

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



COURSE OUTLINE

COURSE TITLE: Electronics I

CODE NO. : ELR621 **APP Level:** ONE

PROGRAM: Construction & Maintenance Electrician – Level 1

AUTHOR: Sean Hager

DATE: August 2016 **PREVIOUS OUTLINE DATED:** August 2015

APPROVED: *“Corey Meunier”*
CHAIR

TOTAL CREDITS: 5

PREREQUISITE(S): None

HOURS/WEEK: 4

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I. COURSE DESCRIPTION:

This is a course in electronics which includes topics such as series, parallel and combination DC circuits, diodes, LEDs, NPN and PNP bipolar transistors used as a switch, logic gates and flip flops.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

- Describe TTL and CMOS logic gate technology
- Describe the operation of basic logic gates including NOT, AND, OR, NAND and EXCLUSIVE OR gates
- Identify the schematic symbols both North American and European for basic logic gates.
- Demonstrate the use of basic logic gates to create digital logic.
- State the Boolean equations for simple logic gates.
- Design and test combination logic circuits using basic logic gates.
- State the truth table and demonstrate the use of an R, S and D type flip flop.
- Demonstrate the use of a logic probe to troubleshoot a digital system.
- Demonstrate the proper procedure for soldering and de-soldering.
- State the standard resistor colour code.
- Connect resistors in series, parallel and combination circuits, complete with voltmeter and ammeter connections.
- Describe the properties of N and P type semiconductor materials.
- Describe and demonstrate the operation of a bipolar diode.
- State current and voltage requirements for silicon diodes, germanium and light emitting diodes (LEDs).
- Demonstrate requirements for silicon diodes, germanium diodes and LEDs to be forward and reverse biased.
- Explain the important diode characteristics used when selecting replacement diodes
- Describe the operation and biasing requirements of NPN and PNP transistors
- Identify the schematic symbols for NPN and PNP bipolar transistors
- Describe and demonstrate how a transistor can be used as a switch
- Describe the operation of an opto-coupler
- State and demonstrate common applications for an opto-coupler

III. TOPICS:

1. SEMICONDUCTORS
2. POWER RATING
3. JUNCTION DIODES
4. LIGHT-EMITTING DIODES (LEDS)
5. THE TRANSISTOR
6. THE TRANSISTOR SWITCH
DIGITAL LOGIC
THE BOUNCELESS SWITCH

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

TEXT – Electronics For Electricians 6th Edition
Author: Stephen L. Herman

Proper P.P.E. (Personal Protective Equipment)

Hand tools – Needle nose pliers, side cutters

V. EVALUATION PROCESS/GRADING SYSTEM:

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

60% = Theory (Tests)

**40% = Lab Activities (Lab reports, attendance, on site evaluation
practical lab exercises, active participation)**

- There will likely be 2-3 tests during the intake and dates will be identified in class.
- The professor reserves the right to adjust the number of tests as warranted. Any modifications will be discussed in class.
- Attendance is mandatory and quizzes will only be marked when completed in class.
- Tests will not be returned but will be available for review.

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%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
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.	

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

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.*

If a student misses a test he/she must have a valid reason (i.e. medical or family emergency – documentation may be required). In addition, the instructor must be notified prior to the test sitting. If this procedure is not followed the student will receive a mark of zero on the test with no make-up option.

If a student misses class time due to sickness, family emergency or other reason beyond his/her control the student must at his/her first opportunity meet with the course faculty to discuss if the missed time has placed the student at an increased risk of failing. The student must follow up the meeting by emailing the faculty with a summary of the meeting's discussions. Documentation validating the missed time may be required.

Any material covered during any absence legitimate or not is the responsibility of the student.

There are no make-up tests, assignments or extra work allowed for any reason.

Any material covered during any absence legitimate or not is the responsibility of the student.

Deadlines will be specified for submission of assignments for grading. Late assignments will not be accepted and a grade of 0 will be assigned.

Use of cell phones/PDAs for any form of communication (voice, text...) during class or lab time is strictly prohibited. **Cell phones/PDAs must be silenced during regular class and lab times and must be turned off and kept out of sight during test sittings. Failure to follow the latter requirement during a test sitting will result in a grade of 0 being assigned.**

Students may not wear earphones of any kind during lab activities or test sittings. This does not include hearing aids required for the hearing impaired.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.