COMP 1701 Introduction to Electrical and Computer Engineering (3 credit hours)

Elmira College

SPRING 2025

Required Text:

1. Allan Hambley, ***Electrical Engineering: Principles and Applications***, 2018, Pearson Education Limited;
2. David Harris, Sarah Harris, ***Digital Design and Computer Architecture***, 2012, Morgan Kaufmann.

Supplemental readings will be included to illustrate or expand on textbook readings.

Pre-requisites: None

Course Description

This course offers a broad foundation in the core concepts of electrical and computer engineering. Topics covered include digital abstractions, number systems, and logic gates, with an emphasis on designing digital circuits. The course also introduces key components such as resistive circuits, transistors, and operational amplifiers, while exploring advanced topics like memory systems, microcontrollers, and hardware description languages. Students will gain both theoretical knowledge and hands-on experience in solving engineering problems, equipping them with the skills needed to design and analyze complex systems in modern electrical and computer engineering.

Course Objectives and Goals

- Understand and apply number systems (binary, hexadecimal) and logic gate operations..
- Design and analyze combinational and sequential digital circuits..
- Apply principles of resistive circuits, inductance, and capacitance in electrical systems.
- Understand CMOS transistors and their role in digital system design.
- Explore the applications of amplifiers, transistors, and operational amplifiers.
- Gain practical skills in using hardware description languages for digital system design.

Evaluation of Performance

Your grade will be based upon your performance on exams, assignments, and participation.

6 Lab Exercises	15%
5 Assignments	30%
Midterm Exam	20%
Final Project	10%
Final Exam	25%
Total	100%

Grades will be assigned as follows:

A	93% and above	B-	80 - 82%	D+	67 - 69%
A-	90 - 92%	C+	77 - 79%	D	63 - 66%
B+	87 - 89%	C	73 - 76%	D-	60 - 62%
B	83 - 86%	C-	70 - 72%	F	59% or below

Withdrawal Policy: Please see Elmira College Bulletin for information on this policy.

Academic Honesty: Please read the section on Academic Honesty in the **Code of Conduct**. Briefly, academic dishonesty includes: cheating, fabrication, facilitating academic dishonesty, and plagiarism. Ask if you have any questions on whether something constitutes as academic dishonesty. All work must be original and new. Past assignments from current or other courses will not be accepted. Academic dishonesty will not be tolerated. It will result in zero on the assignment, and a report will be filed with the school. Continued practice will result in failure of the class. Institutional penalties may also apply with repeated acts of academic honesty.

Student Responsibility:

- It is your responsibility to keep track of assignments and due dates.
- You should ask questions concerning assignments and lectures, if you need any clarifications.
- If you are struggling in class, have concerns, and/or unsure about expectations, please stop by during office hours or make an appointment for another time.

Tentative Schedule of Topics

Topic	Materials	Tasks & Evaluations
Combinational Logic Design	Chapter 1	Lab#1
Sequential Logic Design	Chapter 2	Assignment 1
Hardware Description Languages	Chapter 3	
Digital Building Blocks	Chapter 4	Lab#2
Architecture and Microarchitecture	Chapter 5	Assignment 2
Memory and I/O Systems	Chapter 6	
Programming in Digital Systems	Chapter 7	
Resistive Circuits and Circuit Analysis	Chapter 8	Lab#3
Inductance, Capacitance, and Circuit Behavior	Chapter 9	Assignment 3
Transients in Electrical Circuits	Chapter 10	
Steady-State Sinusoidal Analysis in Circuits	Chapter 11	Midterm Exam
Frequency Response, Bode Plots, and Resonance	Chapter 12	Lab#4
Logic Circuits and Boolean Functions	Chapter 13	
Computers and Microcontrollers in Embedded Systems	Chapter 14	Assignment 4
Computer-Based Instrumentation Systems	Chapter 15	
Diodes and Semiconductor Basics	Chapter 16	Lab#5
Amplifiers: Specifications, Characteristics, and Applications	Chapter 17	
Field-Effect Transistors and their Applications	Chapter 18	Assignment 5

Bipolar Junction Transistors and Their Characteristics	Chapter 19	
Operational Amplifiers in Analog Circuits	Chapter 20	Lab#6
Magnetic Circuits, Transformers, and Electromagnetic Principles	Chapter 21	Final Project
DC Machines: Principles and Applications	Chapter 22	
AC Machines: Principles and Applications	Chapter 23	Final Exam