College of the Mainland

ENGR 2305-101C3
Electrical Circuits I
Spring 2025
Monday Wednesday 2:00 pm-3:50 pm
STEAM Building Room 127

Instructor Information: Dr. E. Carl McIntyre, emcintyre1@com.edu, (337)693-2624

Student hours and location: Monday, Wednesday 12:00 pm to 2:00 pm STEAM 325-28
Tuesday Thursday 1:30 pm to 2:00 pm STEAM 325-28 Friday 10:00 am to 12:30 pm via Zoom

Required Textbook/Materials:

Textbook
Electric Circuits
James W. Nilsson and Susan Riedel
Pearson 12th edition (2023)
Print ISBN 9780137648375, 0137648375
eText ISBN 9780137648344, 0137648340

Materials
•   Engineer Pad, 5 Squares per Inch, 8.5" x 11", Green

Online Resources
•   COM BrightSpace: https://de.com.edu/webapps/login/

Training is required to access. If you have any questions regarding course access or training, please contact the Distance Education department at ext. 8476.

Course Description: (catalog description)
 (LECTURE 3, LAB 1). CREDIT 3. ACGM.
Principles of electrical circuits and systems.
• Basic circuit elements (resistance, inductance, mutual inductance, capacitance, independent and dependent controlled voltage, and current sources).
• Topology of electrical networks; Kirchhoff 's laws; node and mesh analysis; DC circuit analysis; operational amplifiers; transient and sinusoidal steady-state analysis; AC circuit analysis; first- and second-order circuits; Bode plots; and use of computer simulation software to solve circuit problems.
Prerequisite: PHYS 2426 and MATH 2414 with a grade of "C" or better.
Prerequisite/Co-requisite: MATH 2320.

Course requirements: (including description of any special projects or assignments)
Calculators
- You will be required to have a high quality calculator for this class. Preferably a calculator that can handle equations.

Exams
- There will be two exams (non-cumulative).
- Exams will be given during the scheduled class time.
- A formula sheet will be provided in the exam.
- There are NO make-up exams so please make every effort to not miss a test.

Homework Assignments
- These assignments will be linked to the course material to help reinforce the information covered in lecture.
- Homework has deadlines and must be completed on time for full credit.

Lectures
- Each class will cover textbook material.

Determination of Course Grade/Detailed Grading Formula: (methods of evaluation to be employed to include a variety of means to evaluate student performance)

Task	Total	% of the FINAL grade
Exams (100 points each)	200	30%
Attendance (8 points each)	232	35%
Assignments (8 points each)	224	34%
Total	**656**	**100%**

Percentage	Letter Grade
90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
0 – 59%	F

Late Work, Make-Up, and Extra-Credit Policy:
Any deviations from the policies described below are at the sole discretion of the instructor.
Late Work
- Late work will be accepted ONE WEEK late ONLY and given **HALF CREDIT**.

Make-Up Exams
- There are NO MAKE-UP EXAMS.
- You may be allowed to replace ONE missed exam with HALF the value of your LOWEST exam grade.

- Any additional missed exams will be issued a ZERO.

Attendance Policy:
COM recognizes no excused absences other than those prescribed by law: religious holy days and military service https://www.com.edu/student-services/student-handbook.html.
- Students are expected to attend all class sessions as listed on the course calendar.
- Attendance will be taken at the beginning of each class.
- Leaving early from class (without approval from the instructor) may result in an absence for that day.
- IF you do have to miss class, it is your responsibility to obtain notes from a classmate.
- Missing lectures may affect your allover class performance.
- Should you anticipate an absence, you must contact your instructor by email PRIOR to the absence.
- Each situation will be evaluated independently.
- You must provide legitimate proof for your absence.

Communicating with your instructor: ALL electronic communication with the instructor must be through your COM email. Due to FERPA restrictions, faculty cannot share any information about performance in the class through other electronic means. (Faculty may add additional statement requiring monitoring and communication expectations via D2L or other LMS)

Student Learner Outcomes*	Core Objectives**	Assessed via this Assignment
1. Explain basic electrical concepts, including electric charge, current, electrical potential, electrical power, and energy.	Communication Skills	Exams
2. Apply concepts of electric network topology: nodes, branches, and loops to solve circuit problems, including the use of computer simulation.	Critical Thinking Skills	Exams
3. Analyze circuits with ideal, independent, and controlled voltage and current sources.	Empirical and Quantitative Skills	Assignments
4. Apply Kirchhoff's voltage and current laws to the analysis of electric circuits.	Critical Thinking Skills	Exams
5. Explain the relationship of voltage and current in resistors, capacitors, inductors, and mutual inductors.	Communication Skills	Assignments
6. Derive and solve the governing differential equations for a time-domain first-order and second-order circuit, including singularity function source models.	Empirical and Quantitative Skills	Assignments
7. Determine the Thévenin or Norton equivalent of a given network that may include passive devices, dependent sources, and independent sources in combination.	Empirical and Quantitative Skills	Assignments
8. Analyze first and second order AC and DC circuits for steady-state and transient response in the time domain and frequency domain.	Critical Thinking Skills	Exams
9. Derive relations for and calculate the gain and input impedance of a given operational amplifier circuit for both DC and frequency domain AC circuits using an ideal operational amplifier model.	Empirical and Quantitative Skills	Assignments
10. Apply computer mathematical and simulation programs to solve circuit problems.	Critical Thinking Skills	Exams

Academic Dishonesty:

•   College of the Mainland is committed to a high standard of academic integrity. In becoming a part of the academic community, students are responsible for honesty and independent effort. Incidents of academic and scholastic dishonesty (including cheating, plagiarism, and collusion) will be dealt with in a manner consistent with College Policy and the Student Handbook.

•   Violations may result in a penalty. The maximum penalty will be a grade of "F" for the course. Violations may also be reported to the Judicial Coordinator as instances of Inappropriate Behavior. Please see the section on Privileges and Obligations in the Student Handbook for a more complete discussion of Inappropriate Behavior, and of your rights and responsibilities.

•   There are many situations where you will be required to submit written work to earn points. It is important that the work you submit be your own. You cannot copy the work of another, or have your work copied by another. Doing so will be considered a violation of Academic Honesty.

•   The work that you submit must be a product of your own mind. When completing assignments, for example, you are encouraged to collaborate with others to try to come to an understanding. But when you set pen to paper to write your answer, what you write must be a product of your own mind. When identical, or nearly identical, writings are submitted by students, it will lead me to suspect that work was copied. You could then be in violation of the standards of academic honesty, as described above.

Student Concerns: If you have any questions or concerns about any aspect of this course, please contact me using the contact information previously provided. If, after discussing your concern with me, you continue to have questions, please contact [insert name and title of direct supervisor] at [phone number/email address].

Course outline: (include calendar with lecture topics, due dates)

Date	Day	Lecture Topic	Reading Due	Homework Due
1/13/25	Monday	Chapter 1 - Course Introduction and Circuit Fundamentals	—	—
1/15/25	Wednesday	Voltage & Current Sources, Resistors, Ohm's Law, and Power	Chapter 1 & 2 pages 2 – 38	#01
1/20/25	Monday	Kirchoff's Laws, Open and Short Circuits, and Series and Voltage Division	Chapter 2 & 3 pages 39 – 70	#02
1/22/25	Wednesday	Parallel Resistors and Current Divider Circuits	Chapter 3 pages 61 – 70	#03
1/27/25	Monday	Delta-Wye Transforms and Wheatstone Bridge	Chapter 3 pages 73 – 78	#04
1/29/25	Wednesday	Introduction to Node-Voltage Method	Chapter 4 pages 94 – 103	#05
2/3/25	Monday	Introduction to the Mesh Current Method and Supernode and Supermesh	Chapter 4 pages 104 – 111	#06
2/5/25	Wednesday	Node Voltage vs. Mesh Current	Chapter 4 pages 112 – 114	#07
2/10/25	Monday	Source Transformations	Chapter 4 pages 115 – 118	#08
2/12/25	Wednesday	Thevenin & Norton Equivalent Circuits	Chapter 4 pages 118 – 128	#09
2/17/25	Monday	Thevenin & Norton Equivalent Circuits	Chapter 4 pages 118 – 128	#10
2/19/25	Wednesday	Maximum Power Transfer Theorem & Superposition Principle and One-port Network Exam 1 Review (Chapter 1 - 4)	Chapter 4 pages 129 – 131	#11
2/24/25	Monday	Exam, Chapter 1 - 4	Chapter 1 - 4	#12
2/26/25	Wednesday	Inductance and Capacitance	Chapter 6 pages 184 – 199	#13
3/3/25	Monday	Magnetically Coupled Circuits	Chapter 6 pages 199 – 211	—
3/5/25	Wednesday	Mutual Inductance Energy Calculations	Chapter 6 pages 207 – 209	#14
3/10/25	Monday	Transient Response First-Order Circuits	Chapter 7 pages 222 – 240	#15

3/12/25	Wednesday	Transient Analysis Step-by-Step Procedure	Chapter 7 pages 241 – 246	#16
3/24/25	Monday	Transient Analysis Sequential Switching	Chapter 7 pages 246 – 250	#17
3/26/25	Wednesday	Transient Analysis Unbounded Response	Chapter 7 pages 250 – 256	#18
3/31/25	Monday	Natural and Step Response Parallel RLC Circuit	Chapter 8 pages 274 – 296	#19
4/2/25	Wednesday	Natural and Step Response of Series RLC Circuits	Chapter 8 pages 296 – 303	#20
4/7/25	Monday	Time Domain Analysis of RLC Circuits	Chapter 9 pages 320 – xx	#21
4/9/25	Wednesday	Sinusoidal Sources	Chapter 9 pages 320 – xx	#22
4/14/25	Monday	Phasors and Impedance Part 1	Chapter 9 pages 324 – xx	#23
4/16/25	Wednesday	Phasors and Impedance Part 2	Chapter 9 pages 324 – 327	#24
4/21/25	Monday	Steady State AC Sinusoidal Analysis (Part 1)	Chapter 9 pages 327 – 347	#25
4/23/25	Wednesday	Steady State AC Sinusoidal Analysis (Part 2)	Chapter 9 pages 327 – 347	#26
5/1/25	Monday	Steady State AC Sinusoidal Analysis (Part 3)	Chapter 9 pages 327 – 347	—
5/6/25	Wednesday	Exam, Chapter 6 – 9	Chapter 6 - 9	—

Institutional Policies and Guidelines

Grade Appeal Process: Concerns about the accuracy of grades should first be discussed with the instructor. A request for a change of grade is a formal request and must be made within six months of the grade assignment. Directions for filing an appeal can be found in the student handbook **https://www.com.edu/student-services/docs/Student_Handbook_2024-2025_v2.pdf.** *An appeal will not be considered because of general dissatisfaction with a grade, penalty, or outcome of a course. Disagreement with the instructor's professional judgment of the quality of the student's work and performance is also not an admissible basis for a grade appeal.*

Academic Success & Support Services: College of the Mainland is committed to providing students the necessary support and tools for success in their college careers. Support is offered through our Tutoring Services, Library, Counseling, and through Student Services. Please discuss any concerns with your faculty or an advisor.

ADA Statement: Any student with a documented disability needing academic accommodations is requested to contact:
Kimberly Lachney, Student Accessibility Services Coordinator
Phone: 409-933-8919
Email: AccessibilityServices@com.edu
Location: COM Doyle Family Administration Building, Student Success Center

Textbook Purchasing Statement: A student attending College of the Mainland is not under any obligation to purchase a textbook from the college-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Withdrawal Policy: Students may withdraw from this course for any reason prior to the last eligible day for a "W" grade. Before withdrawing students should speak with the instructor and consult an advisor. Students are permitted to withdraw only six times during their college career by state law. The last date to withdraw from the 1st 8-week session is February 26. The last date to withdraw from the 16-week session is April 21. The last date to withdraw for the 2nd 8-week session is April 30.

FN Grading: The FN grade is issued in cases of *failure due to a lack of attendance*, as determined by the instructor. The FN grade may be issued for cases in which the student ceases or fails to attend class, submit assignments, or participate in required capacities, and for which the student has failed to withdraw. The issuing of the FN grade is at the discretion of the instructor. The last date of attendance should be documented for submission of an FN grade.

Early Alert Program: The Student Success Center at College of the Mainland has implemented an Early Alert Program because student success and retention are very important to us. I have been asked to refer students to the program throughout the semester if they are having difficulty

completing assignments or have poor attendance. If you are referred to the Early Alert Program you will be contacted by someone in the Student Success Center who will schedule a meeting with you to see what assistance they can offer in order for you to meet your academic goals.

Resources to Help with Stress:
If you are experiencing stress or anxiety about your daily living needs including food, housing or just feel you could benefit from free resources to help you through a difficult time, please click here https://www.com.edu/community-resource-center/. College of the Mainland has partnered with free community resources to help you stay on track with your schoolwork, by addressing life issues that get in the way of doing your best in school. All services are private and confidential. You may also contact the Dean of Students office at deanofstudents@com.edu or communityresources@com.edu.

Nondiscrimination Statement:
The College District prohibits discrimination, including harassment, against any individual on the basis of race, color, religion, national origin, age, veteran status, disability, sex, sexual orientation, gender (including gender identity and gender expression), or any other basis prohibited by law. Retaliation against anyone involved in the complaint process is a violation of College District policy.