

# SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

## COURSE OUTLINE

Course Title : Digital Electronics  
Course No.: ELN-115  
Program: Electrical / Electronics / Instrumentation Technician  
Semester: Two  
Author(s): Ed Sowka  
Date: January 2000  
Previous  
Outline Dated: January 1999

Approved:

K. DeRosario  
Dean

Dec. 21/99  
Date

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For additional information, please contact Kitty DeRosario, Dean, School of Trades  
& Technology, (705) 759-2554, Ext. 642.

**Course Name:**  
**Digital Electronics**

**Course No.:**  
**ELN-115**

**TOTAL CREDITS:** 5

**PREREQUISITES:** ELN-100

**COURSE LENGTH:** 17 Weeks @ 5 Hours/Week  
3 Hours Theory + 2 Hours Lab

**TOTAL CREDIT HOURS:** 85 Hours

## **I. COURSE DESCRIPTION**

This course is a study of modern digital devices and circuits. The student will study Digital Numbering Systems, Boolean Algebra and common Digital Integrated circuits. Emphasis will be placed on the analysis and troubleshooting of these devices and circuits, with a small component of design.

## **II. TOPICS TO BE COVERED:**

1. Rectangular / Pulse Waveshapes
2. Digital Number Systems
3. TTL Logic Devices and Circuits
4. CMOS Logic Devices
5. Pulse Generating / Shaping Circuits

### **III. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE:**

#### **A. Learning Outcomes:**

1. Understand Pulse waveform terminology and Characteristics.
2. Use common test equipment to measure and set-up, pulse waveform characteristics.
3. Understand and convert between the common digital numbering systems.
4. Analyse, construct, test and troubleshoot circuits employing TTL/CMOS I.C.'s.
5. Design simple logic circuits.
6. Construct and Analyse Pulse Shaping / Generating Circuits.

#### **B. Learning Outcomes with Elements of Performance:**

**Upon successful completion of this course, the student will demonstrate the ability to:**

1. Understand terminology and characteristics associated with rectangular waveshapes.

##### **Potential elements of the performance:**

- Identify and Define Pulse Amplitude, Period, Pulse Width, Pulse Space, Duty Cycle, Rise / Fall Times, Overshoot / Undershoot and Ringing.
- Setup common test equipment to output and measure the above listed electrical characteristics of rectangular waveshapes.

2. Understand digital numbering systems.

##### **Potential elements of the performance:**

- Fluently count in Binary, Octal, Hexadecimal, Binary Coded Decimal up to  $100_{10}$ .
- Convert between Decimal and Binary, Octal, Hexadecimal, Binary Coded Decimal.
- Understand the Gray and ASCII codes.

... and microcontroller circuits employing digital logic functions using common test equipment (DVM, Oscilloscope, Logic Probe / Pulser).

Timer, Integrators, Differentiators and Schmitt Triggers.

#### IV. REQUIRED STUDENT RESOURCES:

- Text - Digital Systems Principles and Applications by Tocci & Widmer ( 7<sup>th</sup> Edition )  
**Note:** 6<sup>th</sup> Edition will suffice.
- Motorola Fast and LS TTL Databook or any current LS TTL Databook  
You can obtain your data book directly from Motorola ( Shipping Cost Applies)
- Digital Parts Package - Digital I.C.'s  
1<sup>st</sup> Year Parts Package

#### V. METHODS OF EVALUATION:

The following Grading System will be used:

A+ = 90% - 100%

A = 80% - 89%

B = 70% - 79%

C = 60% - 69%

R = less than 60% (Repeat Course)

X = Temporary Grade as per College Policy

The final grade will be derived as follows: Theory - Tests ( 2 or 3 ) and Quizzes = 50 %

Lab - Practical tests and Lab Reports = 40 %

Subjective Evaluation \*\*\* = 10%

**Total = 100%**

\*\*\* Subjective Evaluation is based on attendance, punctuality, participation, and professional work ethic .