SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: Electrical Fundamentals

CODE NO. : ELR100 **SEMESTER:** ONE

PROGRAM: Electrical Engineering Technician
- Process Automation
- Process Automation & Trades

AUTHOR: A. GOODERHAM

DATE: September 2015 **PREVIOUS OUTLINE DATED:** September 2014

APPROVED:

"Corey Meunier"

CHAIR **DATE**

TOTAL CREDITS: FIVE

PREREQUISITE(S): NIL

HOURS/WEEK: FIVE

I. COURSE DESCRIPTION:

An introductory course designed to give an overview of terms, devices, symbols and analysis techniques used in DC circuits. Topics include series, parallel and series-parallel DC circuit analysis. Other topics include an introduction to magnetism and magnetic devices, inductors and capacitors and their principle operation in DC circuits

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Analyze Series, Parallel and Series-Parallel DC circuits containing voltage and current sources and resistors, to determine individual voltage, current and power values.

Potential Elements of the Performance:

- Complete mathematical questions from text and assignments
- Choice and use of network Theorems to aid in analysis
- Completion of written test

2. Analyze magnetic properties of circuits and devices.

Potential Elements of the Performance:

- Determine the direction of magnetic flux present as a result of DC current flow in a conductor
- Determine the direction and strength of magnetic flux present as a result of DC current flow in a coil
- Determine the direction of rotation of a simple dc motor
- Determine the direction of current flow in a simple dc generator
- Completion of dc machine diagrams showing flux & main fields and rotation
- Completion of written test

3. Analyze a DC circuit containing inductors or capacitors and resistors, to determine charge and discharge characteristic values.

Potential Elements of the Performance:

- Completion of RL and RC circuit questions regarding time constants
- Completion of RL and RC circuit questions requiring the solution of the time for threshold voltage or current achievement
- Completion of written test

III. TOPICS:

1. Definition of voltage, current, resistance, sources, symbols
2. Ohm's Law
3. Series Circuits, Kirchhoff's Laws, Real vs. Ideal Circuits
4. Energy and Power, Efficiency
5. Parallel Circuits, Conductance
6. Series-Parallel Circuits
7. Circuit Theorems, Thevenin's, Max Power Transfer, Superposition
8. Magnetics, materials and circuits, Right Hand Rule, Motor/Generator action
9. Inductors, Series and Parallel, Mutual Inductance, energy storage
10. Capacitors, Series and Parallel, energy stored
11. Inductor-Resistor Circuits, Time Constants, Instantaneous Values of Current and Voltage, Back emf
12. Capacitor-Resistor Circuits, Time Constants, Instantaneous Values of Current and Voltage, Back emf

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Fundamentals of electric Circuits, by David Bell, *7th Ed., ISBN# 13-978-0-19-542524-6*

V. EVALUATION PROCESS/GRADING SYSTEM:

Three Tests @ 33.33 % each; for**: TOTAL = 100%**

Surprise Quiz's may be given for a maximum of 5% of the final grade and are attributed toward the next test percentage value.

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.

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.

If a student misses a test or surprise quiz (maximum 5% of final grade) without contacting the instructor, the Dean’s office or the switchboard **prior to the test or quiz**, a mark of zero will be granted without a re-write option.

No re-write will be given for completed tests.

VII. COURSE OUTLINE ADDENDUM:

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