



**ENGR-2305-101CL**  
**Electrical Circuits I**  
**Spring 2023**  
**2:00 pm to 3:50 pm**  
**Monday and Wednesday**

**Instructor Information:**

**Instructor:** Dr. Rebecca Fagan

**E-mail:** rfagan@com.edu (preferred method of communication)

**Office:** (409)933-8244

**Student hours and location:**

Monday and Friday 9:30am to 12:00pm

Wednesday 9:30am to 11:00am, 11:30am to 12:30pm

Or by appointment

Location: STEAM 325-18

**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:**

- (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:

#### Calculators

- <https://nces.org/exams/calculator/>
- NCEES approved calculators will be used for exams. After your first warning, your exam will be collected and your grade will be a zero if you are caught using a non-approved calculator.
  - Casio: All fx-115 and fx-991 models  
(Any Casio calculator must have "fx-115" or "fx-991" in its model name.)
  - Hewlett Packard: The HP 33s and HP 35s models, but no others
  - Texas Instruments: All TI-30X and TI-36X models  
(Any Texas Instruments calculator must have "TI-30X" or "TI-36X" in its model name.)

#### 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:

The details of how each item will be added to your final total are shown in the following chart.

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

Percentage	Letter Grade
<b>90 – 100%</b>	A
<b>80 – 89%</b>	B
<b>70 – 79%</b>	C
<b>60 – 69%</b>	D
<b>0 – 59%</b>	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.

**Student Learner Outcomes:**

Upon successful completion of this course, students will successfully demonstrate mastery of the Student Learner Outcomes listed below.

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

Student Learner Outcomes*	Core Objectives**	Assessed via this Assignment
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

\*\* <https://reportcenter.highered.texas.gov/training-materials/lower-division-academic-course-guide-spring-21/>

\*\* <http://leaptx.org/coreobjectives/>

### 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 the department chairperson, Professor Sheena Abernathy, either in person, by telephone at 409-933-8330, or by email at [sabernathy@com.edu](mailto:sabernathy@com.edu).

**Course outline:*****ENGR-2305-101CL, Electrical Circuits I – Tentative Course Schedule***

<b>Class</b>	<b>Date</b>	<b>Lecture Topic</b>	<b>Reading Due</b>	<b>Homework Due</b>
1	Wednesday, January 18	Chapter 1 - Course Introduction and Circuit Fundamentals	—	—
2	Monday, January 23	Voltage & Current Sources, Resistors, Ohm's Law, and Power	Chapter 1 & 2 pages 2 – 38	#01
3	Wednesday, January 25	Kirchoff's Laws, Open and Short Circuits, and Series and Voltage Division	Chapter 2 & 3 pages 39 – 70	#02
4	Monday, January 30	Parallel Resistors and Current Divider Circuits	Chapter 3 pages 61 – 70	#03
5	Wednesday, February 01	Delta-Wye Transforms and Wheatstone Bridge	Chapter 3 pages 73 – 78	#04
6	Monday, February 06	Introduction to Node-Voltage Method	Chapter 4 pages 94 – 103	#05
7	Wednesday, February 08	Introduction to the Mesh Current Method and Supernode and Supermesh	Chapter 4 pages 104 – 111	#06
8	Monday, February 13	Node Voltage vs. Mesh Current	Chapter 4 pages 112 – 114	#07
9	Wednesday, February 15	Source Transformations	Chapter 4 pages 115 – 118	#08
10	Monday, February 20	Thevenin & Norton Equivalent Circuits	Chapter 4 pages 118 – 128	#09
11	Wednesday, February 22	Thevenin & Norton Equivalent Circuits	Chapter 4 pages 118 – 128	#10
12	Monday, February 27	Maximum Power Transfer Theorem & Superposition Principle and One-port Network Exam 1 Review (Chapter 1 - 4)	Chapter 4 pages 129 – 131	#11
13	Wednesday, March 01	Exam, Chapter 1 - 4	Chapter 1 - 4	#12
14	Monday, March 06	Inductance and Capacitance	Chapter 6 pages 184 – 199	#13
15	Wednesday, March 08	Magnetically Coupled Circuits	Chapter 6 pages 199 – 211	—

Class	Date	Lecture Topic	Reading Due	Homework Due
<b>Spring Break, March 13 – 19</b>				
16	Monday, March 20	Mutual Inductance Energy Calculations	Chapter 6 pages 207 – 209	#14
17	Wednesday, March 22	Transient Response First-Order Circuits	Chapter 7 pages 222 – 240	#15
18	Monday, March 27	Transient Analysis Step-by-Step Procedure	Chapter 7 pages 241 – 246	#16
19	Wednesday, March 29	Transient Analysis Sequential Switching	Chapter 7 pages 246 – 250	#17
20	Monday, April 03	Transient Analysis Unbounded Response	Chapter 7 pages 250 – 256	#18
21	Wednesday, April 05	Natural and Step Response Parallel RLC Circuit	Chapter 8 pages 274 – 296	#19
22	Monday, April 10	Natural and Step Response of Series RLC Circuits	Chapter 8 pages 296 – 303	#20
23	Wednesday, April 12	Time Domain Analysis of RLC Circuits	Chapter 9 pages 320 – xx	#21
24	Monday, April 17	Sinusoidal Sources	Chapter 9 pages 320 – xx	#22
25	Wednesday, April 19	Phasors and Impedance Part 1	Chapter 9 pages 324 – xx	#23
26	Monday, April 24	Phasors and Impedance Part 2	Chapter 9 pages 324 – 327	#24
27	Wednesday, April 26	Steady State AC Sinusoidal Analysis (Part 1)	Chapter 9 pages 327 – 347	#25
28	Monday, May 01	Steady State AC Sinusoidal Analysis (Part 2)	Chapter 9 pages 327 – 347	#26
29	Wednesday, May 03	Steady State AC Sinusoidal Analysis (Part 3)	Chapter 9 pages 327 – 347	—
30	Monday, May 08	Exam, Chapter 6 – 9	Chapter 6 - 9	—

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**Institutional Policies and Guidelines**

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**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 [Student Handbook 2022-2023 v4.pdf \(com.edu\)](#). *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 at 409-933-8919 or [klachney@com.edu](mailto:klachney@com.edu). The Office of Services for Students with Disabilities is located in the 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 1<sup>st</sup> 8-week session is March 1. The last date to withdraw from the 16-week session is April 24. The last date to withdraw for the 2<sup>nd</sup> 8-week session is May 3.

**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](mailto:deanofstudents@com.edu) or [communityresources@com.edu](mailto:communityresources@com.edu).