

Common Course Outline
ELEI 204/ENSC 215
Introduction to Digital Electronics
3 Semester Hours

The Community College of Baltimore County

Description

ELEI 204/ENSC 215 – 3 Credits – Introduction to Digital Electronics explores the theory and operation of the basic building blocks of digital electronics with emphasis on transistor-transistor logic (TTL) and complementary metal oxide semiconductor (CMOS) integrated circuit logic families; prepares for continued study of theory and operation of microprocessors and microcomputers.

3 Credits: 3 lecture hours per week; 2 lab hours per week

Prerequisite: **EMET 145/ENSC 105**

Overall Course Objectives

Upon successful completion of this course the student will be able to:

1. demonstrate a basic understanding of digital terminology, digital components, and systems;
2. apply digital circuit theory in a laboratory setting as it is applied to a work situation;
3. distinguish between digital and analog systems;
4. explain the basics of Boolean logic operations;
5. evaluate logic circuit outputs, describe the operation of logic gates, write truth tables for logic gates;
6. convert to and from the following number bases: decimal, binary, octal, and hexadecimal;
7. explain the operation of flip flops, D-Flip-Flop, J-K Flip-Flop, Flip-Flop used as a shift register;
8. describe the operation of asynchronous counters;
9. explain the operation of synchronous counters;
10. synthesize a circuit in a field programmable logic array (FPGA) using a logic compiler software on a personal computer; and
11. illustrate the operation of encoders, decoders, multiplexers, shift registers, and wave generating circuits.

Major Topics

- I. Digital and analog systems
- II. Number systems and codes
- III. Logic gates, Boolean Algebra and truth tables
- IV. Boolean theorems
- V. DeMorgan's theorem
- VI. Combinational logic circuits
- VII. Flip-flops
- VIII. Asynchronous inputs
- IX. Digital arithmetic operations and circuits
- X. The Complement System of addition and subtraction

XI. Counters and registers

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member and will be provided the first day of class.

The following will be required for this course:

1. Homework
2. Midterm and final exams
3. Minimum of four (4) lab assignments

Writing: The individual faculty member will determine specific writing assignments, but will include:

- Lab reports

Other Course Information

This course is a required core course for the Engineering Technology Electronics/Electrical Engineering Option.

Components of this course are taught in a computerized lab environment.