

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 small 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.
- Analyse 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 and Circuits
4. CMOS Logic Devices

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- TEXT – Digital Systems 10th Edition
Author: Ronald J. Tocci
- Digital Parts Package – Digital I.C.'s
- 1st Year Parts Package

V. EVALUATION PROCESS/GRADING SYSTEM:

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

70% = Theory (Consisting of 3 Tests and several in class quizzes
with no make-up if the student is absent)

30% = Lab Activities (Lab reports, attendance, on site evaluation)

Both the Theory and the Lab portions must 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:

Grade	<u>Definition</u>	<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:

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Cell Phone Use

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

Ringling during class will result in a deduction of 2% 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.

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.

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, 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 10% per day** will be assessed for late submissions (Weekends are included)

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 instance, first violation – verbal warning, second violation written warning, 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%.