
EE 206 - Circuits I

Spring 2020 - www.BisonAcademy.com

Course Information:

Instructor: Jake Glower
Office: ECE 201A
Class Times: MWF 8am AgHill 330
Labs: Mo 10am AgHill 228
Tu 12 noon AgHill 228
Office Hours: Tu/Th 11am & whenever my door is open
Text: Electric Circuits, Nilsson & Riedel
The edition doesn't matter for EE 206 - buy the used \$5 edition.
Note that the edition does matter for ECE 311 however.
On-Line Reference: www.BisonAcademy.com

Bulletin Description:

Linear electric circuits. Component models, circuit laws, transient analysis, design issues, computer tools. Prereq: MATH 166.

Course Objectives:

By the end of the semester, students should:

- Be able to solve for the currents and voltages in a circuit with steady-state DC and AC inputs.
- Be able to write N equations to solve for N unknowns using Voltage-Nodes and Current-Loop techniques
- Be able to design amplifiers with gains less than one, more than one, and with a negative gain.
- Be able to analyze mathematical functions with complex numbers.
- Be able to use circuit simulators (PartSim) to simulate the response of circuits to steady-state inputs.
- Be able to build circuits in lab and measure the steady-state response.

Text Book & Bison Academy:

Any edition of Electric Circuits works for Circuits I (older editions sell for \$5 on Amazon). The newer editions have different homework problems (which you'll need for Circuits II). In Circuits I, I make up my own homework assignments so I can post the solutions. Likewise, the edition doesn't really matter. (buy the cheapest one you can). Daily lecture notes (and eventually video tutorials) are posted on Bison Academy.

Circuits I and Circuits II

Circuits I covers the analysis of RLC circuits in steady-state. The main techniques we'll be using are current-loops and voltage nodes: techniques which let you write N equations to solve for N unknown voltages or currents. Initially, we look at DC analysis of circuits where we work with real numbers. Towards the second half of the course, we start using complex numbers, which allow us to analyze circuits with sinusoidal inputs (phasor analysis).

Circuits II picks up where Circuits I leaves off and looks at designing circuits to act as filters (such as a sub-woofer), analysis of circuits with periodic inputs which are not sine waves, and the transient analysis of circuits.

All EE and Computer E students are required to take Circuits I. Circuits II is *highly* recommended for all students as well.

- The material is important to both electrical and computer engineers
- The material is background material when helps greatly when you take ECE 343 Signals and Systems
- Circuits II counts as a Technical Elective for computer engineers - so it counts towards graduation.

Even if you are not required to take Circuits II, I *highly* recommend that you take it before you take signals and systems.

Required Student Resources:

- Calculator capable of complex numbers
HP35S recommended (\$50 from Amazon)
Most ECE students use TI84 Plus (\$100 from Amazon)

Evaluation Procedures and Grading Criteria

Grades will be the average of the following:

| Homework | Labs | Exams (x3) | Final Exam |
|----------|--------|-------------|------------|
| 16.67% | 16.67% | 16.67% each | 16.67% |

Grades are rounded to the nearest 1%, with your final grade being

| F | D | C | B | A |
|-------------|-----------|-----------|-----------|-------------|
| 59% or less | 60% - 69% | 70% - 79% | 80% - 89% | 90% or more |

Homework Sets and Groups

Homework sets are assigned on a weekly basis. Students may work in groups of 1 to 2 on homework sets. If you work in a group of 2, you please turn in one assignment per group with both of your names on it.

Note that tests are individual effort - meaning that if you work in a group, make sure each person understands each problem. You'll see them again on the test.

Labs

Each homework assignment has a lab associated with it where you analyze, simulate, then build the circuit to see if your calculations actually match up with reality. For labs, you should work in groups of 2 (ideally) or 3 (if necessary). Each student in a group should be able to build the circuits and operate the equipment.

During the last week of the semester, there will be a lab final which counts as 30% of your lab grade. Here, each student will work alone and have one hour to build a circuit and collect data (such as measure the voltages in the circuit). Likewise, please rotate your rolls each week - you'll need to perform all the rolls on the lab final.

Monday Labs: Section 1 has labs on Mondays. Unfortunately, there are five Monday holidays spring semester - meaning that section will miss one third of the labs. Two make-up labs have been scheduled to remedy this. You can also work on the labs in ECE room 211 and 237 whenever it fits your schedule. Those rooms are closer to my office and I would be glad to help if you'd like to do the labs during the scheduled lab week.

Legal Stuff:

Attendance: According to NDSU Policy 333 (www.ndsu.edu/fileadmin/policy/333.pdf), attendance in classes is expected. Students are responsible for the material covered in class and in assignments regardless of their attendance. Note that all lecture notes, homework sets, and solutions are available on-line at www.BisonAcademy.com

Students with Special Needs: Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor and contact the Disability Services Office (www.ndsu.edu/disabilityservices) as soon as possible.

Academic Honesty: The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academic honesty.

Academic Honesty Defined: All written and oral presentations must "respect the intellectual rights of others. Statements lifted verbatim from publications must be cited as quotations. Ideas, summaries or paraphrased material, and other information taken from the literature must be properly referenced" (Guidelines for the Presentation of Disquisitions, NDSU Graduate School).

ECE Honor Code: On my honor I will not give nor receive unauthorized assistance in completing assignments and work submitted for review or assessment. Furthermore, I understand the requirements in the College of Engineering Honor System and accept the responsibility I have to complete all my work with complete integrity.

Veterans and Student Soldiers: Veterans and student soldiers with special circumstances or who are activated are encouraged to notify the instructor in advance.
