

ECE 204 Introduction to Electrical Engineering Fall 2020 (Lear)

Course objective: 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. In particular, 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.

Catalog description (1986): “Basic analog and digital circuits and systems; ~~introduction to electromechanical devices.~~”

Prerequisites:

- MATH 161 (Second semester of single variable calculus for engineers)
 - PH 142 (Electricity and magnetism, circuits, ... (calculus based))
- ECE 204 is a prerequisite for MECH 307 Mechatronics and Measurement Systems.

Course Credits: 3

Class Lecture Sessions: 12:30 – 1:45, Tuesday and Thursday

Classroom Location: Microsoft Teams (Join [Here](#))

Instructor: Kevin Lear

Office: Scott Bioengineering 346

Email: KLLear@enr.ColoState.edu

When emailing me regarding class, please include “ECE204” as part of the subject line. I filter emails and may not see yours if you do not include "ECE204" in the subject line.

Phone: 491-0718

Office Hours:

Tuesdays 10:30 to 11:30 AM

Wednesdays 2:30 to 3:30 PM

These hours may be adjusted based on student feedback. If students have scheduled course conflicts with these times, they may request in advance an appointment at other times. Please plan ahead on homework to use available office hours.

Administrative Assistant: The administrative assistant for the course is Lakshmi Abburi, who uses the email address Lakshmi.Abburi@colostate.edu. Please note that email sent to this address goes to her, not to the instructor. If you have concerns about scores shown in Canvas, please email her directly. If you have questions or concerns about materials posted in Canvas, please email her with a cc to the instructor.

Learning Assistants: The learning assistants (LAs) for this course are:

- Marshall Bruner bruner@rams.colostate.edu
- Christina Chang ctchang@rams.colostate.edu
- Brandon Rouault brouault@rams.colostate.edu

They will typically hold two or more office hours per week. The specific times of their office hours will be posted on Canvas.

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 in 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 "[2020FA-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, 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.** 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 via Canvas as I rarely read messages there. You may use the Canvas email feature if it sends the email to my engr.colostate.edu address listed above.

Course Topics

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 week
- 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:

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

The midterm exams will be held online for 70 minutes and are tentatively scheduled for October 8 and November 19. 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 24 and November 5. 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 16th at 6:20 PM.

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 most basic 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. To take advantage of this PREMIE test score replacement, you will be required to fill out a replacement form, meet with the instructor or a learning assistant between the time of the PREMIE test and midterm exam and actively discuss the mistakes you made on the PREMIE test, and obtain their signature on the replacement form. 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 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 Thursday, 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 every week except the weeks before a midterm exam. Any paper assignments will typically be due at the beginning of a class period, and no late paper submissions will be accepted. For any paper 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.

Your participation score will be 100% unless you don't participate in more than 6 classes, as monitored by Learning Catalytics (LC). Your participation score will be calculated as $\text{score} = \text{lower of } 100\% \text{ OR } (\# \text{ of classes you participated in} / (\# \text{ of classes} - 6))$. You must get at least one LC question correct per class to qualify as participating in that class. (There are typically three or more LC questions per class.) I reserve the right to ask LC questions designed to determine if you are physically present in class. I also reserve the right to give quizzes near the start of class on Tuesdays. Quizzes cover reading, other outside of class preparation, or prior assignments. Your lowest quiz score will be dropped when calculating your quiz average. Quizzes will be weighted the same as one week's LC participation, when calculating your average quizzes and class participation score. **It is your responsibility to periodically review your LC scores online in Mastering-Engineering to make sure they are getting properly transferred. I recommend doing this each week. Please notify the instructor immediately if your LC scores do not show up in MasteringEngineering.**

Grades will be assigned according to the following scale:

		> 90%	A	87-90%	A-
84-87%	B+	80-84%	B	77-80%	B-
74-77%	C+	70-74%	C		
		60-70%	D	< 60%	F

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, a 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 a score change 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.

Academic Integrity Policy: This course will adhere to the [Academic Integrity Policy of the Colorado State University General Catalog](#) and the [Student 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/>.