

# ECE 204 Course Syllabus: Fall 2024

## Introduction to Electrical Engineering

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**Class Lectures:** Tuesdays and Thursdays 12:30 – 1:45 PM @ Scott 101

**Course Description:** Basic analog and digital circuits and systems.

### Prerequisites:

- MATH 161 (Second semester of single variable calculus for engineers)
- PH 142 (Calculus based electricity and magnetism, circuits, ...)

ECE 204 is a prerequisite for MECH 307 Mechatronics and Measurement Systems.

**Course objectives:** Upon completing this course, the student should be able to demonstrate an introductory understanding of DC and AC circuits, electronic semiconductor components, and digital logic. A student successfully completing this class will be able to:

- Quantitatively relate fundamental electrical quantities of charge, current, voltage, energy and power.
- Analyze multi-branch DC linear circuits to determine currents and voltages by methods of reduction to equivalent elements, source transformation, superposition, and node equations.
- Analyze simple linear AC circuits to determine transient response and phasor currents and voltages using complex numbers.
- Calculate the power for a circuit element from its DC, transient, or phasor current and voltage, and calculate power factor and related quantities for sinusoidal circuits including balanced three-phase systems.
- Design simple operational amplifier circuits using resistor feedback networks to obtain a specified voltage gain.
- Apply ideal diode and other piecewise-linear models to analyze circuits and confirm analysis assumptions.
- Describe the basic structure and operation of transistors.
- Discuss example applications of simple circuits that contain resistors, capacitors, inductors, diodes, transistors, and operational amplifiers.
- Convert integers between binary, hexadecimal and decimal form.
- Determine the binary output of simple combinations of logic gates

**Textbook:** Electrical Engineering Principles and Applications, (7th ed. preferred) by Allan R. Hambley. Pearson, 2017. In addition to the textbook, you will need access to Pearson's MasteringEngineering for online homework and Pearson's Learning Catalytics (LC) for in class electronic participation. See announcements on Canvas for more information. You must use the same email address and password for your MasteringEngineering and LC log in so that they are linked to the same account.

**Webpage:** This course will use CSU's Canvas, and the ECE 204 course webpage in Canvas is only accessible to registered students. To reach Canvas, direct your browser to <http://canvas.colostate.edu> and log in using your eID. If you are unable to log into Canvas, contact the ACNS helpdesk for support. If you have been registered for the class for more than about 48 hours, you should see a link for "2023SP-ECE-204-001: Introduction to Electrical Engineering" listed on the screen. Be aware that the publicly accessible webpage for this class, which is [www.engr.colostate.edu/ECE204](http://www.engr.colostate.edu/ECE204), may contain out-of-date information from a prior term.

Lecture notes, assignments, solutions, grades, and general announcements will be posted on the Canvas webpage or in MasteringEngineering. It is your responsibility to check both websites for new assignments each week. Often, MasteringEngineering assignments will not appear in the Canvas calendar. Feel free to use the discussion section of Canvas to broadcast questions to other students or participate in threaded discussions related to class topics. I will occasionally check these discussion postings. Please never send me messages or email me via Canvas as I rarely read messages there and using Canvas to generate emails doesn't preserve threaded email conversations and doesn't allow you to specialize your email subject line to tell me what aspect of the class you are emailing about.

**Outline:** The planned course topics are:

- Fundamental physics of electricity (review PH 142 circuits) 1 week
- DC Circuits 2 weeks
- AC Circuits 3 weeks
- Operational Amplifiers 1 week
- Diodes 2 weeks
- Transistors 2 weeks
- Digital Logic 1 week
- Reviews, exams, and other topics 3 weeks

**Grading:** Your overall score will be based on the following weighting:

- Assignments 25%
- Quizzes & Class Participation 10%
- Midterm Exam 1 20%
- Midterm Exam 2 20%
- Final Exam 25%

**Grading Scale:**

The following grade cut-offs are guaranteed:

A	A-	B+	B	B-	C+	C	D
90	87	84	80	77	74	70	60

The grading scale may be adjusted to award higher grades at the instructor's option. Overall scores are rounded to two decimal digits. For example, 76.99% results in a C+, not a B-. Final grades are not negotiable and are not

based on what you hoped to receive or what you need for specific academic or scholarship requirements; they are based strictly on your overall score. Any request for score changes on a prior assignment, quiz, or exam due to a grading error or any other reason must be emailed to the instructor no later than 14 days after the score and solution for that item are available to you.

**Exams:** The midterm exams are tentatively scheduled for October 3 and November 7. Additionally, we will be having a Preliminary Readiness Evaluation for Motivating Improved Exams (PREMIE) test in class two weeks prior to these dates, i.e., September 19 and October 24. See the next paragraph for details on the PREMIE tests. If you have official university conflicts on any of the four test and exam days, you must notify the instructor at least four weeks in advance of the date to make other arrangements. Exams and PREMIE tests are closed book, but you are allowed to bring one sheet of notes (front and back) to the first PREMIE test and midterm exam, two sheets of notes to the second PREMIE test and midterm exam, and three sheets of notes to the final exam, which is scheduled for Wednesday, December 11 at 9:40 AM.

**PREMIE Tests:** The purpose of the PREMIE tests is to increase student preparation for the midterm exams, hopefully leading to higher midterm exam scores. PREMIE tests will cover the fundamentals of material on the subsequent midterm exams. They will last 25 minutes and contain approximately 5 multiple-choice questions on essential topics. For example, the first PREMIE test will likely cover Kirchoff's laws, recognizing serial and parallel circuits, Ohm's law, and/or power and energy in circuits. Your score on the PREMIE tests will account for 25 to 33% of your overall score for the midterm exams. However, if you perform poorly on the PREMIE tests, you will be allowed to replace your entire score on the PREMIE tests with your score for a subset of questions on the subsequent midterm exam that cover the same fundamental material. If you perform well on the PREMIE test, you can skip the fundamental material questions on the corresponding midterm exam and substitute your PREMIE test score for those questions. Thus, the PREMIE test guarantees a minimum score on a portion of the midterm exam, and the midterm exam can function as a safety net if you score poorly on the PREMIE test.

**Tutorial and Homework Assignments** Tutorial and homework assignments will primarily be online through the MasteringEngineering website offered by the textbook publisher. Tutorial assignments are intended to be done after reading the textbook, but before necessarily covering the material in class. Homework assignments should be done after the Tutorials and after covering the material in class including addressing questions about the homework you ask in class. Weekly tutorial assignments are typically due by 11:59 PM on Monday, and weekly homework assignments are typically due by 11:59 PM on Friday, but please check the MasteringEngineering website for exact deadlines. If you submit MasteringEngineering work up to 24 hours late, you will receive partial credit, which decreases with time. I plan for there to be a new assignment due every week except the weeks of a midterm exam. Any written assignments will typically be due at 11:59 PM on Tuesdays through Canvas, and no late written submissions will be accepted. For any written homework, please write on your paper your name, CSU ID number, the number of hours you spent on each problem, and the name of any person other than the instructor and learning assistants who helped you or whom you helped with that homework problem.

**Class Participation:** To earn a participation score of 100% you must participate in at least 20 classes, as monitored by Learning Catalytics (LC). Your participation score will be calculated as

$$\text{score} = (\# \text{ of classes you participated in}) / 20$$

I will give extra credit on this score for additional participation and/or correctly answering at least one question each class. It is your responsibility to periodically review your LC scores online in MasteringEngineering to make sure they are getting properly transferred. I recommend doing this every week. Please notify the instructor immediately if your LC scores do not show up in MasteringEngineering.

## Academic Integrity:

This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog (<http://www.conflictresolution.colostate.edu/academic-integrity>) and the Student Conduct Code (<http://www.conflictresolution.colostate.edu/conduct-code>). Failure to abide by this policy and code may result in an academic penalty up to and including failing this course. You may discuss homework with others but are expected to do your own calculations and are not allowed to duplicate another student's work. You are expected to know and review definitions and implications of the code as described at <https://tilt.colostate.edu/integrity/knowTheCode/>.

All submitted work should be your own. Copying of language, structure, images, ideas, or thoughts of another, and representing them as one's own without proper acknowledgement (from web sites, books, papers, other students, solutions from previous offerings of this course, etc.) and failure to cite sources properly is not acceptable. Sources must always be appropriately referenced, whether the source is printed, electronic, or spoken. My policy is that of zero tolerance. Minor first infraction in HWs can lead to a zero score and/or up to one letter level (e.g., A to B) reduction in the course grade. Major repeated infractions in HWs will result in "F" grade for the course as well as reporting to the Dean's Office.

Use of Chegg or other online corporate cheating websites or any not explicitly authorized source of homework solutions, including solutions from prior years, is strictly prohibited for this class. You cannot use online sources other than those published in Canvas or MasteringEngineering for this course, either for seeking problem solutions or for posting class materials. Doing so are clear violations of CSU academic integrity policies. You won't have access to Chegg on exams, so you should learn how to solve problems without it when doing homework. Part of learning how to problem-solve is translating problem statements into an approach. Trying approaches that don't end up solving a problem provides helpful reinforcement of which approaches work in which situations. Using pre-existing detailed solutions to problems robs you of these experiences as well as violating class and CSU policies. Save yourself some money, improve your academic performance, and avoid disciplinary actions by canceling your Chegg or similar account now.

## CSU PRINCIPLES OF COMMUNITY:

- **Inclusion:** We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents and contributions.
- **Integrity:** We are accountable for our actions and will act ethically and honestly in all our interactions.
- **Respect:** We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.
- **Service:** We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.
- **Social Justice:** We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.

## Important information for students:

**Masks are no longer required inside university buildings. You must, however, meet university vaccine or exemption requirements.**

**All students are expected and required to report to the COVID Reporter (<https://covid.colostate.edu/reporter/>) when:**

- You suspect you have symptoms of COVID, regardless of whether you are vaccinated and even if your symptoms are mild
- You have tested positive for COVID through a non-CSU testing site, such as home test or test at a pharmacy
- You believe you may have been exposed to COVID go to the COVID Reporter and follow the guidance under “I believe I have been in close contact with someone who has COVID-19.” This guidance will depend upon your individual circumstances

You will not be penalized in any way for reporting symptoms or concerns.

**Do not ask me as your instructor to report for you. It is your responsibility to report through the COVID Reporter promptly.**

**As your instructor I may not ask you about vaccination status or if you have COVID, but you may freely volunteer to send me information from a public health official - if you have been asked to isolate or quarantine.**

When you complete the COVID Reporter, the CSU Public Health office will be notified. Once notified, that office will contact you and, depending upon each situation, will conduct contact tracing, initiate any necessary public health requirements and notify you if you need to take any steps.

If you do not have internet access to fill out the online COVID-19 Reporter, please call (970) 491-4600.

For the latest information about the University’s COVID resources and information, including FAQs about the spring semester, please visit the **CSU COVID-19 site** <https://covid.colostate.edu/>.

### **CSU Has Resources to Help**

Many of us are struggling. CSU is a community that cares. You are not alone. CSU Health Network Counseling Services has trained professionals who can help. Your student fees provide access to a wide range of support services. Call Counseling Services at (970) 491-6053, and they will work together with you to find out which services are right for you. Visit <https://health.colostate.edu/about-counseling-services> to learn more and <https://health.colostate.edu/mental-health-resources/> for additional student mental health and well-being resources. If you are concerned about a friend or peer, use Tell Someone by calling (970) 491-1350 or visiting <https://supportandsafety.colostate.edu/tell-someone/> to share your concerns with a professional who can discreetly connect the distressed individual with the proper resources. Rams Take Care of Rams. Reach out and ask for help if you or someone you know is having a challenging time.