

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: ELECTRONICS I

CODE NO. : ELR621 **LEVEL:** 1

PROGRAM: CONSTRUCTION AND MAINTENANCE ELECTRICIAN
APPRENTICESHIP (6520)

AUTHOR: S.Hager

DATE: 08/2008 **PREVIOUS OUTLINE DATED:** Sept.
2005

APPROVED: "Corey Meunier"
CHAIR **DATE**

TOTAL CREDITS: 5

PREREQUISITE(S):

HOURS/WEEK: 4

Copyright ©2008 The Sault College of Applied Arts & Technology
*Reproduction of this document by any means, in whole or in part, without prior
written permission of Sault College of Applied Arts & Technology is prohibited.*
For additional information, please contact Corey Meunier, Chair
School of Technology & Skilled Trades
(705) 759-2554, Ext. 2610

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:

1. Describe TTL and CMOS logic gate technology.
2. Describe the operation of basic logic gates including NOT, AND, OR, NAND, NOR and EXCLUSIVE-OR gates.
3. Identify the schematic symbols both North American and European for basic logic gates.
4. Demonstrate the use of basic logic gates to create digital logic circuits.
5. State the Boolean equations for simple logic gates.
6. Design and test combinational logic circuits using basic logic gates.
7. State the truth table and demonstrate the use of an R, S and D type flip-flop.
8. Demonstrate the use of a logic probe to troubleshoot a digital system.
9. Demonstrate the proper procedure for soldering and de-soldering.
10. State the standard resistor colour code.
11. Connect resistors in series, parallel and combination circuits, complete with voltmeter and ammeter connections.
12. Describe the properties of N and P type semiconductor materials.
13. Describe and demonstrate the operation of the bipolar diode.
14. State current and voltage requirements for silicon diodes, germanium and light emitting diodes (LEDs).

15. Demonstrate requirements for silicon diodes, germanium diodes and LEDs to be forward and reverse biased.
16. Explain the important diode characteristics used when selecting replacement diodes.
17. Describe the operation and biasing requirements of NPN and PNP transistors.
18. Identify the schematic symbols for NPN and PNP bipolar transistors.
19. Describe and demonstrate how a transistor can be use as a switch.
20. Describe the operation of an opto-coupler.
21. 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
7. Digital Logic
8. The Bounceless Switch

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Electronics for Electricians
Stephen L. Herman

V. EVALUATION PROCESS/GRADING SYSTEM:

Theory 50%

Lab 50%

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.	

VI. SPECIAL NOTES:**Special Needs:**

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

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.

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*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. 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.

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.

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

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.

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

Requires texts are brought to each class. Sections of the course text books may be highlighted however they are not to be written in. Tests will be 'open book' as far as the textbooks are concerned. However, use of a book containing markings other than the aforementioned highlights is not permitted and will be considered as academic dishonesty. Students are responsible for supplying their own texts for tests. Sharing books during a test is not permitted.

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. PRIOR LEARNING ASSESSMENT:

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

VIII. ADVANCE CREDIT TRANSFER:

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.