

ECE 215/S – Principles of Electronic Cyber Warfare

Block 1: Resistive Circuits and Power Distribution

Lesson 1: Course Overview

Department of Electrical and Computer Engineering
United States Air Force Academy

Fall 2026

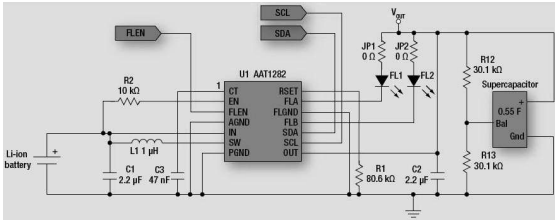
Welcome to ECE 215/S

This course builds one capability: **analyze an engineered system well enough to make a decision about it.**

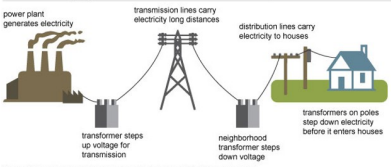
- We start with a **resistor** and finish with a **jamming scenario** — in one semester
- Three blocks: circuits and power, signal processing, then communications, radar, and electronic warfare
- Every block ends in a **group project** on a real system

You do not need to be an ECE major. You do need to show up and do the work.

Why This Course Matters



Electricity generation, transmission, and distribution

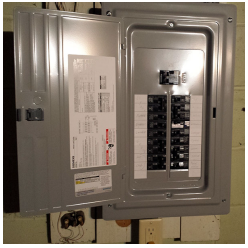


Source: Adapted from National Energy Education Development Project (public domain)

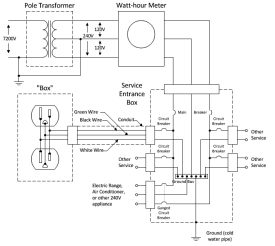
Understanding systems like the **F-35**, **hypersonic weapons**, and **GPS** is part of leading in a technical force.

- Every one of them is a circuit, a signal, and a link
- Whatever your major, you will be handed technical problems
- The goal is not to make you an engineer — it is to make you dangerous in a technical conversation

Engineers Model What They Cannot Solve Whole



⇒



The panel on the left is a real thing with screws and heat. The diagram on the right is what lets you *compute* with it. Half of this course is learning which model to reach for.

The Three Blocks



- **Block 1** — analyze a circuit, protect it, and move power across a system
- **Block 2** — turn a real-world signal into bits a computer can act on
- **Block 3** — put those bits on a radio wave, bounce them off a target, and deny them to an adversary

40 lessons, 25 learning objectives, 3 projects.

How You Are Graded

Category	Weight
Quizzes (11)	40%
Projects and Labs (5)	15%
Midterm	15%
Final	30%
Total	**100%**

- **Quizzes** are the backbone — 11 of them, each tied to specific objectives
- **Projects** are group work; labs count here too
- **Midterm** is take-home; the **final** is proctored during finals week

Gradescope carries the official deadlines. When in doubt, Gradescope wins.

Alternative Grading: You Earn a 1 or a 0

This course does not use partial credit. Each quiz problem is scored **1** or **0**.

- **1** — correct, with at most trivial math errors. Understanding is evident
- **0** — you get *feedback*, not the answer
- If you submitted real effort on time, you may **revise a 0 into a 1** within one week
  - Correct the problem, submit a shareable link through a Gradescope regrade request
- Miss the deadline or submit no effort, and the revision path closes
  - The only way back is reading a paper your instructor assigns and leading a discussion on it

Partial credit hides what you do not know. A 1 or a 0 does not.

Learning Objectives Drive Everything

There are **25 learning objectives**, and every graded item maps to one.

- Each is written as "**I can** . . . " — a thing you will be able to do, not a topic you will have seen
- Objectives are numbered **Block.Objective** — "2.5" is the fifth objective of Block 2
- You will see the same numbers on the website, the slides, the quizzes, and the exams
- Today's lesson has no objective. It is the only one that does not

If you can honestly say "I can do this" for all 25, you will do well.

Materials and Communication

- **Course website** — syllabus, schedule, readings, slides, practice problems, projects
  - `usafa-ece.github.io/ece215-book`
  - Updated during the semester. Bookmark it and come back often
- **Gradescope** — every assignment is submitted, graded, and returned here. Official deadlines live here
- **Teams** — day-to-day communication, schedule changes, and the Discussions channel
  - Asking a question in Discussions helps you and the person who was afraid to ask
- **Email** — bedrest, SCAs, and anything needing a paper trail

Policies That Actually Matter

- **Extra Instruction** — the single best predictor of doing well here
  - Open EI every T-day during AW time; individual EI by calendar invite; questions by Teams
- **Collaboration** is encouraged; copying is not
  - The test: can you explain every step you submitted? Then it was collaboration
- **Generative AI** — Level 4 for most work (co-create and revise), but **never on quizzes**
  - It is bad at engineering math. A perfect answer from a cadet who never came to EI is visible
- **Documentation** — every submission needs a documentation statement
  - "Documentation: None" is a complete and correct statement when it is true
  - Missing or incomplete documentation earns a 0
- **Absences** — talk to your instructor **before**, not after. Deadlines hold regardless

Your Turn

Take two minutes, then we go around the room:

1. Your name, your major, and where you are from
2. One system you actually want to understand by the end of this course — an aircraft, a satellite, a weapon, a phone, anything
3. One thing that would make this class work well for you

Answer 2 honestly. It shapes the examples we use all semester.

Wrap-Up

Key ideas:

- Three blocks, 25 objectives, 3 projects — from one resistor to an EW scenario
- Quizzes are 40% and are graded **1 or 0**, with a revision path if you put in real effort on time
- The website is the course; Gradescope is the deadline; Teams is the conversation

Next lesson:

- **Lesson 2 — Objective 1.1: Circuit Fundamentals and Ohm's Law**
- **Quiz 0** (skills review) is due at Lesson 2 — it is how you practice the revision process