South Plains College-Reese Center
Course Syllabus

COURSE:	**RADR 2305-200 (3:3:0), Principles of Radiographic Imaging II**
SEMESTER:	**Spring 2024**
CLASS TIMES:	**MW, 9:30-10:45am**
INSTRUCTOR:	**Clinton Bishop**
OFFICE:	**SPC Reese Center, office 512B**
OFFICE HOURS:	**M-F, 9:00-11:00am & by appointment**
OFFICE PHONE:	**806-716-4629**
E-MAIL:	**cbishop@southplainscollege.edu**

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

GENERAL COURSE INFORMATION

COURSE DESCRIPTION
This course focuses on radiographic imaging technique formulation with the synthesis of all variables in image production.

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. Identify digital imaging system components.
10. Compare computed radiography to digital radiography.

STUDENT LEARNING OUTCOMES
The student will:
1. Gain the technical ability to work digital imaging in radiography.
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.

EVALUATION METHODS
The course grade will be determined by a combination of major exams and a comprehensive final exam.

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.

If found cheating or plagiarizing, the student's future in this program will be based on the decisions from the Allied Health Departmental Director's Committee.

BLACKBOARD

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

The student should only access his or her own Blackboard account. Granting permission to another or accessing another student's Blackboard account is prohibited and against the Academic Integrity code.

SOCIAL MEDIA

Facebook: https://www.facebook.com/spcradtechprogram
Instagram: https://www.instagram.com/spcradtech/

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.

SPECIFIC COURSE INFORMATION

TEXT AND MATERIALS

Bushong, S.C., Radiologic Science for Technologists – Physics, Biology, & Protection. 12th Edition. 2021. Elsevier.

ATTENDANCE POLICY (read carefully)

SPC - Students are expected to attend all classes in order to be successful in a course. The student may be administratively withdrawn from the course when absences become excessive as defined in the course syllabus.

When an unavoidable reason for class absence arises, such as illness, an official trip authorized by the college or an official activity, the instructor may permit the student to make up work missed. It is the student's responsibility to complete work missed within a reasonable period of time as determined by the instructor. Students are officially enrolled in all courses for which they pay tuition and fees at the time of registration. Should a student, for any reason, delay in reporting to a class after official enrollment, absences will be attributed to the student from the first class meeting.

Students who enroll in a course but have "Never Attended" by the official census date, as reported by the faculty member, will be administratively dropped by the Office of Admissions and Records. A student who does not meet the attendance requirements of a class as stated in the course syllabus and does not officially withdraw from that course by the official census date of the semester, may be administratively withdrawn from that course and receive a grade of "X" or "F" as determined by the instructor. Instructors are responsible for clearly stating their administrative drop policy in the course syllabus, and it is the student's responsibility to be aware of that policy.

It is the student's responsibility to verify administrative drops for excessive absences through MySPC using his or her student online account. If it is determined that a student is awarded financial aid for a class or classes in which the student never attended or participated, the financial aid award will be adjusted in accordance with the classes in which the student did attend/participate and the student will owe any balance resulting from the adjustment.

SPC Radiologic Technology - Class attendance is mandatory. Students with three (3) absences will be counseled. Students are allowed five (5) absences during the spring semester. The student will be dropped from the program after

exceeding five (5) absences, regardless of the student's grade. Policies regarding absences coincide with those established for South Plains College as outlined in the SPC General Catalog.

An absence is an absence. The Radiologic Technology faculty do not distinguish between an excused and an unexcused absence.

It is extremely important to arrive for class **on time. Tardiness** disrupts the instructor and the other students. Students who chronically arrive late will be counseled. The student should be prepared for class at the scheduled class start time. **3 tardy will equal 1 absence.**

Students with perfect attendance and two or less tardy will be awarded 2 points to their final grade at the end of the semester.

DROPS AND WITHDRAWALS

http://www.southplainscollege.edu/admission-aid/apply/schedulechanges.php

ADVISING

http://www.southplainscollege.edu/admission-aid/advising/spcadvisors.php

INSTRUCTIONAL METHODS

The student will receive course information through a series of lectures, PowerPoint presentations, lab assignments, and textbook assignments.

CLASSROOM 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. Information handouts may be given in certain instances, but the student should not rely on them. The student is encouraged to take adequate notes during class. 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. The textbook is a mandatory requirement. **The student must bring the textbook/e-book to every class.** In some instances, information from the reading assignments not covered during class may be included on an exam.

COMPUTER USAGE

As computer technology in the field of health occupations continues to become more popular, computers will be used in this course for several assignments. All students have access to computers and printers on the South Plains College campus. Students will be expected to utilize computers to access assignments and classroom resources. All registered students are supplied with a working email account from South Plains College. In order to take exams, students must have their user name and password.
ALL STUDENTS ARE EXPECTED TO KNOW THEIR SPC STUDENT USER NAME AND PASSWORD.

COMPUTER LAB USAGE

The open computer lab(s) on any campus may be used by students during scheduled open hours or as assigned by an instructor. Printer paper will not be provided for students to print materials, but students may seek assistance from faculty or staff to request lab paper from the college if needed. Lack of computer lab paper is not an excuse for not having homework assignments, skills lab sheets, or any other required documents. Students should come prepared for class.

REVIEW

If a student needs assistance with reviewing any of the information giving during class or lab, the student is encouraged to make an appointment with the instructor.

CONFERENCES

If at any time a student is not satisfied with their overall performance, he/she is encouraged to schedule an appointment with the instructor. If necessary, a plan can be developed to help the student improve in their areas of weakness.

GRADING RUBRIC

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

Assessment Tool	Assessment Criteria	Percentage Score	Grade
MAJOR EXAMS 70%	✓ Exceptional unit content knowledge & understanding	90 – 100	A
	✓ Good unit content knowledge & understanding	80 – 89	B
	✓ Average unit content knowledge & understanding	75 – 79	C
	✓ Unacceptable unit content knowledge & understanding	0 – 74	F
FINAL EXAM 30%	✓ Exceptional course content knowledge & understanding	90 – 100	A
	✓ Good course content knowledge & understanding	80 – 89	B
	✓ Average course content knowledge & understanding	75 – 79	C
	✓ Unacceptable unit content knowledge & understanding	0 – 74	F

Course Grade: A 90 – 100
B 80 – 89
C 75 – 79
F 0 – 74

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

Major Exams – 70% (4 exams, each worth 17.5%)

Major exams will be given throughout the semester following each unit or units presented. Exams will be completed electronically in the computer lab.

The following guidelines will be followed regarding **Major Exams**:

1. The student will complete the exam at the scheduled time. **Make-up exams will be at the instructor's discretion.**
2. The student must complete the exam within the allotted class time of **75 minutes**.
3. If a major exam is missed, a zero will be recorded in the gradebook for that exam.
4. A student arriving late for an exam will not be allowed to take the exam if **any** student has completed the exam and left the room. This will also count as a tardy.
5. No cell phones, smartwatches, calculators, or other electronic assistance devices are allowed during exams.
6. Major exams will no longer be available to print or save. Once you have finished your exam, please review the exam. Students may review exams in the instructor's office by appointment.

Final Exam – 30%

A comprehensive final exam will be given at the end of the semester. Two hours will be allotted for the final exam which will be completed electronically in the computer lab.

The following guidelines will be followed regarding the **Final Exam**:

1. The final exam will be comprehensive.
2. The final exam must be completed within the allotted time, **2 hours**.
3. A student arriving late for an exam will not be allowed to take the final exam if **any** student has completed the exam and left the room.
4. No cell phones, smartwatches, calculators, or other electronic assistance devices are allowed during final exam.
5. If the final exam is missed, a zero will be recorded in the gradebook for that exam.
6. The final exam will no longer be available to print or save. Once you have finished your exam, please review the exam. Students may review the final exam in the instructor's office by appointment.

COMMUNICATION POLICY

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

STUDENT CONDUCT

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

Rules and regulations relating to the students at South Plains College are made with the view of protecting the best interests of the individual, the general welfare of the entire student body and the educational objectives of the college. As in any segment of society, a college community must be guided by standards that are stringent enough to prevent disorder, yet moderate enough to provide an atmosphere conducive to intellectual and personal development.
A high standard of conduct is expected of all students. When a student enrolls at South Plains College, it is assumed that the student accepts the obligations of performance and behavior imposed by the college relevant to its lawful missions, processes and functions. Obedience to the law, respect for properly constituted authority, personal honor, integrity and common sense guide the actions of each member of the college community both in and out of the classroom.
Students are subject to federal, state and local laws, as well as South Plains College rules and regulations. A student is not entitled to greater immunities or privileges before the law than those enjoyed by other citizens. Students are subject to such reasonable disciplinary action as the administration of the college may consider appropriate, including suspension and expulsion in appropriate cases for breach of federal, state or local laws, or college rules and regulations. This principle extends to conduct off-campus which is likely to have adverse effects on the college or on the educational process which identifies the offender as an unfit associate for fellow students.
Any student who fails to perform according to expected standards may be asked to withdraw.
Rules and regulations regarding student conduct appear in the current Student Guide.

CELL PHONES

Cell phones are to be turned OFF (not vibrate) during scheduled class, lab, or test periods, unless prior approval has been given from the instructor. **This includes text messaging.** Cell phones are to be used outside of the classroom during class hours.

Students will be dismissed from class, lab, or test and sent home if a phone continuously rings/vibrates or if the student is discovered texting. The student will receive an absence for the class.

SPC SYLLABUS STATEMENTS (ACCOMMODATIONS)

https://www.southplainscollege.edu/syllabusstatements/

COURSE OUTLINE

REVIEW OF X-RAY TUBE

REVIEW OF X-RAY PRODUCTION

REVIEW OF X-RAY EMISSION

REVIEW OF X-RAY INTERACTIONS

CONCEPTS OF RADIOGRAPHIC IMAGE QUALITY

The student will:

1. Define radiographic image quality, resolution
2. Identify and explain the characteristics of radiographic image quality: spatial resolution, contrast resolution, noise and relate them to image receptor speed. (C15)
3. Identify and explain the interrelated factors affecting radiographic image quality that are divided into the categories of: *film, geometric* and *subject*. (C15)
4. Identify and explain the film factors that affect radiographic image quality: characteristic curve, optical density and film processing. (C15)
5. Identify and explain the toe, shoulder and straight-line portion of a characteristic curve. (C15)
6. Interpret the shape of a characteristic curve for: speed, optical densities, contrast and latitude. (C15)
7. Identify and explain the geometric factors that affect radiographic image quality: magnification, distortion, focal spot blur and anode heel effect. (C15)
8. 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)
9. Explain the effect of motion blur on radiographic image quality. (C15)
10. 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. (C15)
11. List the four prime exposure factors. (C15)
12. Discuss mA and kVp. (C15)
13. Describe characteristics of the imaging system that affect x-ray beam quantity and quality. (C15)
14. List the four patient factors and explain their effects on radiographic imaging. (C15)
15. Identify four image-quality factors and explain how they influence the characteristic of a radiograph. (C15)
16. Discuss the three types of technique charts. (C15)
17. Explain AEC. (C15)
18. Discuss tomographic angles and section thickness. (C15)
19. Describe magnification and its uses. (C15)

IMAGING SCIENCE / COMPUTERS IN MEDICAL IMAGING

The student will:

1. Discuss the history of computers and the role of the transistor and microprocessor. (C15)
2. Define bit, byte, and word as used in computer terminology. (C15)
3. List and explain various computer languages. (F10)
4. Contrast the two classifications of computer programs, systems software, and application programs. (F10)
5. List and define the components of computer hardware. (C15)
6. Discuss the methods that computers use to communicate. (C15)
7. Identify the primary use of computers in medical imaging. (C15)

COMPUTED RADIOGRAPHY

The student will:

1. Describe several advantages of computed radiography. (C15)
2. Identify workflow changes with computed radiography. (F12)
3. Discuss the relevant features of a storage phosphor imaging plate. (C15)
4. Explain the operating characteristics of computed radiography reader. (F12)
5. Discuss spatial resolution, contrast resolution, and noise related to computer radiography. (C15)
6. Identify opportunities for patient radiation dose reduction with computed radiography. (F12)

DIGITAL RADIOGRAPHY

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. (C15)
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. (C18)

DIGITAL RADIOGRAPHY TECHNIQUE

The student will:

1. Distinguish between spatial resolution and contrast resolution. (C15)
2. Identify the use and units of spatial frequency. (C15)
3. Interpret a modulation transfer function curve. (C15)
4. Discuss how postprocessing allows the visualization of a wide dynamic range. (C15)
5. Describe the features of a contrast-detail curve. (C15)
6. Discuss the characteristics of digital imaging that should result in lower patient radiation doses. (C15)

IMAGE ACQUISITION

The student will:

1. List the four prime exposure factors. (C15)
2. Discuss mAs and kVp in relation to x-ray beam intensity and energy. (C15)
3. Describe characteristics of the imaging system that affect x-ray beam intensity and energy. (C15)
4. Explain the three types of automatic exposure controls. (C15)

PATIENT-IMAGE OPTIMIZATION

The student will:

1. Discuss the body habitus patient factors and how they influence imaging factors. (F12)
2. Describe the relationship among spatial resolution/contrast resolution and image detail. (F12)
3. Identify types of distortion. (F12)
4. Define image artifact. (F12)

MEDICAL IMAGE DESCRIPTORS

The student will:

1. Define medical image quality, resolution, noise, and speed. (C15)

2. Distinguish the geometric factors that affect medical image quality. (F12)
3. Analyze the subject factors that affect medical image quality. (F12)
4. Examine the tools and techniques available to create high-quality images. (C15)

TECHNIQUES & CHARTS

The student will:

1. Develop applicable technique charts. (C17)
2. Understand the relationship of mAs and kVp to different patient habitus. (C17)

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.

SCANS COMPETENCIES

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.

SYLLABUS ACKNOWLEDGMENT

Required completion by January 19, 2024, by 11:59pm.

After reading and understanding the contents of this syllabus:

- Go to SPC's Blackboard, https://southplainscollege.blackboard.com
- Choose the RADR2305-200 course
- Click on the Discussion content area
- Click on Syllabus Acknowledgment
- Click on Create Thread
- In the Subject field type: Syllabus
- In the Message field type:
  I, (fill in your first and last name), student ID (xxxxxxx), have received, read, and understand the contents of the syllabus for the RADR2305.200, spring 2024. Date (today's date).