

Updated 07/18/2023



WACO, TEXAS

**COURSE SYLLABUS
AND
INSTRUCTOR PLAN**

Introduction to Digital Systems

ENGR – 2406 – 001

Professor Laura E. Wright

NOTE: This is a 16-week course.

NOTE: This is a Face-to-Face course.

Course Description:

Introduction to theory and design of digital logic, circuits, and systems. Number systems, operations and codes, logic gates, Boolean Algebra and logic simplification, Karnaugh maps, combinational logic, functions of combinational logic, flip-flops and related devices, counters, shift registers, sequential logic, memory and storage. Semester Hours 4 (3 lec/3 lab)

Prerequisites and/or Corequisites:

Prerequisite: MATH 1314 with a grade of C or better.

Instructor Information:

Instructor Name: Professor Laura Wright

MCC Email: lwright@mclennan.edu (preferred method of contact)

Office Phone Number: 254-299-8419

Office Location: S 246 or Zoom Meeting ID: 837-729-4618

Office/Teacher Conference Hours: 9-11 T/W/Th, please email me if you need to meet outside of this

I generally try to answer emails, calls, and Slack messages as quickly as possible. However, please give me at least 24 hours to respond. Emails/calls/messages sent on weekends or holidays may not receive a response until the following business day.

This course meets every Tuesday & Thursday from 2:15-4:55pm in the Science 230

Required Text & Materials:

- *Digital Systems: Principles and Applications*, 12th ed by Tocci
- Digital Lab kit – available only in the MCC Bookstore
- At least 4 working AA batteries – I don't have extras! You MUST provide your own
- A scientific calculator (any calculator that can handle exponents and logs)
- Five 882-E scantron sheets
- A reliable internet connection
- Access to Brightspace: This course will have a significant component on Brightspace. If you haven't yet logged into the system, learn how to do so. Log in, and make sure you can access the materials for this course.

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

Additional requirements:

Students must have a reliable computer and internet connection. Students must be able to demonstrate basic computer literacy skills such as keyboarding, sending and receiving email, and using a web browser. Students may need access to LabVIEW to complete assignments, which is available in the Learning Lab, room 135 in the Science Building, the laptops in the engineering workshop, and can be downloaded for free.

***MCC Engineering uses Slack for communication.** All major course announcements will be posted in Slack – failure to check Slack will result in you missing important information. Also, anything we hear about jobs, scholarships, speakers, etc., will also be posted to Slack in the #general channel.*

Slack is free and used in the professional community as a workflow management system, so it is good to gain experience with the tool. All “general questions” like “I’m stuck on problem 5” will be directed to Slack, which will allow you and your classmates to support each other, especially in “time-crunch” situations. (Your classmates are a lot more likely to be up at 3 am doing homework than I am going to be checking email.) Always be respectful and professional in your participation.

Please bear in mind that Slack is an open communication tool. Please do not ask for or reveal personal information through the tool. Note that anything you post in Slack in channels will be viewable by other channel participants. Do not post anything about personal grades, due dates, or personal issues. Do not post your own correct solutions to assignments, but you can post incorrect work and ask if anyone can see where you went wrong.

Slack can be used on both a desktop computer and as an app. For more information about Slack in general, visit <https://slack.com/>. You will be invited to our class channel via your MCC student account. Detailed guidelines for Slack are on Brightspace and on Slack itself.

Methods of Teaching and Learning:

Students will learn through in-class lectures, videos, and reading, as well as through weekly homework assignments, quizzes, and tests. In addition, students will learn through lab activities and computer simulations. Additional methods may be used as opportunities present themselves.

Course Objectives and/or Competencies:

Upon successful completion of this course, students will be able to:

- Utilize binary and hexadecimal numbers. (*Chapter 2*)
- Solve problems involving digital codes, operations, and number systems. (*Chapter 2 & 6*)
- Define, describe, and analyze fundamentals of Boolean algebra and digital logic gates. (*Chapter 3*)
- Describe, analyze, design, and fabricate combinational logic circuits. (*Chapter 3, 4, 9*)
- Describe, analyze, design, and fabricate sequential logic circuits. (*Chapter 5-7*)
- Describe and explain the fundamentals of memory operations. (*Chapter 10-12*)
- Apply computer mathematical and/or simulation tools to solve digital systems problems. (*Select labs*)
- Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner. (*All labs*)
- Conduct basic laboratory experiments involving design and construction of digital circuits and systems. (*All labs*)
- Relate physical observations and measurements involving digital circuits and systems to theoretical principles. (*All labs*)
- Evaluate the accuracy of physical measurements and the potential sources of error in the measurements. (*All labs*)
- Design fundamental experiments involving principles of digital circuits and systems. (*All labs*)
- Identify and apply appropriate sources of information for conducting laboratory experiments involving digital circuits and systems. (*All labs*)

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.

Before the 60% point of the semester, a student who is absent for 25% or more of a face-to-face or blended course or who misses 25% or more of assigned work for an online course will be

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withdrawn from the course with a grade of W. A student may also request to be withdrawn with a grade of W before the 60% point of the semester. After the 60% point of the semester, the student may request to be withdrawn if the student is passing, or be assigned the final grade earned at the end of the semester after grades have been updated to reflect missing work.

Attendance will be taken during each lecture session and each lab session. If you are not in lecture or lab when attendance is taken, you will be marked absent, regardless if you show up later in the class period. In addition, if you leave lecture or lab before you are officially dismissed, you may be marked absent. For this class, which meets twice a week, and has both a lecture and lab section, 25% of class time is 16 lecture/lab sessions. If you reach 16 absences, the above withdrawal rules apply.

Course Outline or Schedule:

This calendar is subject to change. In the event that I need to make changes to the schedule, I will notify the class via Slack, MCC email, Brightspace announcement, and in class as soon as I possibly can. Please make sure you check Slack, your MCC email account, and Brightspace regularly in the event of a change.

Week	Topic	Textbook	What's Due Tuesday?
Week 1 Aug 22 – Aug 28	Introduction to Digital Systems Number Systems & Codes <i>Lab 1 – Number Systems & Codes</i>		
Week 2 Aug 29 – Sep 4	Parity Methods for Error Detection AND/OR/NOT Operations <i>Lab 2 – Basics of Electronics, AND/OR Operators</i>		HW 1 due Tuesday, Aug 29 @2:15pm
Week 3 Sep 5 – Sep 11	NOR/NAND Operations Boolean Theorems <i>Lab 3 – NOR/NAND, Boolean Theorems</i>		HW 2 due Tuesday, Sep 5 @2:15pm
Week 4 Sep 12 – Sep 18	Combinational Logic		HW 3 due

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	Test 1 – Thursday, September 13		Tuesday, Sep 12 @2:15pm
Week 5 Sep 19 – Sep 25	Karnaugh Maps XOR/XNOR Operators <i>Lab 4 – XOR/XNOR, Combinational Logic</i>		HW 4 due Tuesday, Sep 19 @2:15pm
Week 6 Sep 26 – Oct 2	Decoders/Encoders Multiplexers/Demultiplexers <i>Lab 5 – Decoders, Encoders, and Multiplexers</i>		HW 5 due Tuesday, Sep 26 @2:15pm
Week 7 Oct 3 – Oct 9	Latches & Flip Flops Sequential Logic <i>Lab 6 – Latches and Flip Flops</i>		HW 6 due Tuesday, Oct 3 @2:15pm
Week 8 Oct 10 – Oct 16	Clock Signals Asynchronous Inputs <i>Lab 7 – Sequential Logic</i>		HW 7 due Tuesday, Oct 10 @2:15pm
Week 9 Oct 17 – Oct 23	Shift Registers Frequency Division & Counting <i>Lab 8 – Counters 1</i>		HW 8 due Tuesday, Oct 17 @2:15pm
Week 10 Oct 24 – Oct 30	Digital Arithmetic Test 2 – Thursday, October 26		HW 9 due Tuesday, Oct 24 @2:15pm
Week 11 Oct 31 – Nov 6	Binary, Hex, and BCD Arithmetic Adders <i>Lab 9 – Digital Arithmetic</i>		HW 10 due Tuesday, Oct 31 @2:15pm
Week 12 Nov 7 – Nov 13	Asynchronous Counters Synchronous Counters		HW 11 due Tuesday, Nov 7 @2:15pm

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	<i>Lab 10 - Adders</i>		
Week 13 Nov 14 – Nov 20	Special Counters Register Data Transfer <i>Lab 10 – Counters 2</i>		HW 12 due Tuesday, Nov 14 @2:15pm
Week 14 Nov 21 – Nov 27	Digital to Analog Conversion Analog to Digital Conversion		HW 13 due Tuesday, Nov 21 @2:15pm
Week 15 Nov 28 – Dec 3	Test 3 – Tuesday, November 28 Final Exam Review <i>Bonus Lab</i>		HW 14 due Tuesday, Nov 28 @2:15pm
Week 16 Dec 7	FINAL EXAM – Thursday, December 7 @ 2:15 – 4:15 pm in Science 230		

Course Grading Information:

Grade Distribution	
Homework	25%
Labs	30%
Quizzes	5%
Test Average	40%
Total	100%

A: 90%+ B: 80% – 89% C: 70% – 79% D: 60% – 69% F: 0% – 59%

Homework: Homework is due each week on Tuesday before class starts at 2:15 pm. Homework will consist of problems worked from the textbook.

Labs: The lab activities in this class will provide real-world practice applying the concepts learned in the lecture, as well as creating computer simulations to model certain concepts. Unless otherwise stated, you will need to bring your circuit kit with you to every class in order to complete each lab. Failure to bring your circuit kit to class will result in a zero on that particular lab, which will not be eligible to be made up. Some labs will require LabVIEW software, which

is available for student download. LabVIEW is also available on the laptops in the engineering workshop, as well as the computers in Room 131 of the Science building. Some labs will take one class period to complete, others may take two class periods to complete. The lowest lab grade will be dropped at the end of the semester.

Quizzes: There will be 6 “pop” quizzes given randomly throughout the course of the semester. Quiz questions will likely come from the homework assignments. Each quiz will be open note, open book.

Tests: There will be three tests throughout the course of the semester on the dates indicated in the calendar, plus a comprehensive final exam, for a total of four tests. You will need a scientific calculator, and you will need to bring your own 882-E scantron (I do not have extras to give out). Internet capable devices (phones, tablets, etc) will not be allowed. If you are late to a test, you will lose that testing time. The lowest of the four test grades will be dropped.

Academic Dishonesty: Any student that is found guilty of academic dishonesty, such as cheating, plagiarism, or collusion, will receive a zero grade on every test or assignment involved. For repeated violations, a guilty student can be assigned a failing grade in this course and can be recommended for suspension from the McLennan Community College District.

Late Work and Make Up Work Policies:

Excused Absence Policy: MCC allows for “excused” absences under these circumstances: authorized participation in official College functions; personal illness, or the illness of a dependent (such as a child) that requires the student to serve as a caretaker; an illness or a death in the immediate family; the observance of a religious holy day. Additionally, accommodations can be made for special circumstances related to military service, changes in immigration status, pregnancy and parenting protection under Title IX. It is your responsibility to let me know the reason for an absence the day you return to campus and provide sufficient documentation (doctor's note, email from coach, etc.).

Late Work Policy: Late work will not be accepted, for any reason. If you are absent on the day a homework is due, you must scan it and send it to me electronically. If you miss a lab, quiz, or test on the dates listed in the calendar above due to an MCC excused absence reason, you must contact me as soon as possible (before any applicable lab, quiz, test dates, if possible) and

provide acceptable documentation as listed above for your absence so that I can make arrangements for you to make up the affected assignment(s). Absences without documentation or for reasons that do not fall under the above will not be considered for makeup and you will receive a zero for each affected assignment.

If you wish to withdraw from this class, you must email me from your MCC student account before 5 pm on the last day for student-initiated withdrawals, with the request "Please withdraw me from COURSE ID and SECTION NUMBER." If the email does not come from your student account, or if the request is verbal, I cannot withdraw you. Otherwise, you will stay on the roster for the rest of the semester and be awarded the grade earned. Withdrawing past the 60% date is only done in documented, extreme, life-crisis circumstances, which usually involve withdrawing from school entirely.

Normally, please do not bring your children, friends, or guests to the class. (Please discuss this with me because I do not want you missing class if you cannot make childcare arrangements.)

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.

[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.