uploaded to the platform.

- **It is a program requirement for students to meet with the instructor if an exam grade falls below a score of 78%. It is the student's responsibility to make an appointment immediately with the course instructor concerning scores on examinations.**

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

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) 525-8228 during the first ten business days of the academic term.

Attendance to all classes plays a vital role in satisfactory completion to this course; therefore, students are expected to attend all classes. Please refer to the Attendance Policy listed in each course syllabus and in the student handbook. If a student misses lecture and/or lab, it is the student's responsibility to obtain materials and/or assignments from the course instructor. Students are encouraged to attend class and/or lab on time. The instructor may restrict entrance into class after the scheduled starting time; however, the student may enter during the first break.

**It is the student's responsibility to email the course instructor and coordinator if they have questions about course material. The student may also make an appointment for additional review.

- **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. Students are expected to log into Blackboard and online components every week and complete assignments. Communication with the instructor weekly is the responsibility of the student.**
- **During examinations and quizzes, 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.**

Assignments, worksheets, and course reviews may be posted to 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 didactic course assignments 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 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.

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. **For clinical coursework, the student must follow the clinical call-out policy.** 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.

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 regular 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 in order to earn a non-withdrawal grade.
 5. Students are expected to be in class *on time*. Arrival to class after the scheduled start time or leaving class prior to dismissal 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.
 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 course textbook information along with additional information provided by course instructor and announcements presented or posted, whether present or absent. Students will sign an attendance form when arriving to class.** If a student arrives after ten minutes of the start of lecture or lab, a tardy will be received. If a student leaves early from lecture or lab, a tardy will be received.

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.

ACADEMIC MISCONDUCT (See TCL student handbook, division handbook, and course syllabi)

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.

ACADEMIC MISCONDUCT

Academic misconduct by health science students calls that trust into question and academic integrity is expected.

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.)

Recording Devices / Cell Phones

Students are not allowed to use recording devices during any lecture, lab, or clinical courses.

Additionally, students must have cell phones **turned off or on silence** during lectures, reviews, and lab times. If for any reason a cell phone rings or vibrates during lecture or lab, the student will receive a warning for the first occurrence. After the **first** warning, students will be placed on a learning contract in reference to not abiding classroom policy. **Violation of the rules and or requirements listed above may result in possible dismissal from the Radiologic Sciences program.**

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, WWVV 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WLVA 101.1, WSOK 1230 AM, WAEV 97.3, WTOG 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.reggroup.com/signup>

SAFETY & SECURITY

Purpose

The Technical College of the Lowcountry is committed to providing a safe educational environment for students and employees. With this plan, the College attempts to anticipate a needed response in the event of an emergency that may endanger life or health of persons or inflict major damage to College property. While the plan does not cover every conceivable situation, it is intended to supply the basic administrative guidelines necessary to cope with most campus emergencies.

The basic emergency procedures outlined below are to enhance the protection of lives and property through effective use of college and campus community resources. Whenever an emergency affecting the campus reaches proportions **that cannot be handled by routine measures**, the President or Vice President for Administrative Services may declare a state of emergency and these contingency guidelines may be implemented.

Since an emergency may be sudden and without warning, these procedures are designed to be flexible in order to accommodate contingencies of various types or magnitudes. The procedures described are applicable to almost any disaster.

Definition

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 <https://www.fbi.gov/about/partnerships/office-of-partner-engagement/active-shooter-resources>

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

Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. <https://tcl.regroup.com/signup>

Classroom and Lab Rules

1. No food or beverages are allowed near the radiographic equipment or media equipment.
2. Any food products in the Radiologic Technology classroom must be contained. Drinks must have lids. Any unused food or drink must be disposed of properly. No liquid is to be placed in the trash receptacle.
3. All equipment must be returned to its proper place at the end of each laboratory session.
4. Equipment must be handled with care.
5. No equipment is to be "borrowed" or removed from the lab without the permission of the faculty. If models are borrowed from the lab, a responsibility of release form must be completed.
6. Each student is responsible for the clean-up of his/her own area in lab including turning off equipment and putting equipment and models away.
7. Negligent use of equipment may result in dismissal from the program.

EXPECTATIONS OF RADIOLOGIC TECHNOLOGY STUDENTS:

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.

Course Instructor: Heather Elmquist, BS, R.T. (R) (M) (ARRT)
Office Location: Bldg. 4, Room 201
Office Phone: 843-470-8402
Office Hours: By Appointment
Email: helmquist@tcl.edu



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

I, _____ have been given a copy of the Spring 2021 Syllabus for ***RAD 103 – Introduction to Computed Tomography***. 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 103 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 located on the college website link under the Radiologic Technology Program Additional Information:

<https://www.tcl.edu/programs/radiologic-technology-associate-of-applied-science/>

and <http://catalog.tcl.edu/>

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 103 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: _____