

EGR 2400: Introduction to Electrical and Computer Engineering

Credits Hours: 4 credits, 3.57 contact hours/week.

Instructor: Brian K. Dean, Ph.D.

Text book: Digital Systems Principles and Applications (Custom edition for Oakland University) by Ronald Tocci, Neal Widmer, Gregory Moss. ISBN-13: 978-1-323-41956-4

Specific course information

An introduction to the fundamentals of electrical and computer engineering; DC and AC circuits, digital logic circuits; combinational logic design; sequential circuits, introduction to electronics, operational amplifiers, DC electromechanical machines. With laboratory.

Prerequisites: EGR 1400 or CSI 1420

Required course for CS major

Course Objectives: Upon successful completion of this course, students should be able to

- Convert a number in one base (decimal, binary, hexadecimal) to another and vice versa (a);
- Identify basic gates (NOT, AND, OR, NAND, NOR, XOR, XNOR) and list the truth tables for each gate [ABET CS: (a, b)]
- Find the reduced form of any logic function with 3 or 4 inputs by using Karnaugh maps [ABET CS: (a, b, c)]
- Simulate basic digital circuits using Verilog and synthesize these circuits in an FPGA [ABET CS: (b, c, i, k)]
- Find the voltages and currents in basic DC circuits [ABET CS: (a)]
- Use phasors to find voltages and currents in basic AC circuits [ABET CS: (a)]
- Set up the nodal and mesh matrix equations for AC and DC circuits [ABET CS: (a)]
- List the properties of an ideal operational amplifier and use these properties in circuit analysis [ABET CS: (a)]
- Find and draw Thevenin and Norton's equivalent circuits of simple DC and AC circuits [ABET CS: (a)]

List of Topics:

- Fundamentals of electrical and computer engineering
- DC and AC circuits
- Digital logic circuits
- Combinational logic design
- Sequential circuits
- Introduction to electronics
- Operational amplifiers

- DC electromechanical machines