

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title : **Digital Electronics**
Course No.: **ELN-115**
Program: **Electrical / Electronics / Instrumentation Technician**
Semester: **Two (2)**
Author(s): **Edward Sowka**
Date: **January 1997**
Previous
Outline Dated: **January 1995**
Approved: *K. DeLoraine* 1998-01-07
Dean Date

TOTAL CREDITS: 5
PREREQUISITES: ELN100
COURSE LENGTH: 17 Weeks @ 5 Hours/Week
3 Hours Theory + 2 Hours Lab
TOTAL CREDIT HOURS: 85 Hours

Course Name:
Digital Electronics

Course No.:
ELN-115

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:

- Setup common test equipment to output and measure electrical characteristics of rectangular waveshapes (Pulse Amplitude, Period, Pulse Width, Pulse Space, Duty Cycle, Rise / Fall Times, Overshoot / Undershoot and Ringing)
2. Understand digital numbering systems.

Potential elements of the performance:

- Fluently count in Binary, Octal, Hexadecimal, Binary Coded Decimal.
- Convert between Decimal and Binary, Octal, Hexadecimal, Binary Coded Decimal.
- Understand the Gray and ASCII codes.

3. Understand and troubleshoot circuits employing TTL & CMOS Logic Gates

Potential elements of the performance:

- Construct and test circuits employing common digital logic functions.
- Analyse and troubleshoot circuits employing common digital logic functions using common test equipment.

4. Understand Pulse Generating and Waveshaping Circuits.

Potential elements of the performance:

- Construct and test circuits used in the generation of non-sinusoidal waveforms utilizing the 555 Timer, Integrators, Differentiators and Schmitt Triggers.

Course Name:
Industrial Electronics

Course No.:
ELN-213

IV. REQUIRED STUDENT RESOURCES:

- Text - Digital Systems Principles and Applications by Tocci & Widmer (7th Edition)
Note: 5th or 6th Editions will suffice.
- Motorola Fast and LS TTL Databook or any current TTL Databook
- Digital Parts Package - Digital I.C.'s and Scope Probe

V. METHODS OF EVALUATION:

The following Grading System will be used:

A+ = 90% - 100%
A = 80% - 89%
B = 70% - 79%
C = 55% - 69%
R = less than 55% (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 =	<u>50 %</u>
Total	= 100%

VI. SPECIAL NOTES:

1. The Instructor reserves the right to modify the course as is deemed necessary to meet the needs of the students.
2. Students with special needs (Physical Limitations, Visual/Hearing Impairments etc.) are encouraged to discuss confidentially, required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Extension 493, 717 or 491.
3. Attendance to lab activities is compulsory, unless discussed with the instructor in advance of the absence. Your attendance and final grade are directly related.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in this course, should consult with the Professor.