

South Plains College-Reese Campus  
Course Syllabus

COURSE: **RADR 2305.200 (3:3:0), Principles of Radiographic Imaging II**

SEMESTER: **Spring 2015**

CLASS TIMES: **MW, 09:30-10:45**

INSTRUCTOR: **Stacy Randel**

OFFICE: **RC 512B**

OFFICE HOURS: **MTWR: 01:00 – 03:00; By appointment**

OFFICE PHONE: **806-716-4628**

E-MAIL: [srandel@southplainscollege.edu](mailto:srandel@southplainscollege.edu)

Facebook: The radiologic technology program has a Facebook page at [www.facebook.com/spradiologictechnologyprogram](http://www.facebook.com/spradiologictechnologyprogram). In addition to the South Plains college websites, this Facebook page will be used to keep students up-to-date on program activities, weather delays, South Plains college announcements and will help with program recruitment. "Liking" the radiologic technology program's Facebook page is not mandatory, nor is a personal Facebook accounts in order to access this page.

BlackBoard: Blackboard is an e-education platform designed to enable educational innovations everywhere by connecting people and technology. This education tool will be used in this course throughout the semester.

*"South Plains College improves each student's life."*

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**GENERAL COURSE INFORMATION**

**COURSE DESCRIPTION**

This course focuses on radiographic imaging technique formulation. It also looks at equipment quality control, image quality assurance and the synthesis of all variables in image production.

**PURPOSE**

This course will enhance and expand the student's technical knowledge and ability to control the radiographic exposure and image.

**STUDENT LEARNING OUTCOMES**

The student will:

1. Have the technical ability to work in either film/screen imaging or digital imaging.
2. Select technical factors and accessory equipment that control and/or influence radiographic exposure and imaging.
3. Formulate techniques to optimize image quality, minimize patient exposure and preserve equipment.
4. Assess radiographic images for diagnostic quality.

## COURSE OBJECTIVES

The student will be able to:

1. Identify the primary technical factors controlling radiographic exposure, optical density, contrast and recorded detail.
2. Identify the characteristics that affect image quality.
3. Identify the radiographic image factors that make detail visible.
4. Identify the radiographic image factors that affect recorded detail.
5. Identify the imaging system components that affect radiographic technique selection.
6. Identify the imaging system components that affect radiographic image quality.
7. Assess a radiographic image for diagnostic optical density, contrast and recorded detail.
8. Identify and adjust appropriate factors to assure radiographic image quality.
9. Compare conventional film-screen imaging systems to digital imaging systems.
10. Compare computed radiography to digital radiography.

## EVALUATION METHODS

The course grade will be determined by a combination major exams and a comprehensive final exam. The following guidelines will be followed regarding exams:

- The student is expected to complete a major exam at the scheduled time. **Make-up exams will be subject to the instructor's digression.**
- A student arriving late for a major exam will not be allowed to take the exam if any student has completed the exam and left the classroom.
- All major exams must be completed within the designated class time.
- A comprehensive final exam will be given during the time designated by South Plains College.

## ACADEMIC INTEGRITY

It is the aim of the faculty of South Plains College to foster a spirit of complete honesty and a high standard of integrity. The attempt of any student to present as his or her own any work which he or she has not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offender liable to serious consequences, possibly suspension.

**Cheating** - Dishonesty of any kind on examinations or on written assignments, illegal possession of examinations, the use of unauthorized notes during an examination, obtaining information during an examination from the textbook or from the examination paper of another student, assisting others to cheat, alteration of grade records, illegal entry or unauthorized presence in the office are examples of cheating. Complete honesty is required of the student in the presentation of any and all phases of coursework. This applies to quizzes of whatever length, as well as final examinations, to daily reports and to term papers.

**Plagiarism** - Offering the work of another as one's own, without proper acknowledgment, is plagiarism; therefore, any student who fails to give credit for quotations or essentially identical expression of material taken from books, encyclopedias, magazines and other reference works, or from themes, reports or other writings of a fellow student, is guilty of plagiarism.

## SCANS and FOUNDATION SKILLS

Scans and foundation skills are identified for specific course objectives. A complete list explaining these skills is attached to the back of the syllabus for your information.

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## SPECIFIC COURSE INFORMATION

### TEXT AND MATERIALS

Bushong, Stewart C. Radiologic Science for Technologists. 10<sup>th</sup> Edition. 2013. Elsevier/Mosby.

### ATTENDANCE POLICY

Class attendance is mandatory. Policies regarding absences coincide with those established for South Plains College as outlined in the SPC General Catalog.

It is important that the student take class attendance very serious, in order to make it possible to complete the course objectives. It is extremely important that students arrive for class on time. Tardiness disrupts the instructor and the other students. **Students that chronically arrive late for class will be counseled and if necessary dropped from the class, regardless of grade point average.**

### CLASS PARTICIPATION

Attending class regularly will provide the student opportunity to supplement their reading assignments and acquire a better understanding of the course material. Class time missed will result in information gaps and will increase course difficulty. It is the student's responsibility to attend class which will enable him or her to take notes, ask questions, and participate in class discussions. Recording class is permitted.

### ASSIGNMENT POLICY

The student is responsible for being prepared for class, which means reading the assigned chapters and/or pages from the textbook prior to class. In some instances, information from the reading assignments not covered during class may be included on an exam.

### REVIEW

Time is limited and the amount of information that must be covered during class is significantly large. Therefore, classroom time will not be used for extensive review. If a student needs assistance with reviewing information for a test, the student is encouraged to make an appointment with the instructor.

### COMMUNICATION POLICY

Electronic communication between instructor and students in this course will utilize the South Plains College email system. Instructor will not initiate communication using private email accounts. Students are encouraged to check SPC email on a regular basis.

## GRADING RUBRIC

Grades in this course will be determined using the following criteria:

Assessment Tool	Assessment Criteria	Percentage Score	Grade
<b>MAJOR EXAMS 50%</b>	✓ Exceptional unit content knowledge & understanding	91 – 100	A
	✓ Good unit content knowledge & understanding	83 – 90	B
	✓ Average unit content knowledge & understanding	75 – 82	C
	✓ Unacceptable unit content knowledge & understanding	0 – 74	F
<b>FINAL EXAM/FINAL PAPER 50%</b>	✓ Exceptional course content knowledge & understanding	91 – 100	A
	✓ Good course content knowledge & understanding	83 – 90	B
	✓ Average course content knowledge & understanding	75 – 82	C
	✓ Unacceptable unit content knowledge & understanding	0 – 74	F

### Course Weights:

Major Exams (5) - 45%

Final exam – 55%

<b>Course Grade:</b>	A	91 – 100
	B	83 – 90
	C	75 – 82
	F	0 – 74

**A grade average of C (75) must be maintained in all RAD TECH classes.** Failure to do so will result in the student being dropped from the Program.

## CLASS ASSIGNMENTS

### Major Exams – 45%

Four major exams will be given throughout the semester following each module presented. Exams will be multiple choice and done electronically in the computer lab

### Exam Final – 55%

A comprehensive final exam will be given at the end of the semester. Two hours will be allotted for an exam of approximately 100 multiple choice questions and will be done on paper in the classroom.

## STUDENT CONDUCT

Students in this class are expected to abide by the standards of student conduct as defined in the SPC Student Guide.

## CELL PHONES

Cell phones are to be turned OFF during scheduled class periods, unless prior approval has been given from the instructor. This includes text messaging. Cell phones are to be used outside the classroom only.

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## ACCOMMODATIONS

### DIVERSITY STATEMENT

In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

### DISABILITIES STATEMENT

#### ADA Statement

Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office through the Guidance and Counseling Centers at Reese Center (Building 8) [716-4606](tel:716-4606), or Levelland (Student Services Building) [716-2577](tel:716-2577).

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## COURSE OUTLINE

### FILM-SCREEN IMAGE RECEPTORS

The student will:

1. Identify and describe the components of radiographic film.
2. Explain *latent image* formation.
3. Identify and describe the characteristics that are considered when selecting a screen-film combination: *contrast, speed and, spectral matching*.
4. Explain the purpose and function of radiographic *intensifying screens*. (C19)
5. Differentiate between *luminescence, fluorescence* and *phosphorescence*. (F12)
6. Explain how screens can be categorized based on phosphor type, spectral emission and speed.
7. Identify the effect of *phosphor crystal size, layer thickness* and *concentration* on **screen speed** and **recorded detail**.
8. Identify and compare the *phosphors* used in radiographic intensifying screens. (F12)
9. Define *relative speed value* and explain its value to technical factor adjustment. (F3)

10. Identify the effect of *film-screen contact* on recorded detail.
11. Identify and explain the function of the each *automatic processing system*.(C15)
12. Identify and compare the *three alternate methods* of automatic processing and their value in radiographic imaging. (F12)
13. Explain the importance and methods of silver recovery. (C15)

Text Assignment: Bushong, Ch. 12

## **CONCEPTS OF RADIOGRAPHIC IMAGE QUALITY**

The student will:

1. Identify and explain the characteristics of radiographic image quality: spatial resolution, contrast resolution, noise and relate them to image receptor speed. (C15)
2. Identify and explain the interrelated factors affecting radiographic image quality that are divided into the categories of: *film, geometric* and *subject*. (C15)
3. Identify and explain the film factors that affect radiographic image quality: characteristic curve, optical density and film processing. (C15)
4. Identify and explain the toe, shoulder and straight-line portion of a characteristic curve. (C15)
5. Interpret the shape of a characteristic curve for: speed, optical densities, contrast and latitude. (C15)
6. Identify and explain the geometric factors that affect radiographic image quality: magnification, distortion, focal spot blur and anode heel effect. (C15)
7. Identify and explain the patient factors that affect the selection of a radiographic technique, the subject contrast and the quality of the completed radiographic image: patient size, shape and tissue composition. (C15)
8. Explain the effect of motion blur on radiographic image quality. (C15)
9. Explain and select the appropriate equipment and factors to produce high-quality radiographic images: patient positioning, the election of proper image receptors, and radiographic technique.

Text Assignment: Bushong, Ch. 10

## **SCREEN-FILM RADIOGRAPHIC TECHNIQUE**

The student will:

1. Identify and explain the radiographic prime exposure factors: kVp, mA, exposure time and SID. (F3,10,12)
2. Identify and explain the relation between milliamperage-seconds, kilovolt-peak, x-ray beam quality and quantity. (F10,12;C15,18,19)
3. Identify and explain the radiographic imaging system factors that affect radiographic technique: focal-spot size, filtration and high-voltage generation. (F10,12;C15,18,19)
4. Identify and explain the patient factors that affect radiographic technique: tissue thickness, composition and pathology. (F10,12;C15,18,19)
5. Identify and describe the image-quality factors that influence the radiographic image: optical density, contrast, detail and distortion. (F10,12;C15,18,19)
6. Identify the different exposure technique factor charts used to manipulate the exposure to produce a diagnostic radiographic image. (F10,12;C15,18,19)

Text Assignment: Bushong, Ch. 13, pp. 237 - 258

## DIGITAL RADIOGRAPHIC TECHNIQUE

The student will:

1. Compare the differences between *computed radiography (CR)* and *digital radiography (DR)*. (C15)
2. Identify the unique features that separate digital imaging from film/screen imaging.
3. Explain and distinguish between spatial resolution and spatial frequency. (F10)
4. Explain the relationship between modulation transfer function, spatial frequency and spatial resolution. (F12)
5. Compare the spatial resolution of digital imaging and film-screen imaging. (C15)
6. Explain and distinguish between spatial resolution and contrast resolution. (F12)
7. Identify and explain the relationship between contrast resolution and dynamic range. (F12)
8. Identify and explain the possibilities of data postprocessing options that affect the dynamic range and contrast resolution. (C-8)
9. Identify and explain the relationship between contrast resolution and signal-to-noise ratio (SNR). (F12)
10. Identify the features of a contrast-detail curve. (F10)
11. Identify the digital imaging factors that should reduce patient radiation doses. (C-18)

Textbook Assignment: Bushong, Ch. 17

### FOUNDATION SKILLS

#### **BASIC SKILLS—Reads, Writes, Performs Arithmetic and Mathematical Operations, Listens and Speaks**

F-1 Reading—locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.

F-2 Writing—communicates thoughts, ideas, information and messages in writing and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.

F-3 Arithmetic—performs basic computations; uses basic numerical concepts such as whole numbers, etc.

F-4 Mathematics—approaches practical problems by choosing appropriately from a variety of mathematical techniques.

F-5 Listening—receives, attends to, interprets, and responds to verbal messages and other cues.

F-6 Speaking—organizes ideas and communicates orally.

#### **THINKING SKILLS—Thinks Creatively, Makes Decisions, Solves Problems, Visualizes and Knows How to Learn and Reason**

F-7 Creative Thinking—generates new ideas.

F-8 Decision-Making—specifies goals and constraints, generates alternatives, considers risks, evaluates and chooses best alternative.

F-9 Problem Solving—recognizes problems, devises and implements plan of action.

F-10 Seeing Things in the Mind's Eye—organizes and processes symbols, pictures, graphs, objects, and other information.

F-11 Knowing How to Learn—uses efficient learning techniques to acquire and apply new knowledge and skills.

F-12 Reasoning—discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

#### **PERSONAL QUALITIES—Displays Responsibility, Self-Esteem, Sociability, Self-Management, Integrity and Honesty**

F-13 Responsibility—exerts a high level of effort and perseveres towards goal attainment.

F-14 Self-Esteem—believes in own self-worth and maintains a positive view of self.

F-15 Sociability—demonstrates understanding, friendliness, adaptability, empathy and politeness in group settings.

F-16 Self-Management—assesses self accurately, sets personal goals, monitors progress and exhibits self-control.

F-17 Integrity/Honesty—chooses ethical courses of action.

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## SCANS COMPETENCIES

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C-1 **TIME** - Selects goal - relevant activities, ranks them, allocates time, prepares and follows schedules.

C-2 **MONEY** - Uses or prepares budgets, makes forecasts, keeps records and makes adjustments to meet objectives.

C-3 **MATERIALS AND FACILITIES** - Acquires, stores, allocates, and uses materials or space efficiently.

C-4 **HUMAN RESOURCES** - Assesses skills and distributes work accordingly, evaluates performances and provides feedback.

### **INFORMATION - Acquires and Uses Information**

C-5 Acquires and evaluates information.

C-6 Organizes and maintains information.

C-7 Interprets and communicates information.

C-8 Uses computers to process information.

### **INTERPERSONAL—Works With Others**

C-9 Participates as a member of a team and contributes to group effort.

C-10 Teaches others new skills.

C-11 Serves Clients/Customers—works to satisfy customer’s expectations.

C-12 Exercises Leadership—communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.

C-13 Negotiates—works toward agreements involving exchanges of resources; resolves divergent interests.

C-14 Works With Diversity—works well with men and women from diverse backgrounds.

### **SYSTEMS—Understands Complex Interrelationships**

C-15 Understands Systems—knows how social, organizational, and technological systems work and operates effectively with them.

C-16 Monitors and Corrects Performance—distinguishes trends, predicts impacts on system operations, diagnoses systems performance and corrects malfunctions.

C-17 Improves or Designs Systems—suggests modifications to existing systems and develops new or alternative systems to improve performance.

### **TECHNOLOGY—Works with a Variety of Technologies**

C-18 Selects Technology—chooses procedures, tools, or equipment, including computers and related technologies.

C-19 Applies Technology to Task—understands overall intent and proper procedures for setup and operation of equipment.

C-20 Maintains and Troubleshoots Equipment—prevents, identifies, or solves problems with equipment, including computers and other technologies.

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**RADR 2305.200 – Principles of Radiographic Imaging II  
Spring 2015**

<b>Monday</b>	<b>Wednesday</b>	<b>Monday</b>	<b>Wednesday</b>	<b>Monday</b>	<b>Wednesday</b>
1/19 <b>MLK Holiday</b>	1/21 Syllabus	1/26 F/S IMAGING Film	1/28 F/S IMAGING Film	2/2 F/S IMAGING Screens	2/4 F/S IMAGING Processing
2/9 F/S IMAGING Processing	2/11 F/S IMAGING Processing	2/16 <b>Test 1</b>	2/18 CONCEPTS OF IMAGE QUALITY Film	2/23 CONCEPTS OF IMAGE QUALITY Film	2/25 CONCEPTS OF IMAGE QUALITY Geometric
3/2 CONCEPTS OF IMAGE QUALITY Subject	3/4 CONCEPTS OF IMAGE QUALITY Tech. Charts	3/9 <b>Test 2</b>	3/11 Review	3/16 <b>Spring Break</b>	3/18 <b>Spring Break</b>
3/23 S/F TECHIQUE Exp. Factors	3/25 S/F TECHIQUE Geom. Factors	3/30 S/F TECHIQUE Subj. Factors	4/1 S/F TECHIQUE Image Factors Spatial & Contrast Resolutions	4/6 <b>Easter Holiday</b>	4/8 S/F TECHIQUE Tech. Charts
4/13 <b>Test 3</b>	4/15 Filler	4/20 DIG. TECHIQUE Spatial Resolution MTF	4/22 DIG. TECHIQUE Spatial Resolution MTF	4/27 DIG. TECHIQUE Contrast Resolution	4/29 DIG. TECHIQUE Post-Processing
5/4 <b>Test 4</b>	5/6 Review	5/11 Finals	5/14 Finals		