

Virginia Western Community College

ETR 280

Introduction to Digital Logic Circuits and Computers

Prerequisites

ETR 113-Studies DC and AC circuits, basic electrical components, instruments, network theorems, and techniques used to predict, analyze and measure electrical quantities.

Course Description

Studies digital logic, Boolean algebra, and arithmetic circuits, using standard integrated circuits and the functional block approach. Introduces concepts of computers, the internal operation and control language.

Semester Credits: 4 Lecture Hours: 3 Lab/Recitation Hours: 3

Required Materials

Textbook:

Science of Electronics: Digital, Author: Floyd, Publisher: Pearson Prentice Hall, ISBN# 9780130875495

Other Required Materials:

- Jump Drive
- Arduino Microcontroller Uno (provided)
- Multi-Sim IC software (free to download)
- Arduino IDE (free to download)

Course Outcomes

At the completion of this course, the student should be able to:

- Convert between the number systems used in digital systems.
- Identify commonly used integrated circuit families used in digital equipment and discuss their operation, characteristics, and features.
- Discuss the operation and application of gates, flip-flops, digital counters, shift registers, and other digital common components.
- Analyze and design basic combinatorial logic circuits and use circuit reduction techniques.
- Analyze basic sequential logic circuits and explain their relation to computer-controlled systems.
- Construct and demonstrate the operation of digital circuits.
- Troubleshoot basic digital systems given the appropriate equipment and technical information.

Topical Description

- Digital Quantities and Functions, Logic Gates: AND, OR, Inverter
- Logic Gates: NAND and NOR
- Logic Gate Combinations
- Logic Gate Combinations
- Arithmetic Logic and Processes
- Decoders
- Encoders, Multiplexers
- Latches, Flip Flops, Timers
- Counters
- Shift Registers
- Computer Basics, Types of Memory
- Digital Signal Processing
- Micro-Controller Applications

Notes to Instructors

Beginning Fall 2020, VWCC will require students to have a computer or reliable access to a computer, capable of participating in an online format. Online courses at Virginia Western require a significant amount of interaction with Canvas, the Learning Management System, and many require real-time class sessions using the Zoom web-conferencing tool. To be successful in online classes, students must have substantial access to a computer with high-speed internet connectivity. The expected requirements are listed on the college webpage.

[TITLE IX STATEMENT](#)

[ADA STATEMENT](#)