SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	ELECTRICAL THEORY II		
CODE NO. :	ELR720	**SEMESTER:**	
PROGRAM:	CONSTRUCTION AND MAINTENANCE ELECTRICIAN APPRENTICESHIP		
AUTHOR:	JUHANI (JOHN) PALONIEMI		
DATE:	SEPT 2010	**PREVIOUS OUTLINE DATED:**	MAY 2010
APPROVED:	*"Corey Meunier"* **CHAIR**		_____ **DATE**
TOTAL CREDITS:			
PREREQUISITE(S):			
HOURS/WEEK:	SIX		

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 covering the topics of magnetism, DC machines and AC circuit theory.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Describe magnetic flux and flux density.
2. Solve problems associated with magnetic energy, including magnetic potential difference, flux density, reluctance, permeance, and permeability.
3. List and explain the factors that affect the magnitude and direction of induced EMF in single conductors and in coils.
4. Describe factors which affect inductance and perform related calculations.
5. State Fleming's hand rules.
6. State and apply Lenz's law.
7. Describe the creation and effects of eddy currents.
8. Describe the construction, operation and characteristics of permanent magnet, separately excited, shunt , series and compound (cumulative and differential) DC motors and generators.
9. Draw connection diagrams for all types of DC motors and generators.
10. Describe a sine wave, calculate RMS average, maximum and instantaneous values.
11. Explain and calculate frequency, electrical and mechanical degrees.
12. Interpret and calculate phasors, vectors, and vector diagrams.
13. Describe the effects of alternating voltage and current in a resistive device.
14. Describe inductance, self inductance and characteristics of a coil connected to a DC source.
15. Describe the characteristics of a coil connected to an AC source.
16. Calculate inductive reactance, voltage, current and power of an inductive circuit.
17. Describe capacitance and the characteristics of a capacitor connected to a DC source.
18. Describe the characteristics of a capacitor connected to an AC source.
19. Calculate the capacitive reactance, voltage, current, power and phase relationships of a capacitive circuit.
20. Calculate the values for RL/RC/RLC series circuits.
21. Describe and calculate resonant circuits.
22. Describe and calculate resonant circuits and phase relations.
23. Explain and calculate RL/RC parallel circuits.
24. Label, describe and calculate values for RLC parallel circuits.
25. Describe the method for testing RLC parallel circuits.
26. Explain and calculate RLC parallel circuits.

27. Explain and calculate the efficiency of AC loads as related to power factor correction.
28. Explain the effects of power factor correction.
29. Calculate power factor correction for single-phase loads.
30. Describe the principles of operation of various types of single phase transformers.
31. Determine and perform calculations involving turns/voltage/current ratios for single phase transformers.

III. TOPICS:

1. Magnetism
2. Magnetic Induction
3. Basic Trigonometry and Vectors
4. Alternating Current (AC)
5. Inductance in AC circuits
6. Resistive-Inductive Series Circuits
7. Resistive-Inductive Parallel Circuits
8. Capacitors
9. Capacitors in AC Circuits
10. Resistive-Capacitive Series Circuits
11. Resistive-Capacitive Parallel Circuits
12. Resistive-Inductive-Capacitive Series Circuits
13. Resistive-Inductive-Capacitive Parallel Circuits
14. Single Phase Transformers
15. DC Generators
16. DC Motors

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Delmar's Standard Textbook of Electricity
By Stephen L. Herman

EVALUATION PROCESS/GRADING SYSTEM:

Theory tests and quizzes 100%

The following semester grades will be assigned to students:

Grade	Definition	*Grade Point Equivalent*
A+	90 – 100%	4.00
A	80 – 89%	
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.

VII. COURSE OUTLINE ADDENDUM:

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