

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



COURSE OUTLINE

Course Title : **Electrical Fundamentals**

Course No.: **ELR 100**

Program: **Electrical / Electronics / Instrumentation Technician**

Semester: **ONE**

Author(s): **Alan Gooderham**

Date: August 1999

Previous
Outline Dated: August 1998

Approved:

Dean

Date

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For additional information, please contact Kitty DeRosario, Dean, School of Trades & Technology, (705) 759-2554, Ext. 642.

Course Name: Electrical Fundamentals

Course No.: ELR100

TOTAL CREDITS: 5

PREREQUISITES: None

COURSE LENGTH: 17 wks.

TOTAL CREDIT HOURS: 68 hrs.

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. TOPICS TO BE COVERED:

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, Transformer Introduction
10. Capacitors, Series and Parallel, energy stored

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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

III. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE:

A. Learning Outcomes:

Upon successful completion of this course the student will be able to:

1. Analyse fundamental DC Circuits
2. Use a number of Theorems to analyse complex DC Circuits
3. Describe basic parts and operation of transformers and DC machines
4. Analyse RL and RC , DC circuits

B. Learning Outcomes with Elements of Performance:

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

1. Analyse 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 test

2. Analyse 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 fields, main fields and rotation
 - Complete test questions
3. Analyse 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 test

IV. REQUIRED STUDENT RESOURCES:

- Principles of Electric Circuits, ^{6th} Ed. By Floyd

V. METHODS OF EVALUATION:

The following Grading System will be used:

A+ = 90% - 100%

A = 80% - 89%

B = 70% - 79%

C = 60% - 69%

R = less than 60% (Repeat Course)

X = Temporary Grade as per College Policy

Three Tests @ 33.33 % each, for : TOTAL 100%

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

VI. SPECIAL NOTES:

1. The Instructor reserves the right to modify the course as is deemed necessary to meet the needs of the students.
2. Students with special needs (Physical Limitations, Visual/Hearing Impairments etc.) are encouraged to discuss confidentially, required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Extension 493, 717 or 491.
3. 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.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in this course, should consult with the Professor.