

Updated 07/18/2023



WACO, TEXAS

**COURSE SYLLABUS
AND
INSTRUCTOR PLAN**

Principles of Radiographic Imaging II

RADR 2305 001

Michelle Morphis

NOTE: This is a 16-week course.

Principles of Radiographic Imaging II

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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 testing and other assessments. 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 exam 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, C-117

Office/Teacher Conference Hours: Hours are posted on door.

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/>

Methods of Teaching and Learning:

Lectures, exams, quizzes, project, and group activities will primarily be used in this course.

Course Objectives and/or Competencies:

Unit 01 Objectives

- 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 Equivalent 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

- 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

- 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

- 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

- 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

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- Discuss the use of DICOM and HL-7

Unit 06 Objectives

- 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

- 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
- 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

Technical Factors Project Objectives

- Recall technical factors for different anatomical parts in digital radiography
- Evaluate technical factors and demonstrate quality factors for technique chart
- Recognize acceptable exposure indices and demonstrate corrective action when values are not within normal parameters

Course Attendance/Participation Guidelines:

If a student is not in attendance in accordance with the policies/guidelines of the class as outlined in the course syllabus as of the course census date, faculty are required to drop students from their class roster prior to certifying the respective class roster. A student's financial aid will be re-evaluated accordingly and the student will only receive funding for those courses attended as of the course census date.

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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 via 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) 9/3
3	Photostimulable Phosphor Image Capture	Unit 2 CH 4	
4	Continue Photostimulable Phosphor Image Capture		Unit 2 Exam (4) 9/12)
5	TFT Flat-Panel Array Image Acquisition	Unit 3 CH 5	
6	Continue TFT Flat-Panel Array Image Acquisition; CCD/CMOS Image Capture		Unit 3 Exam (5) 9/26
7	CCD/CMOS Image Capture; **Dynamic Imaging: Fluoroscopy	Unit 4 CH 6; **CH 10	
8	**Dynamic Imaging: Fluoroscopy		Unit 4 Exam (6,**10) 10/12
9	Basic Computer Principles; Networking & Communication Basics	Unit 5 CH 7,8	
10	Networking & Communication Basics		Lab 10/27 Unit 5 Exam (7,8) 10/26
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) 11/11
13	Medical Informatics; Ensuring Quality in PACS	Unit 07 CH 11 & 12	Project (TBD)
14	Ensuring Quality in PACS; Quality Acceptance Testing within Digital Projection Imaging	Unit 07 CH 13	
15	Quality Acceptance Testing within Digital Projection Imaging; Final Review		Unit 07 Exam (11,12,13 & Lecture Notes) 11/30
16	Final Comprehensive Exam		FINAL 12/07

** Radiographic Imaging and Exposure Textbook

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Campus Closed:

- Labor Day: 09/04
- Thanksgiving Break: 11/22 – 11/26

Course Grading Information:

Assessment	Percentage of Course Grade
Assignments & Quizzes	15%
Exams	35%
Project	20%
Final Exam	30%
Total Course Grade	100%

Grade Scale:

90-100	A
80-89	B
75-79	C
*60-74	D
*Below 60	F

***This is an RT course—C is the minimum acceptable grade. Any grade below 75 is considered a failing grade for this program. In order to progress through the program, you must meet the minimum acceptable grade requirement.**

Throughout the course, grades in Brightspace will indicate grades without a decimal point. Brightspace has been setup to round up grades that are .5 up to .9. Grades that fall at .4 down to .1 will not round up. (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

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Exams

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

The plan for comprehensive final exams 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 an exam to be taken online, the following information and consequences should be reviewed. If a student fails to take a Brightspace exam during the allotted time frame, a zero will be given with no opportunity to re-take the exam. This only applies to exams 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 exam. If “glitches” continue during on-line Brightspace testing the student will be required to use the Testing Center for Brightspace exams.

The instructor may exam 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

Late Work and Make Up Work Policies:

Absenteeism will result in the student having less information and will usually result in a lower grade. As outlined by both the MCC and Health Profession Division policies, regular and punctual attendance is expected of all students, and a complete record of attendance will be kept by each instructor 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 addition, as specifically stated in the MCC Health Professions policy on attendance in didactic courses, a student will be dropped if a cumulative of 15% of class meetings are missed due to unexcused reasons.

Please refer to the full MCC Attendance policy and the MCC Health Professions Division policy for full details.

Leaving early (up to 30 minutes) and arriving late (tardy) will result missed learning opportunities. In If a student leaves early or is late three times during the course, then one absence will be counted. A student must be present the entire class time to receive full attendance for the day.

Late assignments will be given a 10-point deduction on the first day missed and five points on the 2nd day missed. On the 3rd day, the student will not be allowed to submit assignments and will be given zero (0) points for the missed assignment.

Make-up exams 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. If a missed exam occurs due to an illness, funeral, or military reasons, it may be necessary to provide documentation for consideration to take the missed exam. The professor may decide to replace a missed exam with the final exam. Only one missed exam will be considered for the semester.

Class Tardy:

Is defined by the instructor of this class as any time past the originally scheduled time class is to begin. **At 11:00, class has officially begun** and a student is considered late if arrival is any time after that. Habitual tardiness indicates a lack of discipline and will be dealt with on an individual basis.

The doors to the classroom will be locked at 11:00 and upon return from lunch. The student will be denied access until the first break of the class which is usually at 50 minutes after the beginning of class. Students will be given the time to return from lunch in class, as it will fluctuate each day, depending on content.

Class breaks:

Students will be allowed to take a brief break at approximately 50-minute intervals. A break is designed to allow the student restroom facility time as well as technology breaks to check cell phones/messages, etc. Leaving while class is in session can be disruptive to others. Students may leave but need to understand that the classroom doors are locked and will remain locked and no re-entry will be allowed until the next break or class has officially ended. Should you have an emergent situation and need to leave during class, please gather your belongings quietly and leave since you will not be allowed class access until the next break or until class is over. Special considerations need to be discussed with the instructor

Respondus Lockdown Browser:

The browser must be downloaded prior to taking an exam

[Download Respondus Browser \(Click Here\)](#)

When using Respondus Lockdown Browser to complete exams, the student must follow these rules:

- Student will read and follow all instructions of Respondus prior to beginning the exam.
- The student will use a flat surface such as a desk or table and a chair. The student must remain seated throughout the length of the exam.
- When performing the environment scan, it must be done slowly to include a 360-degree view of the room and the entire surface where the computer is located.
- The student will be in view of the camera throughout the exam and allow recording of sound throughout the exam.
- All problems will be communicated to the instructor during the exam and an email with explanation should follow after the completion of the exam.
- Students should always strive to look at the monitor. Any eye movement that indicates cheating may result in the student retaking the exam in person. Should cheating be found, the student will receive a zero and risk being removed from the program.
- Do not wear caps, hats or other head coverings that will cast a shadow onto your face

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- Do not take exam in a dark room. Avoid backlighting situations, such as sitting with your back to a window. Always have light in front of your face, not behind your head.
- Choose an environment that is distraction-free. This includes people, television, animals, or any other item that will draw your eyes away from the monitor.
- Do not take exam with laptop computer in your lap. Instead, place it on a flat surface. Be careful not to move the laptop during the exam. This may result in lack of face detection.

The instructor may **remove Respondus testing privileges** if the student does not comply with the rules or experiences more than **one** problem with testing away from campus. Reliable technology and internet is the responsibility of the student. A student may use computers at MCC Examining center and should inform instructor for scheduling purposes.

If a student fails to take the exam during the allotted time frame, a zero will be given with no opportunity to re-take the exam. This only applies to exams that are not begun and completed during the time frame. If a technology glitch occurs when taking the exam at the Examining Center, the student must report the issue to a designated staff member. If the Examining Center is not used and the student is taking an exam via Brightspace, a technology glitch must be reported to the instructor immediately through email or phone. The instructor may exam 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.

A comprehensive final will be given at the end of the semester. It is important to start the exam as instructed by the instructor. If a student experiences a delay in starting the exam and fails to notify the instructor, a zero will be given. If the comprehensive exam is given in the classroom and the student is late and does not notify the instructor prior the start time of the exam, a zero will be given. Unless the instructor approves reason for delay, all comprehensive final exams will include a 10-point deduction if exam is not started on time. All final exams must be completed by the deadline. Otherwise, the student will submit the exam without the opportunity to complete the remainder of the exam. Medical emergencies are situations in which the instructor will work with the student to make up the exam without any penalty. Medical documentation may be required.

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.

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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.

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.

Use of Electronics

Electronic devices may be used to accompany lectures or complete assessments. Taking pictures of lecture material without the instructor's approval is not allowed. Recording of lectures is

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prohibited. If a student is caught recording or taking photos of course material/lectures without permission, counseling with the professor and program director will occur to document the situation and discuss consequences of violating academic integrity.

[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 additional guidelines specific to this course.

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ACADEMIC RESOURCES/POLICIES

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. For additional information, please visit www.mclennan.edu/disability.

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

disabilities@mclennan.edu 2542998122 Room
319, Student Services Center

Title IX:

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 acting Title IX Coordinator at titleix@mclennan.edu or by calling, Dr. Claudette Jackson, (Accommodations/Title IX) at (254) 299-8465. MCC employees are mandatory reporters and must report incidents immediately to the Title IX Coordinator. Individuals may also contact the MCC Police Department at (254) 299-8911 or the MCC Student Counseling Center at (254) 299-8210. The MCC Student Counseling Center is a

confidential resource for students. Any student or employee may report sexual harassment anonymously by visiting <http://www.lighthouse-services.com/mclennan/>. Go to McLennan's Title IX webpage at www.mclennan.edu/titleix/. It 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.

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/>

Academic Support and Tutoring is here to help students with all their course-related needs. Specializing in one-on-one tutoring, developing study skills, and effectively writing essays. Academic Support and Tutoring can be found in the Library and main floor of the Learning Commons. This service is available to students in person or through Zoom. You can contact the Academic Support and Tutoring team via Zoom or email (ast@mclennan.edu) by going to our website (<https://www.mclennan.edu/academic-support-and-tutoring/>).

College personnel recognize that food, housing, and transportation are essential for student success. If you are having trouble securing these resources or want to explore strategies for balancing life and school, we encourage you to contact either MCC CREW – Campus Resources Education Web by calling (254) 299-8561 or by emailing crew@mclennan.edu or a Success Coach by calling (254) 299-8226 or emailing SuccessCoach@mclennan.edu. Both are located in the Completion Center located on the second floor of the Student Services Center (SSC) which is open Monday-Friday from 8 a.m.-5 p.m.

Paulanne's Pantry (MCC's food pantry) provides free food by appointment to students, faculty and staff. To schedule an appointment, go to https://mclennan.co1.qualtrics.com/jfe/form/SV_07byXd7eB8iTqJg. Both the Completion Center and Paulanne's 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 at

https://www.mclennan.edu/foundation/docs/Emergency_Grant_Application.pdf.

MCC Academic Integrity Statement:

Go to www.mclennan.edu/academic-integrity for information about academic integrity, dishonesty, and cheating. The unauthorized use of artificial intelligence (AI) for classwork can be a violation of the College's General Conduct Policy. Whether AI is authorized in a course and the parameters in which AI can be used in a course will be outlined by each instructor.

Minimum System Requirements to Utilize MCC's D2L|Brightspace:

Go to <https://www.mclennan.edu/center-for-teachingandlearning/FacultyandStaffCommons/requirements.html> for information on the minimum system requirements needed to reliably access your courses in MCC's D2L|Brightspace learning management system.

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 notified via 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.

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. For more information about your student email account, go to www.mclennan.edu/studentemail.

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 their 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. If you need assistance with set-up, you may email Helpdesk@mclennan.edu for help.

You can find help on the McLennan website about connecting your McLennan email account to your mobile device:

- [Email Setup for iPhones and iPads](#)
- [Email Setup for Androids](#)

Forwarding Emails:

You may forward 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 be lost or placed in junk or spam filters.

For more helpful information about technology at MCC, go to [MCC's Tech Support Cheat Sheet](#) or email helpdesk@mclennan.edu.

Disclaimer:

The resources and policies listed above are merely for informational purposes and are subject to change without notice or obligation. The College reserves the right to change policies and other requirements in compliance with State and Federal laws. The provisions of this document do not constitute a contract.