



**I. COURSE DESCRIPTION:**

This course is a study of modern digital systems and circuits. The student will study Digital Numbering Systems, Boolean Algebra, common Digital Integrated circuits as well as other pulse shaping / generating circuits. Emphasis will be placed on the analysis and troubleshooting of these devices and circuits, with a component of design.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

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

**1. *Understand the terminology and characteristics associated with rectangular wave-shapes.***

Potential Elements of the Performance:

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

**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.

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

Potential Elements of the Performance:

- Construct and test circuits employing common digital logic functions
- Analyze and troubleshoot circuits employing digital logic functions using common test equipment (DVM, Oscilloscope, Logic Probe / Logic Pulser)

**III. TOPICS:**

1. Rectangular / Pulse Waveshapes
2. Digital Number Systems
3. TTL Logic Devices
4. CMOS Logic Devices

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

- **TEXT – Digital Systems 11<sup>th</sup> Edition**  
Author: Ronald J. Tocci
- **Digital Parts Package – Digital I.C.'s**
- **1<sup>st</sup> Year Parts Package**

**V. EVALUATION PROCESS/GRADING SYSTEM:**

**The Final Grade will be a combination of theory and laboratory grades.**

**45% = Theory** (Consisting of 3 equally weighted tests and several in-class quizzes or assignments (no makeup for missed in-class activities) and assigned homework.)

**45% = Lab Activities** (Lab reports, attendance, on site evaluation practical lab exercises, active participation, 5% for completion of the PRE-Lab assignment, creating a book of data sheets required for this class. Each participant to create their own book.)

**10% = Practical Lab Exam**

**The THEORY, LAB and the PRACTICAL LAB EXAM portions must all have passing grades for a passing grade in the class to be issued!**

**See Special Notes Section for further details affecting final grade.**

The following semester grades will be assigned to students:

<b>Grade</b>	<b>Definition</b>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	

U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

## VI. SPECIAL NOTES:

### Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.

### Other:

Attendance to scheduled lab activities is compulsory, unless permission has been granted by the instructor. Lab attendance and final grade are directly related. If a student arrives late for, or is not continuously present and actively participating at (scheduled breaks excepted), a scheduled lab class he/she will be considered absent for the entire class and will not be permitted to submit the associated lab report.

**Theory Tests will not be returned!**

**Students will be given the opportunity  
to review / correct the test material.**

Students must continuously wear all Sault College required personal protective equipment (PPE) during lab activities. Failure to do this will result in expulsion from the lab activity and a grade of zero being assigned. Students are expected to be wearing their required PPE prior to entering the lab.

The instructor will advise what specific PPE is required. If a student repeatedly neglects to wear PPE as required he/she will be considered to be in violation of the Sault College Academic Code of Conduct and may be sanctioned accordingly (see Student Code of Conduct & Appeal Guidelines) - for example: first violation – verbal warning; second violation - written warning; and third violation – suspension from lab activities.

Students must complete a lab safety orientation prior to participating in lab activities. Successful completion of this orientation will be demonstrated by the student completing a quiz with a minimum grade of 100%.

### Cell Phone Use

Cell phones in the classroom are to be put on Silent or Vibrate during lectures, and labs.

Ringling or Texting during class will result in a deduction of 5% from the final grade per event.

During Tests, Cell Phones are to be SHUT OFF and put away, and are not to be used as a calculator.

Should your phone ring during a test you will be asked to hand your test in and immediately leave the classroom.

A Grade of 0% will be issued for that test.

Students may not wear earphones of any kind (i.e. for play back of recorded music/voice) during lab activities or test sittings. This does not include hearing aids required for hearing impaired.

Any student that is absent for a test will be required to provide a Doctors note immediately upon returning to the College. Failing to do so will result in a Grade of 0% being assigned to the missed test.

Tests, quizzes and other activities will not be scheduled on an individual basis, unless it is for a medical or family emergency

**Disruptions to theory classes such as lateness, excessive talking, inappropriate language, etc are not acceptable and will be dealt with on an individual basis.**

**Laboratory Reports** shall be subject to the handout given at the start of the semester. All Lab Reports are due at the start of the following weeks Lab Class unless otherwise stipulated by the Instructor. A **penalty of 20% per day** will be assessed for late submissions (Weekends are included).

Completed Labs are to be delivered to the instructor in a **clean neat folder** and will include a computer generated cover label stating:

- Lab activity
- Due date
- Date Activity was performed
- Your name
- Your partners name

The content of the lab report will include:

- Cover page
- Usable Table of Contents (MS Word Generated)
- Equipment/parts list
- All Drawings/charts/diagrams are required to have Figure numbers which are referenced in the report.
- A summary of activities which were performed
- A conclusion ( personal statement about what you learned from this activity Very Important -5 if not included)
- Anything else that is appropriate for the activity

## **VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located on the portal form part of this course outline.