

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: ELECTRICAL THEORY I

CODE NO. : ELR620 **LEVEL:** BASIC

PROGRAM: CONSTRUCTION AND MAINTENANCE ELECTRICIAN
APPRENTICESHIP (6520)

AUTHOR: PETER SZILAGYI

DATE: SEPT. 2008 **PREVIOUS OUTLINE DATED:** SEPT. 2007

APPROVED:

**“Corey Meunier”
CHAIR**

TOTAL CREDITS: 8 **DATE**

PREREQUISITE(S):

HOURS/WEEK: 6

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For additional information, please contact C. Meunier, Chair
School of Technology and Skilled Trades
(705) 759-2554, Ext. 2610

I. COURSE DESCRIPTION:

This is an electrical theory in DC electric circuits. Atomic theory will be introduced along with voltage current, resistance, power and energy in electric circuits. Ohm's Law and Kirchhoff's Laws will be studied as they relate to series, parallel and combination circuits. Wire sizing, resistivity and magnetism will also be introduced.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Demonstrate an understanding of atomic theory.
2. Describe the requirements for a simple electric circuit.
3. Define voltage, current and resistance.
4. Define work, power and energy.
5. Convert between mechanical and electrical units of work power and energy.
6. Calculate energy in kilo-watt hours.
7. Describe the effects of current on human body.
8. Apply Ohm's Law to analyze series DC circuits.
9. Apply Kirchhoff's Law to analyze series DC circuits.
10. Apply Ohm's Law to analyze parallel DC circuits.
11. Apply Kirchhoff's Law to analyze parallel DC circuits.
12. Apply Ohm's Law to analyze combination DC circuits.
13. Apply Kirchhoff's Law to analyze combination DC circuits.
14. Analyze and calculate voltage, current and power in 2-wire and 3-wire distribution systems for balanced, unbalanced and faulted.
15. Define and calculate efficiency of electrical distribution systems.

16. Perform calculations relating to wire measurements, AWG, SI units, resistivity, line loss, and temperature coefficients.
17. Name and explain the principles of operation of common sources of EMF.
18. Describe the characteristics of primary and secondary cells.
19. State the Fundamental Law of Magnetism.
20. Define permanent and temporary magnets.
21. Describe magnetic lines of force and list their characteristics.
22. Describe the relationship between magnetism and induced EMF.

III. TOPICS:

1. Atomic Structure
2. Electrical Quantities and Ohm's Law
3. Static Electricity
4. Resistors
5. Series Circuits
6. Parallel Circuits
7. Combination Circuits
8. Using Wire Tables and Determining Conductor Sizes
9. Conduction in Liquids and Gases
10. Batteries and Other Sources of Electricity
11. Magnetism
12. Magnetic Induction

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:
Delmar's Standard Textbook of Electricity
Stephen L. Herman

V. EVALUATION PROCESS/GRADING SYSTEM:

The grading weight for the course is:

Theory 100%

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:

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.

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.