



Radiographic Imaging  
RADT 1085  
COURSE SYLLABUS  
Spring Semester 2017

**Semester:** Fall  
**Course Title:** Radiographic Imaging  
**Course Number:** RADT 1085  
**Credit Hours/ Minutes:** 3 / 3000  
**Class Location:** Room #743  
**Class Meets:** 8:30 AM – 12:30 PM/Monday  
**CRN:** 40302

**Instructor:** Tara W. Powell  
**Office Hours:** Mondays 1 – 5 PM/Thursdays 1 – 5 PM  
**Office Location:** Room 714, Gillis Building  
**Email Address:** tpowell@southeasterntech.edu  
**Phone:** 912-538-3152  
**Fax Number:** 912-538-3106  
**Tutoring Hours:** By appointment

**REQUIRED TEXT:**

Bushong, S., (2017). *Radiologic Science for Technologists: Physics, Biology, and Protection (11<sup>th</sup> edition)*. St. Louis, MO: Elsevier. ISBN: 978-0-323-35377-9

Long, B., Rollins, J., & Smith, B., (2016). *Merrill's Atlas of Radiographic Positioning & Procedures (13<sup>th</sup> Edition)* (Vol. 3). St. Louis, MO: Elsevier. ISBN: 978-0-323-26344-3

**REQUIRED SUPPLIES & SOFTWARE:** Pen, Pencil, Highlighter, Paper, calculator

**COURSE DESCRIPTION:** The content of this course introduces factors that govern and influence the production of the radiographic image using analog and digital radiographic equipment found in diagnostic radiology. Emphasis will be placed on knowledge and techniques required to produce high quality diagnostic radiographic images.

**MAJOR COURSE COMPETENCIES:**

1. Radiographic Imaging Equipment Operation
2. Equipment Quality Control, Quality Management, and Maintenance
3. Fluoroscopy (Image Intensified Conventional and Digital Fluoroscopy)
4. Mobile Radiography

**PREREQUISITE(S):** NONE

**COURSE OUTLINE:**

1. Radiographic Imaging Equipment Operation			
	Description	Learning Domain	Level of Learning
1.1	Identify components of the radiographic unit to include operating console, x-ray tube construction (anode, cathode, rotor/stator), automatic exposure control, and beam restriction devices.	Cognitive	Knowledge
1.2	Discuss x-ray tube construction, to include electron sources, target materials, induction motor.	Cognitive	Comprehension
1.3	Define potential difference, current (alternating and direct) and resistance.	Cognitive	Knowledge

1.4	Describe electrical protective devices such as ground and circuit breaker.	Cognitive	Knowledge
1.5	Identify the general components and functions of the tube and filament circuits.	Cognitive	Knowledge
1.6	Identify the function of solid-state rectification.	Cognitive	Knowledge
1.7	Compare generators in terms of radiation produced and efficiency.	Cognitive	Analysis
1.8	Discuss basic principles of x-ray generators, transformers (step up, step down and autotransformer), and rectification systems (phase, pulse, and frequency).	Cognitive	Comprehension
1.9	Discuss permanent installation of radiographic equipment in terms of purpose, components, types and applications.	Cognitive	Comprehension
1.10	Describe the operation and applications for different types of beam-limiting devices.	Cognitive	Knowledge
1.11	Explain the impact beam filtration has on x-ray beam intensity, beam quality and resultant patient exposure.	Cognitive	Comprehension
1.12	Describe the change in the half value layer (HVL) when filtration is added or removed in the beam.	Cognitive	Comprehension
1.13	Describe functions of components of automatic exposure control (AEC) devices.	Cognitive	Comprehension
1.14	Demonstrate proper use of AEC devices, to include radiation detectors, back-up timer and density adjustment (e.g. +1 or -1).	Cognitive	Guided Response
1.15	Identify the components of diagnostic x-ray tubes.	Cognitive	Knowledge
1.16	Explain protocols used to extend x-ray tube life.	Cognitive	Comprehension

<b>2. Equipment Quality Control, Quality Management, and Maintenance</b>			
	<b>Description</b>	<b>Learning Domain</b>	<b>Level of Learning</b>
2.1	Differentiate between quality improvement/management, quality assurance and quality control.	Cognitive	Analysis
2.2	List the benefits of a quality management program to the patient and to the department.	Cognitive	Knowledge
2.3	List elements of a quality management program and discuss how each is related to the quality management program.	Cognitive	Knowledge
2.4	Discuss the proper test equipment/procedures for evaluating the operation of an x-ray generator.	Cognitive	Comprehension
2.5	Evaluate the results of basic QC tests, to include mAs reciprocity, mA linearity, timer accuracy, light field to radiation field alignment, collimator accuracy, central ray alignment and monitor calibration.	Cognitive	Evaluation
2.6	Discuss quality control of digital imaging receptor systems, to include artifacts, maintenance, and display monitor quality assurance.	Cognitive	Comprehension
2.7	Discuss quality control of lead apron and glove testing.	Cognitive	Comprehension

<b>3. Fluoroscopy (Image Intensified Conventional and Digital Fluoroscopy)</b>			
	<b>Description</b>	<b>Learning Domain</b>	<b>Level of Learning</b>
3.1	Explain the use of standardized radiographic technique charts.	Cognitive	Comprehension
3.2	Identify components of the fluoroscopic unit (fixed and mobile), to include image intensifier, viewing systems, automatic brightness control and magnification mode.	Cognitive	Knowledge
3.3	Explain conventional image-intensified and digital fluoroscopic image formation.	Cognitive	Comprehension
3.4	Discuss gain and conversion factors as they relate to image	Cognitive	Comprehension

	intensification.		
3.5	Discuss automatic brightness control (ABC), image intensifier positioning, magnification mode, kerma display and last image hold.	Cognitive	Comprehension
3.6	Explain brightness gain (product of flux gain and minification gain), multiframe intensifiers, and magnification	Cognitive	Comprehension
3.7	Identify fluoroscopic recording equipment.	Cognitive	Comprehension
<b>4. Mobile Radiography</b>			
	<b>Description</b>	<b>Learning Domain</b>	<b>Level of Learning</b>
4.1	Discuss mobile units in terms of purpose, components, types and applications.	Cognitive	Comprehension

**GENERAL EDUCATION CORE COMPETENCIES:** STC has identified the following general education core competencies that graduates will attain:

- a. The ability to utilize standard written English.
- b. The ability to solve practical mathematical problems.
- c. The ability to read, analyze, and interpret information.

**STUDENT REQUIREMENTS:**

**Prior to the discussion of each chapter in class, the student is expected to complete the following:**

1. Read the assigned chapter.
2. Know the answers to the review questions at the end of each chapter.
3. Know the definitions of the key terms listed at the beginning of each chapter.
4. Complete all activities for assigned chapter.

Completed worksheets and any laboratory performed will be due the day of the corresponding chapter test is given. Worksheets are to assist in reviewing course materials and students are expected to perform any additional preparation for tests on their own. No study guides will be given and no grades will be dropped in this course. Cellphones should not be used during the class for any reason and students found utilizing their cellphone during the class period will automatically receive a zero on the following test.

**TESTING POLICY:** Prior to beginning any exam, all students are required to place all textbooks and personal property underneath the whiteboard in the front of the classroom. No talking is allowed once the exam begins. Once a student completes his/her exam, he/she will turn the exam paper over and remain at his/her desk quietly until everyone has finished with the exam. This will prevent other students from being distracted as students exit. Then, the instructor will take up all exam papers. Students found with their cell phone or any other personal communication device during the exam will be considered cheating and given a zero for the exam.

**FINAL EXAM:** A comprehensive final exam will be given to students at the end of the course to evaluate student learning of course competencies. The comprehensive final exam will be 100 questions.

**Laboratory Activities:**

All students will be required to adhere to the program Laboratory Policy while performing laboratory activities during RADT 1085. Students are required to purchase a radiation dosimeter on the first day of classes. Students must wear their dosimeters while performing laboratory activities requiring an exposure. Any student who does not have their dosimeter on the day laboratory activities are scheduled will forfeit the laboratory activity and receive a grade of 0 for the laboratory.

## **RADIOLOGIC TECHNOLOGY LABORATORY POLICY**

- 1) Laboratory use is restricted to only those students enrolled in the program of Radiologic Technology.
- 2) Laboratory use is restricted to educational assignments only.
- 3) All laboratory experiences will be conducted under direct supervision by program faculty/a qualified radiographer.
- 4) All students must wear radiation monitoring devices during all laboratory assignments requiring an exposure.
- 5) All persons must go into the control area during a radiographic exposure.
- 6) Laboratory doors must be closed during exposures.
- 7) Only phantoms or non-living objects may be used as subjects when performing an experiment or practice examination.
- 8) Care must be taken in the handling of phantoms. They are heavy and very expensive.
- 9) Care must be taken in the handling of all other equipment and supplies.
- 10) All items must be returned to their designated place in the laboratory after use.
- 11) Students are responsible for the proper use of the processor.
  - a. Chemicals used in the darkroom will adhere to the following guidelines:
    - I. All chemicals used by the Radiologic Technology program students will be stored in marked containers and labeled accordingly.
    - II. All chemicals will be used and/or disposed of under conditions as recommended by the manufacturer.
    - III. Material Safety Data Sheets (MSDS) will be maintained on all chemicals.
- 12) Student radiographs must either be submitted to the appropriate faculty member or placed in the reject film container.
- 13) The laboratory must be kept neat and clean. Students are responsible for maintaining the laboratory when performing experiments or practice procedures.
  - a. Cassettes shall be refilled and returned to the cassette credenza in the control area.
  - b. The film bin shall be kept full and organized.
  - c. Trash shall be discarded of in an appropriate trash container.
  - d. Safelights and overhead lights shall be turned off or unplugged when leaving the lab.
- 14) After use of the table and upright bucky will be cleaned with antiseptic solution.
- 15) Any non-functioning equipment must be reported to a faculty member as soon as possible.

\* These rules apply to all radiographic rooms that are used for any lab assignments. \*

**CELLPHONE POLICY:** Cell phones are not to be utilized in the classroom or laboratory unless being used as an academic tool during classroom activities that are approved by the instructor. Students utilizing their cellphone for non-academic purposes during class or laboratory (texting, talking on or, emailing, etc.), will receive a zero on their next chapter test grade. In the event of an emergency, such as a sick family member or sick child, calls should be directed to the front desk at 912-538-3117 where a message can be left.

**ATTENDANCE GUIDELINES:** Class attendance is a very important aspect of a student's success. Being absent from class prevents students from receiving the full benefit of a course and interrupts the learning process. Southeastern Technical College considers both tardiness and leaving early as types of

absenteeism. Responsibility for class attendance rests with the student. Regular and punctual attendance at all scheduled classes is required for student success. Students will be expected to complete all work required by the instructor as described in the individual course syllabus.

Instructors have the right to give unannounced quizzes/assignments. Students who miss an unannounced quiz or assignment will receive a grade of 0. Students who stop attending class, but do not formally withdraw, may receive a grade of F and face financial aid repercussions in upcoming semesters.

Instructors are responsible for determining whether missed work may be made up and the content and dates for makeup work is at the discretion of the instructor.

Students will not be withdrawn by an instructor for attendance; however, all instructors will keep records of graded assignments and student participation in course activities. The completion dates of these activities will be used to determine a student's last date of attendance in the event a student withdraws, stops attending, or receives an F in a course.

## **ADDITIONAL ATTENDANCE PROVISIONS**

### ***Health Sciences***

Requirements for instructional hours within Health Science programs reflect the rules of respective licensure boards and/or accrediting agencies. Therefore, these programs have stringent attendance policies. Each program's attendance policy is published in the program's handbook and/or syllabus which specify the number of allowable absences. All provisions for required make-up work in the classroom or clinical experiences are at the discretion of the instructor.

Attendance is counted from the first scheduled class meeting of each semester. To receive credit for a course a student must attend at least 90% of the scheduled instructional time. Time and/or work missed due to tardiness or absences must be made up at the convenience of the instructor. Any student attending less than the required scheduled instructional time (90%) may be dropped from the course as stated below in the Withdrawal Procedure.

Tardy means arriving after the scheduled time for instruction to begin. Early departure means leaving before the end of the scheduled time. Three (3) tardies or early departures equal one (1) absence for the course. A tardy will be issued if a student has missed less than 20% of instructional class time. An automatic absence will be issued if the student misses greater than 20% of instructional class time. This averages out to 10 minutes per hour. For example, a class that meets from 9:00-11:30 will be considered absent if he/she is not in class by 9:30.

The didactic portion of the class will meet for 60 hours. A student can miss a maximum of 6 hours. Students missing more than 6 hours (1.5 class meetings) will be dropped for exceeding the attendance policy.

**SPECIAL NEEDS:** Students with disabilities who believe that they may need accommodations in this class based on the impact of a disability are encouraged to contact Helen Thomas, 912-538-3126, [hthomas@southeasterntech.edu](mailto:hthomas@southeasterntech.edu), to coordinate reasonable accommodations.

**SPECIFIC ABSENCES:** Provisions for Instructional Time missed because of documented absences due to

jury duty, military duty, court duty, or required job training will be made at the discretion of the instructor.

**PREGNANCY:** Southeastern Technical College does not discriminate on the basis of pregnancy. However, we can offer accommodations to students who are pregnant that need special consideration to successfully complete the course. If you think you will need accommodations due to pregnancy, please advise me and make appropriate arrangements with Helen Thomas, (912) 538-3126, [hthomas@southeasterntech.edu](mailto:hthomas@southeasterntech.edu).

**WITHDRAWAL PROCEDURE:** Students wishing to officially withdraw from a course(s) or all courses after the drop/add period and prior to the 65% portion of the semester (date will be posted on the school calendar) must speak with a Career Counselor in Student Affairs and complete a Student Withdrawal Form. A grade of "W" is assigned when the student completes the withdrawal form from the course.

Students who are dropped from courses due to attendance (see your course syllabus for attendance policy) after drop/add until the 65% point of the semester will receive a "W" for the course. Abandoning a course(s) instead of following official withdrawal procedures may result in a grade of 'F' being assigned.

After the 65% portion of the semester, the student will receive a grade for the course. (Please note: A zero will be given for all missed assignments.)

There is no refund for partial reduction of hours. Withdrawals may affect students' eligibility for financial aid for the current semester and in the future, so a student must also speak with a representative of the Financial Aid Office to determine any financial penalties that may be assessed due to the withdrawal. All grades, including grades of 'W', will count in attempted hour calculations for the purpose of Financial Aid.

**Remember** - Informing your instructor that you will not return to his/her course does not satisfy the approved withdrawal procedure outlined above.

**MAKEUP GUIDELINES (Tests, quizzes, homework, projects, laboratory, etc....):** A grade of zero will be assigned for any missed assignment regardless of the reason.

**ACADEMIC DISHONESTY POLICY:** The STC Academic Dishonesty Policy states *All forms of academic dishonesty, including but not limited to cheating on tests, plagiarism, collusion, and falsification of information, will call for discipline.* The policy can also be found in the *STC Catalog and Student Handbook*.

#### **Procedure for Academic Misconduct**

The procedure for dealing with academic misconduct and dishonesty is as follows:

##### **--First Offense--**

Student will be assigned a grade of "0" for the test or assignment. Instructor keeps a record in course/program files and notes as first offense. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus. The Registrar will input the incident into Banner for tracking purposes.

##### **--Second Offense--**

Student is given a grade of "WF" for the course in which offense occurs. The instructor will notify the

student's program advisor, academic dean, and the Registrar at the student's home campus indicating a "WF" has been issued as a result of second offense. The Registrar will input the incident into Banner for tracking purposes.

**--Third Offense--**

Student is given a grade of "WF" for the course in which the offense occurs. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus indicating a "WF" has been issued as a result of second offense. The Vice President for Student Affairs, or designee, will notify the student of suspension from college for a specified period of time. The Registrar will input the incident into Banner for tracking purposes.

**STATEMENT OF NON-DISCRIMINATION:** Southeastern Technical College does not discriminate on the basis of race, color, creed, national or ethnic origin, gender, religion, disability, age, disabled veteran, veteran of Vietnam Era or citizenship status, (except in those special circumstances permitted or mandated by law). This school is in compliance with Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, or national origin; with the provisions of Title IX of the Educational Amendments of 1972, which prohibits discrimination on the basis of gender; with the provisions of Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination on the basis of handicap; and with the American with Disabilities Act (ADA).

**GRIEVANCE PROCEDURES:** Grievance procedures can be found in the Catalog and Handbook located on STC's website.

**ACCESS TO TECHNOLOGY:** Students can now access Blackboard, Remote Lab Access, Student Email, Library Databases (Galileo), and BannerWeb via the mySTC portal or by clicking the Current Students link on the STC website at [www.southeasterntech.edu](http://www.southeasterntech.edu).

**GRADING POLICY**

Tests	total points 350
Worksheets	total points 75
Laboratory	total points 75
<u>Final Exam</u>	<u>total points 100</u>
Total points possible 600	

**GRADING SCALE**

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

**TCSG GUARANTEE/WARRANTY STATEMENT:** *The Technical College System of Georgia guarantees employers that graduates of State Technical Colleges shall possess skills and knowledge as prescribed by State Curriculum Standards. Should any graduate employee within two years of graduation be deemed lacking in said skills, that student shall be retrained in any State Technical College at no charge for instructional costs to either the student or the employer.*

**RADT 1085 – Radiographic Equipment  
SPRING SEMESTER 2017 LESSON PLAN**

<b>Date</b>	<b>Chap / Less</b>	<b>Content</b>	<b>Assignments &amp; Tests Due</b>	<b>Comp Area</b>
<b>Week 1</b>				
Jan 9		Review Syllabus, classroom policies, etc.	Read Electromagnetic Energy & Electricity, magnetism, and Electromagnetism – Chapters 3 & 4	1/a,b,c
		Lecture - Electricity, magnetism, and Electromagnetism		1/a,b,c
Jan 16		MLK – Holiday – No Class		
<b>Week 2</b>				
Jan 23		<b>Test</b> – Electromagnetic Energy & Electricity, magnetism, and Electromagnetism – Chapter	Read The X-ray Imaging System - Chapter 5 & Mobile Radiography (Handout)	1/a,b,c
		Lecture chapter - The X-Ray Imaging System & Mobile Radiography	Laboratory	4/a,b,c
<b>Week 3</b>				
Jan 30		<b>Test</b> – The X-Ray Imaging System & Mobile Radiography	Read The X-Ray Tube - Chapter 6	1,4/a,b,c
		Lecture - The X-Ray Tube		1/a,b,c
<b>Week 4</b>				
Feb 6		<b>Test</b> – The X-Ray Tube	Read X-Ray Production – Chapter 7	1/a,b,c
		Lecture – X-ray Production		1/a,b,c
<b>Week 5</b>				
Feb 13		<b>Test</b> – X-ray Production	Read Emission – Chapter 8	1/a,b,c
		Lecture – X-Ray Emission		1/a,b,c
<b>Week 6</b>				
Feb 20		<b>Test</b> – X-Ray Emission	Read X-Ray interactions with Matter – Chapter 9	1/a,b,c
		Lecture – X-Ray interactions with Matter		1/a,b,c
<b>Week 7</b>				
Feb 27		<b>Test</b> – X-Ray interactions with Matter	Read Radiographic Image Quality – Chapter 10	1/a,b,c
		Lecture – Radiographic Image Quality	Laboratory	2/a,b,c
<b>Week 8</b>				
Mar 6		<b>Test</b> – Radiographic Image Quality	Read Scatter Radiation – Chapter 11	2/a,b,c



		Lecture – Scatter Radiation	Laboratory	2/a,b,c
<b>Week 9</b>				
Mar 13		<b>Test</b> – Scatter Radiation	Read Medical Imaging Computer Science – Chapter 14	2/a,b,c
		Lecture – Medical Imaging Computer Science		1/a,b,c
<b>Week 10</b>				
Mar 20		<b>Test</b> - Medical Imaging Computer Science	Read Computed Radiography – Chapter 15	1/a,b,c
		Lecture – Computed Radiography	Laboratory	1/a,b,c
<b>Week 11</b>				
Mar 27		<b>Test</b> - Computed Radiography	Read Digital Radiography – Chapter 16	1/a,b,c
		Lecture – Digital Radiography		1/a,b,c
<b>Week 12</b>				
Apr 3		<b>Test</b> – Digital Radiography	Read Digital Radiographic Artifacts & Digital Radiographic Quality Control – Chapter 21 & 22	1/a,b,c
		Lecture – Digital Radiographic Artifacts & Digital Radiographic Quality Control	Laboratory	2/a,b,c
<b>Week 13</b>				
Apr 10		<b>Test</b> – Digital Radiographic Artifacts & Digital Radiographic Quality Control	Read Fluoroscopy – Chapter 25	2/a,b,c
		Lecture - Fluoroscopy		1,3/a,b,c
<b>Week 14</b>				
Apr 17		<b>Test</b> - Fluoroscopy	Read Digital Fluoroscopy – Chapter 26	1,3/a,b,c
		Lecture – Digital Fluoroscopy		1,3/a,b,c
<b>Week 15</b>				
Apr 24		<b>Test</b> – Digital Fluoroscopy	Review all Chapters for Final Exam – Chapters 3,4,5,6,7,8,9,10,11,14,15,16,21,22,25,26	1,3/a,b,c
Apr 26		<b>Final Exam – 8:00 AM</b>		1,2,3,4/a,b,c

**General Education Competencies**

- a. The ability to utilize standard written English.
- b. The ability to solve practical mathematical problems.
- c. The ability to read, analyze, and interpret information.

**MAJOR COURSE COMPETENCIES:**

- 1. Radiographic Imaging Equipment Operation
- 2. Equipment Quality Control, Quality Management, and Maintenance
- 3. Fluoroscopy (Image Intensified Conventional and Digital Fluoroscopy)
- 4. Mobile Radiography

**Southeastern Technical College**  
**Radiologic Technology Degree Program**

I \_\_\_\_\_ have read and understand the syllabus for RADT 1085. I have also been given the opportunity to ask questions to clarify any requirements listed on the syllabi. By signing this agreement I am acknowledging that I fully understand my requirements and grading criteria that I am responsible for. I agree to follow the guidelines and rules listed on the syllabi.

\_\_\_\_\_  
Print Name

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

\_\_\_\_\_  
Date