RAD 145

Computed Tomography Physics and Instrumentation

Spring 2013

Course Description
RAD 145 Physics and Instrumentation
Lec. 3 Lab. 0 Cr. 3
This course provides an overview of technology, repair, and practice that is unique to the computed tomography profession.

Course Focus
This course provides an overview of the physics and instrumentation unique to computed tomography.

Text and References

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. evaluate the basics of scanning pitch
2. evaluate the basics of the volume scanning parameters
3. examine colonoscopies performed using C.T. technology
4. examine the importance the endoscopy done using C.T. technology
5. summarize processing architecture and hardware
6. summarize room layouts for C.T. equipment
7. comprehend cardiac imaging with dual source C.T. scanner
8. comprehend imaging of the human heart
9. define quality control for scanners used in computed tomography
10. identify high resolution of image contrast
11. identify low resolution of image contrast
12. learn effects of image noise
13. learn the effects of image artifacts
14. understand the historical background of C.T.
15. understand the significance of the scanning sequence*
16. appreciate multi-slice spiral and helical reconstruction of an image
17. appreciate single-slice spiral and helical reconstruction of an image
18. categorize basic configuration of a C.T. gantry*
19. categorize basic configuration of a C.T. patient table*
20. classify three-dimensional imaging approaches
21. compare 256 slice scanners to a 320 slice dynamic scanner unit
22. compare data acquisition components
23. compare three dimensional and four dimensional scanner output
24. contrast the advantages and disadvantages of P.E.T.*
25. establish Q.C. testing frequency
26. explain the effects of surface rendering and lighting
27. explain the role of the radiologic technologist in the future of imaging
28. explore positron emission imaging concepts
29. apply the value to C.T. C.T. imaging through window width
30. apply the value to C.T. imaging of window leveling
31. elaborate on the future of three-dimensional imaging
32. expound on C.T. imaging in virtual reality imaging
33. preview limitations of the single slice volume scanner
34. preview the evolution of multislice scanners
35. realize the effect of window leveling on image density*
36. realize the effect of window width on image contrast*
37. breakdown the theory of C.T. scanning instrumentation
38. grasp the concept of proper control of image and equipment quality
39. assess cone beam algorithms in C.T.
40. assess cone beam geometry in C.T.
41. estimate image reconstruction increments
42. estimate image scan time
43. estimate the needs for quality control testing
44. choose a technique for measurement of scanner quality
45. consider three dimensional basic concepts*

**Student Contributions**

Students will complete any assignments and turn them in to the instructor as determined by the instructor.

Classes are designed to employ a variety of teaching techniques. In order 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.

**Course Evaluation**

Grading

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Unit exams/quiz</td>
<td>20%</td>
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<tr>
<td>Mid-term</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>50%</td>
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Course Schedule
Location: Distance Learning
Lecture: Distance Learning

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
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 not attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.

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.
   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. 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 insure that attendance is marked. The
The student is responsible for all material/announcements presented, whether present or absent.

7. Continuity of classroom and laboratory (which includes clinical experiences) is essential to the student’s progress in providing safe and competent patient care. Students are expected to use appropriate judgment for participating in clinical activities. To evaluate the student’s knowledge and skills, it is necessary for the student to be present for all clinical experiences. If absence does occur, the designated clinical site, in addition to the Division of Health Sciences Administrative Assistant, must be notified by telephone no later than 30 minutes prior to the start of the clinical experience. The Division of Health Sciences telephone number is 843-525-8267.

8. Absences from the clinical area are strongly discouraged. The attendance policy applies to clinical activities. “No call, no show” for clinical is unprofessional conduct and the student will be withdrawn from the program with a WF.

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.

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, WLVH 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. www.tcl.edu/textalert.asp

ACADEMIC MISCONDUCT
There is no tolerance at TCL for academic dishonesty and misconduct. The College expects all students to conduct themselves with dignity and to maintain high standards of responsible citizenship.

It is the student’s responsibility to address any questions regarding what might constitute academic misconduct to the course instructor for further clarification.

The College adheres to the Student Code for the South Carolina Technical College System. Copies of the Student Code and Grievance Procedure are provided in the TCL Student Handbook, the Division Office, and the Learning Resources Center.

Health care professionals hold the public trust. 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, or assignments.
3. viewing another student’s computer screen during a quiz or examinations.
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.
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.

GRADING POLICY

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<tr>
<th>Grading Scale</th>
<th>W</th>
<th>WP</th>
<th>WF</th>
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<tr>
<td>90% - 100%</td>
<td>A</td>
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<tr>
<td>82% - 89%</td>
<td>B</td>
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<tr>
<td>75% - 81%</td>
<td>C</td>
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<tr>
<td>70% - 74%</td>
<td>D</td>
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<td>Below 70%</td>
<td>F</td>
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Grading Methodology. The final grade must be 75.000 or more in order to pass the course and progress in the program. 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 or on the examination or presentation day before the test/presentation is scheduled to be given. Arrangements may be completed by telephone. If the instructor is not available, a message should be left on the instructor’s voice mail AND with another member of the faculty or administrative assistant. Messages sent by other students are unacceptable. The student is responsible for notifying the instructor for the reason of the absence. Any student arriving greater than 10 minutes late (according to clock in room where exam is being held) will be considered absent and must follow the criteria stated above or will receive a “0” grade on the exam. Grades are posted on Blackboard within one week of administration of tests and examinations.

Students enrolled in courses that are taught online or have an online component may expect to be called upon to attend on campus, labs, testing, or presentations as determined by the program faculty.

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.

Course Coordinator: John Eichinger, MSRS, R.T. (R), (CT), (ARRT)
OFFICE LOCATION: Building 4 Room 204
OFFICE PHONE: 843-470-8397
Office Hours: By Appointment
Email: jeichinger@tcl.edu