



**RADT 1075 Radiographic Imaging**  
**COURSE SYLLABUS**  
**Fall Semester 2017**

**COURSE INFORMATION**

Credit Hours/Minutes: 4 / 3750  
Class Location: 743  
Class Meets: Monday & Tuesday 8:00am-12:00pm  
CRN: 20402

**INSTRUCTOR CONTACT INFORMATION**

Instructor Name: Tara W. Powell, M.B.A., R.T. (R) (M) (CT), RDMS  
Office Location: 714  
Office Hours: Mondays & Wednesdays 1:00 pm – 5 pm by appointment  
Email Address: [tpowell@southeasterntech.edu](mailto:tpowell@southeasterntech.edu)  
Phone: 912-538-3152  
Fax Number: 912-538-3106  
Tutoring Hours: by appointment

**REQUIRED TEXT**

Fauber, T. (2017). *Radiographic Imaging & Exposure*, 5<sup>th</sup> edition. St. Louis, MO: Elsevier  
ISBN: 978-0-323-35624-4

**REQUIRED SUPPLIES & SOFTWARE**

Pen, pencil, highlighter, notebook, paper

**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. Principles of Imaging and Image Quality
2. Criteria for Image Evaluation
3. Image Acquisition and Processing (Analog and Digital)
4. Exposure Indicator Determination

## 5. Analog vs. Digital Imaging Systems

### PREREQUISITE(S)

Program Admission

### COREQUISITE(S)

None

### COURSE OUTLINE

#### 1.0 Principles of Imaging and Image Quality

	Description	Learning Domain	Level of Learning
1.1	Discuss practical considerations in setting standards for acceptable image quality.	Cognitive	Comprehension
1.2	Describe film screen characteristics of density, contrast, recorded detail and distortion.	Cognitive	Comprehension
1.3	Identify and analyze the relationships of factors that control and affect radiographic density.	Cognitive	Knowledge
1.4	Identify and analyze the relationship of factors that control and affect radiographic contrast.	Cognitive	Analysis
1.5	Identify and analyze the relationships of factors that control and affect recorded detail and visibility of detail.	Cognitive	Analysis
1.6	Identify and analyze the relationship of factors that control and affect distortion.	Cognitive	Analysis
1.7	Differentiate between size and shape distortion.	Cognitive	Analysis
1.8	Perform calculations to determine image magnification and percent magnification.	Psychomotor	Guided Response
1.9	Summarize the relationship of factors affecting exposure latitude and film latitude.	Cognitive	Comprehension
1.10	Apply conversion factors for changes in the following areas: distance (inverse square law), grid, image receptor speed class, mAs reciprocity, density maintenance and the 15 percent rule.	Cognitive	Application
1.11	Describe the basic principles of digital radiography and the terminology associated with digital imaging systems.	Cognitive	Comprehension
1.12	Define digital imaging characteristics of receptor exposure, contrast, spatial resolution and distortion.	Cognitive	Knowledge
1.13	Describe digital imaging characteristics related to spatial resolution to include pixel size, matrix size, bit depth, contrast resolution, sampling frequency, and DEL size.	Cognitive	Comprehension
1.14	Describe digital imaging characteristics related to image signal, to include dynamic range, quantum mottle (noise), signal-to-noise ratio and contrast-to-noise ratio.	Cognitive	Comprehension

1.15	Define window level and window width and how they translate into displayed image brightness and gray scale.	Cognitive	Knowledge
1.16	Define scattered/secondary radiation and the effects of scattered radiation on the image.	Cognitive	Knowledge
1.17	Identify and compare grid types and identify the most appropriate grid for a given clinical situation.	Cognitive	Knowledge
1.18	Interpret grid efficiency in terms of grid ratio and frequency.	Cognitive	Evaluation
1.19	Compare short dimension vs. long dimension grids.	Cognitive	Analysis
1.20	Define grid cut off, summarize factors affecting grid cut off, and describe the various grid artifacts.	Cognitive	Knowledge

## 2.0 Criteria for Image Evaluation

	Description	Learning Domain	Level of Learning
2.1	Identify the criteria for image evaluation.	Cognitive	Knowledge
2.2	Apply problem-solving process for evaluating images for adequate density/brightness, contrast, recorded detail/spatial resolution and acceptable limits of distortion.	Cognitive	Application
2.3	Identify factors relating to image identification and documentation of ordered exam(s).	Cognitive	Knowledge
2.4	Evaluate images to determine the appropriate use of beam restriction.	Cognitive	Evaluation
2.5	Identify common equipment malfunctions that affect image quality, and corrective action.	Cognitive	Knowledge
2.6	Differentiate between technical factor problems, procedural factor problems and equipment malfunctions.	Cognitive	Analysis
2.7	Identify causes of film screen image fog (film age, chemical, radiation, temperature safelight)	Cognitive	Knowledge
2.8	Critique images for appropriate technical, procedural and pathologic factors, and employ corrective actions if necessary.	Cognitive	Evaluation

## 3.0 Image Acquisition and Processing (Analog and Digital)

	Description	Learning Domain	Level of Learning
3.1	Explain film-screen latent image formation.	Cognitive	Comprehension
3.2	Describe film-screen processing and film storage.	Cognitive	Knowledge
3.3	Discuss the steps of the processing cycle (develop, fix, wash, dry) and effects on image quality.	Cognitive	Comprehension
3.4	Identify the purpose of a daily quality control program for processors.	Cognitive	Knowledge
3.5	Identify types and causes of film screen image artifacts.	Cognitive	Knowledge
3.6	Describe the various types of digital receptors (Computed Radiography and Digital Radiography, including direct digital and indirect digital capture)	Cognitive	Knowledge

3.7	Discuss the fundamentals of digital radiography, distinguishing between cassette-based systems and cassette-less systems.	Cognitive	Comprehension
3.8	Compare the image acquisition and extraction of cassette-based vs. cassette-less systems, including detector mechanism, initial image processing, histogram analysis, automatic rescaling, look up tables and exposure index determination.	Cognitive	Synthesis
3.9	Compare detector properties and evaluation criteria such as DQE (detective quantum efficiency), exposure index, and spatial resolution.	Cognitive	Synthesis
3.10	Describe digital receptors, to include: Amorphous selenium/Thin film transistor (TFT) arrays, Cesium iodide/amorphous silicon thin film transistor (TFT) arrays, Charged coupled device (CCD) and complementary metal oxide semiconductor (CMOS) systems and Photostimulable phosphor (PSP) plates.	Cognitive	Knowledge
3.11	Compare the advantages and limits of each digital system.	Cognitive	Analysis
3.12	Describe the response of digital detectors to exposure variations.	Cognitive	Knowledge
3.13	Compare dynamic range to latitude of a screen/film receptor system to that of a digital radiography system.	Cognitive	Analysis
3.14	Describe the response of PSP systems to background and scatter radiation.	Cognitive	Knowledge
3.15	Identify grid use errors associated with grid cut off and Moire' effect.	Cognitive	Knowledge
3.16	Identify common limitations and technical problems encountered when using PSP systems.	Cognitive	Knowledge
3.17	Employ appropriate beam/part/receptor alignment to avoid histogram analysis errors.	Cognitive	Knowledge
3.18	Describe the selection of technical factors and technical factor systems to assure appropriate receptor exposure levels for digital detectors.	Cognitive	Knowledge
3.19	Describe the conditions that cause quantum mottle in a digital image.	Cognitive	Knowledge
3.20	Formulate a procedure or process to minimize histogram analysis and rescaling errors.	Cognitive	Application
3.21	Describe the histogram and the process of histogram analysis as it relates to automatic rescaling and determining an exposure indicator.	Cognitive	Knowledge
3.22	Relate the receptor exposure indicator values to technical factors, system calibration, part/beam/plate alignment and patient exposure.	Cognitive	Analysis

#### 4.0 Exposure Indicator Determination

	Description	Learning Domain	Level of Learning
4.1	Describe the difference between dose area product (DAP) measured with a flat panel system vs. the vendor specific exposure indicators for a PSP-based system.	Cognitive	Knowledge
4.2	Identify optimal value ranges for exposure indicators and relationship to patient exposure.	Cognitive	Knowledge
4.3	Describe the exposure precautions and limitations associated with PSP-based systems.	Cognitive	Knowledge
4.4	Examine the potential impact of digital radiographic systems on patient exposure and methods of practicing the as low as reasonably achievable (ALARA) concept with digital systems.	Cognitive	Synthesis

#### 5.0 Analog vs. Digital Imaging Systems

	Description	Learning Domain	Level of Learning
5.1	Describe the components of Picture Archival and Communications System (PACS) and its function.	Cognitive	Knowledge
5.2	Identify modality types that may be incorporated into a PACS.	Cognitive	Knowledge
5.3	Describe the components of the PACS, RIS, HIS, and the DICOM standard.	Cognitive	Knowledge
5.4	Describe data flow for a DICOM image from an imaging modality to a PACS.	Cognitive	Knowledge
5.5	Identify common problems associated with retrieving/viewing images within a PACS.	Cognitive	Knowledge
5.6	Identify the primary uses of the diagnostic display workstation and clinical display workstation.	Cognitive	Knowledge
5.7	Describe patient benefits gained through the use of teleradiology.	Cognitive	Knowledge
5.8	Describe HIPAA concerns with electronic information.	Cognitive	Knowledge
5.9	Discuss and define digital image processing, to include equalization, smoothing, electronic masking, edge enhancement, and grayscale (bit depth, look up table (LUT)).	Cognitive	Comprehension

#### GENERAL EDUCATION CORE COMPETENCIES

STC has identified the following general education core competencies that graduates will attain:

1. The ability to utilize standard written English.
2. The ability to solve practical mathematical problems.
3. The ability to read, analyze, and interpret information.

## STUDENT REQUIREMENTS

Students are required to abide by all of the policies, rules, and regulations of Southeastern Technical College, as published in the *STC Online Catalog and Handbook*. STC Catalog and Student Handbook Related Policies and Procedures are found online at: <http://www.southeasterntech.edu>

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.

Classroom activities will be performed 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.

## EXAMS

**NO GRADES WILL BE DROPPED. No study guides or test reviews will be given due to time constraints on the amount of material being introduced.** In addition, quizzes are subject to be given on any given day over any assigned material (i.e. reading, workbooks, etc.). Any quizzes missed due to student absence will not be made up.

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. Students are to rotate seats prior to testing. 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 final exam will be given to students and will be a 50-question comprehensive exam.

## MAKEUP POLICY

A grade of zero will be assigned for any missed assignment regardless of the reason. No quizzes or homework will be made up. No late homework assignments will be accepted. Additionally, there is no makeup for any missed laboratories performed in this course.

*\*\*Extenuating circumstances are unforeseen accidents, deaths in the immediate family or personal illness which requires you to be absent from class or clinical. Vacations, weddings, doctor appointments, studying for an exam, child care issues, job interviews and working at your job are not considered extenuating circumstances as these are not unforeseen events. \*\**

*Students are responsible for policies and procedures in student catalog/handbook and Departmental Policies and Procedures. [This could also include safety, academic dishonesty, etc.]*

## **CELL PHONE 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 also 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 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 75 hours. A student is allowed to miss a maximum of 7.5 hours. Students missing more than 7.5 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.

### **Southeastern Technical College does not have an Attendance Appeal Policy.**

Reference: <http://www.southeasterntech.edu/pdf/CodeofConduct.pdf>

### **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.

In this course, which meets 2 days a week for 7 weeks, the maximum number of days a student may miss are 2 days during the semester.

### **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:

#### **1. 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.

#### **2. 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.

#### **3. 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 third 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**

The Technical College System of Georgia and its constituent Technical Colleges do not discriminate on the basis of race, color, creed, national or ethnic origin, sex, religion, disability, age, political affiliation or belief, genetic information, disabled veteran, veteran of the Vietnam Era, spouse of military member 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).

The following individuals have been designated to handle inquiries regarding the nondiscrimination policies:

<b>ADA/Section 504 - Equity- Title IX (Students) - OCR Compliance Officer</b>	<b>Title VI - Title IX (Employees) - EEOC Officer</b>
Helen Thomas, Special Needs Specialist Vidalia Campus 3001 East 1 <sup>st</sup> Street, Vidalia Office 108 Phone: 912-538-3126 <a href="mailto:hthomas@southeasterntech.edu">hthomas@southeasterntech.edu</a>	Blythe Wilcox, Director of Human Resources Vidalia Campus 3001 East 1 <sup>st</sup> Street, Vidalia Office 138B Phone: 912-538-3147 <a href="mailto:bwilcox@southeasterntech.edu">bwilcox@southeasterntech.edu</a>

## 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](#).

## 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.*

## GRADING POLICY

Assessment/Assignment	Total Points
Tests	175
Worksheets	60
Laboratory	15
Final Exam	50
Total Points Possible	300

## GRADING SCALE

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

## RADT 1075 Radiographic Imaging

### Fall Semester 2017 Lesson Plan

Date/Week	Chapter/Lesson	Content	Assignments & Tests Due Dates	Competency Area
<b>Week 1</b> Aug 14		Syllabus, Sign & Send of Policies/Procedures Purchase Dosimeter		
Aug 15	Chap 1 & 2	Lecture/Review – Radiation and It’s Discovery & The X-ray Beam	Read Chapter 1 & 2 Laboratory	3
<b>Week 2</b> Aug 21	Chap 3	<b>Test - Radiation and It’s Discovery &amp; X-Ray Beam</b> Test review & begin Chapter 3	Chapter 2 Worksheet & Laboratory Due Read chapter 3	3
Aug 22	Chap 3	Lecture/Lab - Image Formation & Radiographic Quality	Laboratory Chapter 3 – Image Formation & Radiographic Quality	3
<b>Week 3</b> Aug 28	Chap 4	<b>Test - Image Formation &amp; Radiographic Quality</b> Test review & begin Chapter 4	Chapter 3 Laboratory Due Read Chapter 4	2
Aug 29	Chap 4	Lecture – Digital Imaging	Laboratory / Worksheet	2
<b>Week 4</b> Sept 4		<b>Labor Day – No Class</b>		
Sept 5	Chap 6	<b>Test – Digital Imaging</b> Test review & begin Chapter 6	Chapter 4 Laboratory & Worksheet Due Read Chapter 6	1,2, 3
<b>Week 5</b> Sept 11	Chap 6	Lecture/lab – Exposure Technique Factors	Laboratory & Worksheet	1
Sept 12	Chap 7	<b>Test – Exposure Technique Factors</b> Test review & begin Chapter 7	Chapter 6 Laboratory & Worksheet Due Read Chapter 7	1
<b>Week 6</b> Sept 18	Chap 7	Lecture/lab – Scatter Control	Laboratory & Worksheet	4,5

Date/Week	Chapter/Lesson	Content	Assignments & Tests Due Dates	Competency Area
Sept 19	Chap 8	<b>Test – Scatter Control</b> Test review & begin Chapter 8	Chapter 7 Laboratory & Worksheet Due Read Chapter 8	4,5
<b>Week 7</b> Sept 25	Chap 8	Lecture/lab – Exposure Technique Selection	Laboratory Chapter 8 – Exposure Technique Selection 8	4,5
Sept 26	Chap 9	<b>Test – Exposure Technique Selection</b> Test review & Chapter 8 Exposure Technique Selection - Lecture	Chapter 8 Laboratory Due Read Chapter 9 Worksheets Chapter 9	4,5
<b>Week 8</b> Oct 2	Chap 9	Lecture/lab – Image Evaluation	Laboratory Chapter 8 & 9	2,3
Oct 3	Chap 9	<b>Test - Image Evaluation</b> Test review	Chapter 9 Laboratory & Worksheets Due Study for Final Exam	2,3
Oct. 9	Chap 1,2,3,4,6,7,8,9	<b>Final Exam</b>		1,2,3,4,5

### Competency Areas: Radiographic Imaging

1. Principles of Imaging and Image Quality
2. Criteria for Image Evaluation
3. Image Acquisition and Processing (Analog and Digital)
4. Exposure Indicator Determination
5. Analog vs. Digital Imaging Systems

### General Core Educational 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.



## **RADT 1075 Radiographic Imaging Syllabus Acknowledgement**

I \_\_\_\_\_ have read and understand the syllabus for RADT 1075. 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