Digital Electronics Course Syllabus

Instructor: Mr. Hoffman  Program Code: 171000/171502/171710
Grade Level: 9 - 12  Course Code: 75
Course Length: 1 Year  Lakeview Credits: 1
Course Number: 21008  Hours: 146 based on 50 min. classes
Prerequisite: None

Digital Electronics™ is the study of electronic circuits that are used to process and control digital signals. In contrast to analog electronics, where information is represented by a continuously varying voltage, digital signals are represented by two discreet voltages or logic levels. This distinction allows for greater signal speed and storage capabilities and has revolutionized the world electronics. Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, etc.

The major focus of the DE course is to expose students to the design process of combinational and sequential logic design, teamwork, communication methods, engineering standards, and technical documentation.

Digital Electronics™ is one of three foundation courses in the Project Lead The Way® high school pre-engineering program. The course applies and concurrently develops secondary level knowledge and skills in mathematics, science, and technology.

The course of study includes:

• Foundations of Digital Electronics
  • Scientific and Engineering Notations
  • Electronic Component Identification
  • Basic Soldering and PCB Construction
  • Electron Theory & Circuit Theory Laws
  • Circuit Simulation
  • Breadboard Prototyping
  • Component Datasheets & Troubleshooting

• Combinational Logic Analysis and Design
  • Binary, Octal and Hexadecimal Number Systems
  • Boolean Algebra and DeMorgan’s Theorems
  • AND-OR-INV, NAND Only, and NOR Only Logic Design.
  • Binary Adders and Two’s Complement Arithmetic
  • Combinational Logic Design with Field Programmable Gate Arrays

• Sequential Logic Analysis and Design
  • Flip-Flops, Latches and Their Applications.
  • Asynchronous Counter Design with Small and Medium Scale Integrated Circuits.
  • Synchronous Counter Design with Small and Medium Scale Integrated Circuits.
  • Sequential Logic Design with Field Programmable Gate Arrays
  • Introduction to State Machines.

• Introduction to Microcontrollers
  • Software Development for a Introductory Microcontroller
  • Real-World Interface: Introduction to Hardware Controls
  • Process Control with a Microcontroller

This course can be taken for college credit through University of Minnesota.

Grading:
Total points for the semester will be tabulated from the following areas:
Projects
Engineering Notebook
Assignments
Work Ethic

A letter grade will be given based on the percentage of points earned. A breakdown is as follows: A’s: 100 - 94, B’s: 93 - 87, C’s: 86 - 80, D’s: 79 - 70, and F: 69 and below.