

McLennan

C O M M U N I T Y

COLLEGE

WACO, TEXAS

COURSE SYLLABUS

AND

INSTRUCTOR PLAN

Principles of Radiographic Imaging II

RADR 2305

Michelle Morphis

NOTE: This is a 16-week course.

NOTE: This is a Blended/Hybrid course.

COVID 19 Notice:

McLennan Community College is committed to providing you with every resource you need to reach your academic goals. We are also concerned for your safety. We are working through COVID-19 guidelines to make sure we offer a safe environment for you and our faculty. This will include smaller class sizes to manage social distancing and proper cleaning techniques. You will have the advantage of a physical classroom experience but may also need to work part of the time online as we adjust to limited classroom capacity. This will also allow us the flexibility to move online if so directed by federal, state and/or local COVID 19 guidelines. Faculty and staff are preparing now to ensure that you have the best experience in the midst of these uncertain times.

Principles of Radiographic Imaging II

RADR 2305

Course Description:

Radiographic image quality and the effects of exposure variables, and the synthesis of all variables in image production. Semester Hours: 3 (3 lec/ 1 lab)

Prerequisites and/or Corequisites:

Successful completion of previous RADR courses with minimum grade of C or better.

Course Notes and Instructor Recommendations:

A four-function calculator and a Wi-Fi accessible device is recommended for this course. This course utilizes Brightspace for most testing/quizzes, as well as the internet for access to additional resources. Other testing may be utilized within a traditional testing method.

You will be expected to access the internet for various assignments and exercises. Lab assessment/activities will be used to develop skills and knowledge of course content.

This course builds upon knowledge that has been presented in previous courses. For this reason, you may expect test questions that relate directly and indirectly to information presented in your previous RADR courses.

Instructor Information:

Instructor Name: Michelle Morphis
MCC E-mail: mmorphis@mclennan.edu
Office Phone Number: (254) 299-8584
Office Location: CSC, A-14
Office/Teacher Conference Hours: by appointment
Please call or email to request a conference time

Required Text & Materials:

Title: Digital Radiography and PACS
Author: Christi Carter; Beath Veale
Edition: 3rd
Publisher: Elsevier
ISBN: 978-0-323547581

Title: Radiographic Imaging and Exposure
Author: Terri L. Fauber
Edition: 5th
Publisher: Elsevier
ISBN: 978-0-323-35624-4

MCC Bookstore Website: <http://www.mclennan.edu/bookstore/>

Student Support/Resources:

MCC provides a variety of services to support student success in the classroom and in your academic pursuits to include counseling, tutors, technology help desk, advising, financial aid, etc. A listing of these and the many other services available to our students is available at <http://www.mclennan.edu/campus-resource-guide/>

College personnel recognize that food, housing, and transportation are essential for student success. If you are having trouble securing these resources, we encourage you to contact a success coach by calling (254) 299-8226. Students can visit the Completion Center Monday-Friday from 8:00 a.m.-5:00 p.m. to meet with a success coach and receive additional resources and support to help reach academic and personal goals. Paulanne's Pantry (MCC's food pantry) is open 12:00 p.m.-1:00 p.m., Monday-Friday, without an appointment. The Completion Center and pantry are located on the Second Floor of the Student Services Center (SSC).

MCC Foundation Emergency Grant Fund

Unanticipated expenses, such as car repairs, medical bills, housing, or job loss can affect us all. Should an unexpected expense arise, the MCC Foundation has an emergency grant fund that may be able to assist you. Please go to <https://www.mclennan.edu/foundation/scholarships-and-resources/emergencygrant.html> to find out more about the emergency grant. The application can be found [here](https://www.mclennan.edu/foundation/docs/Emergency_Grant_Application.pdf) (https://www.mclennan.edu/foundation/docs/Emergency_Grant_Application.pdf).

Minimum Technical Skills:

Students should have basic computer skills, knowledge of word processing software, and a basic understanding of how to use search engines and common web browsers.

Backup Plan for Technology:

In the event MCC's technology systems are down, you will be contacted/notified through your MCC student email address. Please note that all assignments and activities will be due on the date specified in the Instructor Plan, unless otherwise noted by the instructor.

*** [Click Here for the Minimum System Requirements to Utilize MCC's D2L|Brightspace](https://www.mclennan.edu/center-for-teaching-and-learning/Faculty%20and%20Staff%20Commons/requirements.html)**
(<https://www.mclennan.edu/center-for-teaching-and-learning/Faculty%20and%20Staff%20Commons/requirements.html>)

Click on the link above for information on the minimum system requirements needed to reliably access your courses in MCC's D2L|Brightspace learning management system.

Email Policy:

McLennan Community College would like to remind you of the policy (<http://www.mclennan.edu/employees/policy-manual/docs/E-XXXI-B.pdf>) regarding college email. All students, faculty, and staff are encouraged to use their McLennan email addresses when conducting college business.

A student's McLennan email address is the preferred email address that college employees should use for official college information or business. Students are expected to read and, if needed, respond in a timely manner to college emails.

Instructional Uses of Email:

Faculty members can determine classroom use of email or electronic communications. Faculty should expect and encourage students to check the college email on a regular basis. Faculty should inform students in the course syllabus if another communication method is to be used and of any special or unusual expectations for electronic communications.

If a faculty member prefers not to communicate by email with her/his students, it should be reflected in the course syllabus and information should be provided for the preferred form of communication.

Email on Mobile Devices:

The College recommends that you set up your mobile device to receive McLennan emails.

Forwarding Emails:

You may forward the emails that come to your McLennan address to alternate email addresses; however, the College will not be held responsible for emails forwarded to an alternate address that may become lost or placed in junk or spam filters.

Methods of Teaching and Learning:

This course is taught by using lecture instruction with visuals, lab activities, review questions, group participation when possible, exams, and assignments. Students may use clinical sites for additional assignments or projects. ASRT Journals may be used to convey current information as it relates to the course. Peer-to-peer learning will be incorporated to yield critical thinking with reference to analysis, reflection, and action.

Course Objectives and/or Competencies:

SCANS

Secretary's Commission on Achieving Necessary Skills

SCANS is an attempt to help make courses more relevant to the needs of a modern work force. SCANS is divided into two types of skills: competencies and foundations. Foundations skills are organized into the basic literacy and computational skills, the thinking skills necessary to put knowledge to work, and the personal qualities that make workers dedicated and trustworthy. The competencies are the abilities to manage resources, to master complex systems, and to work with a variety of technologies. Both are required for successful performance in most jobs, and are definitely required for professions in the radiologic technology field.

COMPETENCIES

Resources --- identifies, organizes, plans and allocates resources including time, money, material, facilities, and human resources.

Interpersonal --- works with others by participating as a member of teams, teaching new skills to others, serving customer and clients in ways to satisfy them, exercising leadership, negotiation, and working well with people from diverse backgrounds.

Information --- manages information by acquiring and evaluation information, organizing and communicating information, using computers to process information.

Systems --- understands complex interrelationships, including understanding how social, organizational, and technological systems work and how to operate effectively with them, how to monitor and correct performance, and improve or design systems.

Technology --- works with a variety of technologies by selecting technology, applying technology to tasks, and maintaining and troubleshooting technologies.

FOUNDATIONS

Basic Skills ---reading, writing, performing arithmetical and mathematical operations, listening and speaking.

Thinking Skills --- thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn, and reasoning to discover rules or principles underlying relationships and applying that knowledge to solving problems.

Legend:

CO1 Resources. Allocating: 1.1 Time, 1.2 - Money, 1.3 - Materials & Facilities, 1.4 - Human Resources

CO2 Interpersonal Skills. Works with others: 2.1 - Working in teams, 2.2 - Teaching others, 2.3 - Serving customers, 2.4 - Leading, 2.5 - Negotiating, 2.6 - working with different cultures.

CO3 Information. Acquires and uses information. 3.1 - Acquiring & evaluating data, 3.2 - Organizing and maintaining files. 3.3 - Interpreting and communicating, 3.4 - Processing information with computers.

CO4 Systems. Understands complex interrelationships: 4.1 - Understands social, technological & organizational systems, 4.2 - Monitoring and correcting performances, 4.3 - Designing and/or improving systems.

CO5 Technology. Works with a variety of technologies: 5.1 - Selects equipment & tools, 5.2 - Applies technology to tasks, 5.3 - Maintains & troubleshoots technologies.

FO1 Basic skills. Reads, writes, performs mathematical operations, listens and speaks: 1.1 - Reading, 1.2 - Reading, 1.3 - Arithmetic/Mathematics, 1.4 - Speaking, 1.5 - Listening.

FO2 Thinking Skills. Think creatively, makes decisions, solves problems, visualizes, knows how to learn and reason: 2.1 - Creative thinking, 2.2 - Decision making, 2.3 - Problem solving, 2.4 - Seeing with the mind's eye, 2.5 - Knowing how to learn, 2.6 Reasoning.

FO3 Personal Qualities. Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty: 3.1 - Responsibility, 3.2- Self-esteem, 3.3 - Sociability, 3.4 - Self-management, 3.5 - Integrity/Honesty.

Unit 01 Objectives (F02, C03, C04)

- Define basic terms associated with digital imaging
- Identify historical development dates and pioneers in digital imaging
- Explain basic components that are important to PSP and FPD imaging receptors
- Recall basic features of PACS
- Define pixel and image matrix and characteristics of each
- Discuss differences between spatial resolution and contrast resolution
- Understand exposure indicators and explain the differences between Indicated Quivalent Air Kerma, Target Equivalent Air Kerma and Deviation Index
- Define Modulation Transfer Function and discuss image noise, exposure latitude, and detective quantum efficiency
- Describe the formation of an image histogram and the effect of automatic rescaling
- List the functions of contrast enhancement parameters
- Explain the importance of the Look-up Table
- Recall the Nyquist Theorem and how aliasing will occur
- Explain the relationship between sampling frequency and spatial resolution
- Recognize effects of improper algorithm applications
- Calculate FOV
- Recall how the size of a CR imaging plate will affect spatial resolution
- Discuss the difference between SNR and CNR
- Differentiate among vendor-specific types of exposure indicators
- Recognize the important features of monitors and the effect on image quality
- Recognize image display functions

Unit 02 Objectives (F02, C303, C304)

- Recognize basic construction and purpose of a PSP cassette and imaging plate
- Explain the process of photostimulation, reading, and erasing the imaging plate
- Recognize technical factors and grids that are recommended with use of PSP

- Discuss significance of preprocessing collimation and image marking
- Identify artifacts associated with PSP image capture
- Differentiate exposure indicators between vendors

Unit 03 Objectives (F02, C03, C04)

- Recall the purpose of a thin-film transistor flat-panel digital image detector and the construction of direct and indirect flat-panel detector systems
- Differentiate between direct and indirect capture.
- Recognize artifacts associated with TFT flat -panel systems and how to prevent or correct detector artifacts
- Describe the components of a charge-coupled device and its function.

Unit 04 Objectives (F02, C03, C04)

- Describe the basic construction and function of a CMOS
- Differentiate between CCD and CMOS technology
- Identify components of digital fluoroscopy
- Describe how a digital fluoroscopic image is created
- Differentiate between conventional and digital fluoroscopy
- Recall purpose of brightness control and magnification with relationships between image quality and patient radiation exposure
- Recall difference between continuous and pulsed fluoroscopy with impacts on radiation safety

Unit 05 Objectives (F02, C03, C04)

- Recall the major components of a computer
- Determine how binary code, bit, and byte are related to one another
- Recognize and recall the function of hardware components
- Explain the measurements used to classify monitors
- Discuss the differences between an operating system and application software
- Discuss the uses of computers in a radiology department
- Distinguish between different types of networks
- Identify common network hardware components
- Recognize different types of network cabling and their uses
- Differentiate between the common network topologies
- Discuss the use of DICOM and HL-7

Unit 06 Objectives (F02, C03, C04, C05)

- Recall PACS, display workstation types, and imaging workflow
- Recognize common features of a PACS workstation
- Differentiate between short- and long-term storage of a PACS system
- Discuss film digitizers and laser imager technology
- Demonstrate application of technical factors in digital imaging

Unit 07 Objectives (F02, C03, C04, C05)

- Recall the history and establishment of health informatics
- Recognize difference between data, information, knowledge, and wisdom
- Determine level of datum or data
- Define health informatics and understand barriers and benefits
- Differentiate between health informatics and information technology
- Recall technical factors for different anatomical parts in digital radiography
- Evaluate technical factors and demonstrate quality factors for technique chart
- Demonstrate effective selections of radiographic technique
- Recognize the differences between QC and QA activities
- Define CQI and its role in radiology
- Discuss total quality management and its uses in digital projection imaging
- Recognize the QC monitoring activities and recall parameters of each

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Course Outline or Schedule: *The instructor may change the schedule with appropriate notice to the student via classroom or Brightspace announcements. Additional assessments may be given in class or through Brightspace.*

	Content	Reading	Exams
1	Introduction to Digital Radiography Digital Imaging Characteristics	Unit 1 CH 1 &2	
2	Digital Imaging Characteristics; Digital Radiographic Image Processing and Manipulation	Unit 1 CH 3	Unit 1 Exam (1-3) 9/03/20 Due at 2:30 PM
	Labor Day Holiday (campus closed) 9/7/20		
3	Photostimulable Phosphor Image Capture	Unit 2 CH 4	
4	Continue Photostimulable Phosphor Image Capture		Unit 2 Exam (4) 9/17/2020 Due at 2:30PM
5	TFT Flat-Panel Array Image Acquisition	Unit 3 CH 5	
6	Continue TFT Flat-Panel Array Image Acquisition		Unit 3 Exam (5) 10/01/2020 Due @ 2:30
7	CCD/CMOS Image Capture; **Dynamic Imaging: Fluoroscopy	Unit 4 CH 6; **CH 10	
8	**Dynamic Imaging: Fluoroscopy		Unit 4 Exam (6,**10) 10/15/20 Due @ 2:30
9	Basic Computer Principles; Networking & Communication Basics	Unit 5 CH 7,8	
10	Networking & Communication Basics		Unit 5 Exam (7,8) 10/29/20 Due @ 2:30
11	PACS Fundamentals; PACS Archiving and Peripherals	Unit 6 CH 9	
12	PACS Archiving and Peripherals ; Applying Radiographic Technique (Lecture)	Unit 6 CH 10	Unit 6 Exam (9,10, Lecture Notes) 11/12/20
13	Medical Informatics; Ensuring Quality in Picture Archiving and Communication Systems	Unit 07 CH 11 & 12	
14	Quality Acceptance Testing; Total Quality Management and QC	Unit 07 CH 13	
15	Total Quality management; Final Exam Review		Unit 07 Exam (11,12,13 & Lecture Notes) 12/03/20 Due @ 2:30
16	Final Comprehensive Exam		FINAL 12/10/19

**Textbook: *Radiographic Imaging and Exposure, Terri L. Fauber*

Course Grading Information:

Assessment	Percentage of Course Grade
Assignments & Quizzes	10%
Exams	35%
Project	25%
Final Exam	30%
Total Course Grade	100%

The course grade will be applied using the following scale:

Percentage	Letter Grade
90-100	A
80-89	B
75-79	C
60-74	D
59 and below	F

Remember: This is an RT course where earning a “C” is the minimum requirement. A student will not pass the course if the minimum requirement has not been met.

Throughout the course, grades in Brightspace will indicate grades with a decimal following such as, 85.3, 89.5 etc....

These grades will remain as posted in the grade book but the final course grade will be rounded up or down to the nearest score depending on the number in the tenth place after the decimal. If a score is .5 to .9 the grade will be rounded up to the next number. If a score is .4 or below to .1, it will remain that number. (Example: 89.5 will be posted as a 90, where 89.4 will remain an 89)

Brightspace Use and Activity

The instructor of this course intends to utilize Brightspace as a communication tool and for course features such as announcements, resources, grades, and assessments. It is the student's responsibility to check Brightspace daily to ensure successful completion of each assignment and to receive important announcements about the course

Late Work, Attendance, and Make Up Work Policies:

Absence from class will result in the student having less information and will usually result in a lower grade. Absence of three (3) consecutive weeks will be taken as an indication that the student does not intend to complete the course and the student may be dropped from the class rolls. Absence of 25% of classes (7 classes) may be taken as evidence in course activities to indicate a low probability of success.

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The student may be dropped on that basis in the absence of contrary indications satisfactory to the instructor.

Hybrid/Blended Format: Attendance will be recorded using a sign-in sheet when meeting on campus. Attendance for online days will be taken as completed assessments given by the instructor. Failure to complete these assessments by the due date & time will result in an absence. Tardies and early departures from class when meeting on campus will count toward an absence. Three tardies or leaving early (or a combination) will result in one absence.

Late assignments will be given a 10 point deduction on the first day missed and five points every class day thereafter, with a maximum of 3 days. On the fourth (4th) day, the student will not be allowed to submit assignments and will be given zero (0) points for the missed assignment. Make-up tests will only be allowed under certain circumstances and is up to the discretion of the instructor. There will not be any make-up quizzes or in class assignments

Performance Goal, Expectation, and Requirements

The Radiologic Technology program coursework is designed to provide students with a structured comprehensive curriculum that prepares them for a career as a professional health care provider. It is imperative that students develop and maintain a strong knowledge base of all course material and competencies to be successful.

Therefore, the program has established a performance goal for all coursework and assessments in all RADR courses of an 80% or higher. Students that do not achieve the minimum grade of 80% will be required to complete an activity of remediation assigned by the instructor of the course immediately following. The activity requirements will vary as they will be customized according to factors such as the students' needs, the purpose of the assignment, its content, etc., and the instructor will maintain all records of completion. Students that fail to complete the required remediation activities will receive an "Incomplete" ("I") grade for the course, regardless of overall passing grade point average, until all work is submitted. An "Incomplete" ("I") in any course must be resolved prior to the start of the following semester or the resulting grade will convert to an "F" and the student will not pass the course.

Testing

Unit tests will be posted on Brightspace and timed according to length and content. Adequate time will be provided to complete the test provided the student has studied the material prior to taking the test. If the chapter test has not been submitted by the indicated time, it will be submitted automatically. It is necessary to be prepared for the test so that there is enough time for completion. The student must start and complete the test in the designated time indicated. To aid with information recall, questions from previous tests may be added throughout the semester. Time constraints will be taken into consideration if/when this occurs.

The plan for comprehensive final testing is to use online testing in the designated classroom. However, the instructor may decide to offer an alternative testing option. If this should occur, the student will be notified in advance using email or Brightspace announcements. In addition, the instructor will make an announcement in class. Final exams are comprehensive and the student is expected to arrive on time. If a student does not arrive by the time the exam has been passed out or started at the time instructed, a zero will be given. If a student has an emergency that will result in arriving late or not at all, it is the responsibility of the student to contact the instructor by phone or email **prior** to the start of the final exam. It is at the discretion of the instructor to allow the student the opportunity to complete the final exam at another date and time.

If the instructor allows a test to be taken online, the following information and consequences should be reviewed. If a student fails to take a Brightspace test during the allotted time frame, a zero will be given with no opportunity to re-take the test. This only applies to tests that are not begun and completed during the time frame. If a technology glitch occurs, the student must contact the instructor immediately by email or phone to report the issue. The instructor will investigate the issue and has the **option** to re-set the test. If “glitches” continue during on-line Brightspace testing the student will be required to use the Testing Center for Brightspace tests.

The instructor may test you over any material covered in lecture, power point presentations, assigned reading, or class discussions. Attendance is very important to assure that you are well prepared for testing.

POSTING OF GRADES: Grades for each exam are posted on Brightspace for students to view. Students are required to report to the instructor any incorrect posting within two days of taking an exam. Failure of students to check their grades and report any incorrect posting to the instructor will result in grades remaining as posted on Brightspace.

Midterm Counseling:

It is important for students to check their grades and attendance regularly. This syllabus provides important information about passing grades and meeting attendance requirements. Between the 8th and 9th week, you may be asked to meet with your instructor if your course average is not 80% or above and/or if you have missed three days. Midterm counseling is designed to identify weak areas and offer suggestions to aid in a student's success.

Student Behavioral Expectations or Conduct Policy:

Students are expected to maintain classroom decorum that includes respect for other students and the instructor, prompt and regular attendance, and an attitude that seeks to take full advantage of the education opportunity. Students in this program are adults and are expected to act appropriately. Behavior that is disrespectful or disruptive will not be tolerated; the student will

be asked to leave the class. Each occurrence will be documented and may result in counseling from the instructor and program director.

Regular and punctual attendance is expected of all students, and each instructor should maintain a complete record of attendance for the entire length of each course. Students will be counted absent from class meetings missed, beginning with the first official day of classes. Students, whether present or absent, are responsible for all material presented or assigned for a course and will be held accountable for such materials in the determination of course grades. In the case of online or hybrid courses, attendance will be determined in terms of participation, as described in the syllabus.

Electronic Communication Policy

This policy applies to all students enrolled at McLennan Community College (MCC) and to all MCC employees. All students, staff, and faculty will use their official college e-mail addresses when conducting college business.

It is MCC's policy to assign all students, upon registration, an official e-mail address, which may remain in effect up to twelve months after students are no longer enrolled at MCC. MCC student e-mail addresses will be the only e-mail authorized to communicate official college information or business. Students are expected to read and, if needed, respond in a timely manner to college e-mails. It is suggested that students check college e-mail daily to avoid missing time-sensitive or important college messages. Students may forward college e-mails to alternate e-mail addresses; however, MCC will not be held responsible for e-mails forwarded to alternate addresses. A student's failure to receive or read official communications sent to the student's assigned e-mail address in a timely manner does not absolve the student from knowing and complying with the content of the official communication.

students and the instructor, prompt and regular attendance, and an attitude that seeks to take full advantage of the education opportunity."

*** [Click Here for the MCC Academic Integrity Statement](http://www.mclennan.edu/academic-integrity)**

(www.mclennan.edu/academic-integrity)

The link above will provide you with information about academic integrity, dishonesty, and cheating.

*** [Click Here for the MCC Attendance/Absences Policy](https://www.mclennan.edu/highlander-guide/policies.html)**

(<https://www.mclennan.edu/highlander-guide/policies.html>)

Click on the link above for the college policies on attendance and absences. Your instructor may have guidelines specific to this course.

Accommodations/ADA Statement

Any student who is a qualified individual with a disability may request reasonable accommodations to assist with providing equal access to educational opportunities. Students should contact the Accommodations Coordinator as soon as possible to provide documentation and make necessary arrangements. Once that process is completed, appropriate verification will be provided to the student and instructor. Please note that instructors are not required to provide classroom accommodations to students until appropriate verification has been provided by the Accommodations Coordinator. Instructors should not provide accommodations unless approved by the Accommodations Coordinator. For additional information, please visit mclennan.edu/disability.

Students with questions or who require assistance with disabilities involving physical, classroom, or testing accommodations should contact:

disabilities@mclennan.edu

254-299-8122

Room 319, Student Services Center

*** Click Here for more information about Title IX**

(www.mclennan.edu/titleix)

We care about your safety, and value an environment where students and instructors can successfully teach and learn together. If you or someone you know experiences unwelcomed behavior, we are here to help. Individuals who would like to report an incident of sexual misconduct are encouraged to immediately contact the Title IX Coordinator at titleix@mclennan.edu or by calling Dr. Drew Canham (Vice President for Student Success) at 299-8645. Individuals also may contact the MCC Police Department at 299-8911 or the MCC Student Counseling Center at MCC by calling 299-8210. The MCC Student Counseling Center is a confidential resource for students. Any student or employee may report sexual harassment anonymously by visiting the following website: <http://www.lighthouse-services.com/mclennan/>.

McLennan's Title IX webpage (<http://www.mclennan.edu/titleix/>) contains more information about definitions, reporting, confidentiality, resources, and what to do if you or someone you know is a victim of sexual misconduct, gender-based violence or the crimes of rape, acquaintance rape, sexual assault, sexual harassment, stalking, dating violence or domestic violence.

** You will need to access each link separately through your Web browser (for example: Internet Explorer, Mozilla, Chrome, or Safari) to print each link's information.*