

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: ELECTRICAL FUNDAMENTALS

CODE NO.:

ELR 104-4

SEMESTER: ONE

PROGRAM:

MECHANICAL/AVIATION

AUTHOR:

ALAN GOODERHAM/DAVID RAISANEN

DATE:

AUG. 31, 92

PREVIOUS OUTLINE DATE:

SEPT. 91

APPROVED:

DEAN

DATE

W Filipowich

L P Orzetta

02-08-91

ELECTRICAL FUNDAMENTALS
COURSE NAME

ELR 104-4
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TOTAL CREDIT HOURS: 80

PREREQUISITES: NONE

1. PHILOSOPHY/GOALS:

An introduction to electrical quantities and units; Ohm's and Kirchhoff's laws; simple DC series, parallel, series parallel, and voltage divider circuits; simple DC network analysis; magnetism and electromagnetism; inductance and capacitance; sine wave characteristics and phasors; basic series and parallel RLC circuit analysis and transformers.

11. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will:

- 1) Have a fundamental knowledge of AC and DC circuit theory;
- 2) Be able to simplify and analyze basic AC and DC circuits comprised of resistors, capacitors and inductors;
- 3) Understand basic magnetism and electromagnetism;
- 4) Use phasors and complex numbers to assist in analysis of AC circuits.

111. TOPICS TO BE COVERED:

- 1) Electrical Units
- 2) Conductors and insulators
- 3) Series Circuits
- 4) Parallel Circuits
- 5) Series/Parallel Circuits
- 6) Network Theorems
- 7) Magnetism
- 8) Magnetic Circuits
- 9) Inductance
- 10) Capacitance
- 11) Alternating Current Fundamentals
- 12) AC Circuit Analysis
- 13) Transformers

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| <u>IV.</u> | <u>LEARNING ACTIVITIES</u> | <u>REQUIRED RESOURCES</u> |
|------------|--|---------------------------|
| | | <u>BELL TEXT</u> |
| 1 | <u>SYSTEM OF UNITS</u> Fundamental Units, Scientific Notation, Electric Current, Resistance, Conductance, Potential Difference, Voltage (EMF), Ohm's Law, Electrical Power and Energy, Electrical Measurement | CH. 1 & 3 |
| 2 | <u>CONDUCTORS, INSULATORS, RESISTORS</u> Construction, Temperature Effect, Resistor Color Code, Dry Cells | CH. 4 |
| 3 | <u>SERIES CIRCUITS</u> Voltage and Current in a Series Circuit, Voltage Drops in a Series Circuit, Voltage Divider, Power, Open & Short Circuit, Problem | CH. 5 |
| 4 | <u>PARALLEL CIRCUITS</u> Voltage, Current, Resistance in a Parallel Circuit, Parallel equivalent Circuits, Open & Short Circuits, Problems | CH. 6 |
| 5 | <u>SERIES-PARALLEL CIRCUITS</u> Voltage & Current in a Series-Parallel Circuit, Equivalent Circuits of a Series-Parallel Circuit, Open and Short Circuits of a Series-Parallel Circuit, Analysis and Problems on Series-Parallel Circuits | CH. 7 |

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LEARNING ACTIVITIES

REQUIRED RESOURCES

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| 6 | <u>CAPACITANCE & INDUCTANCE</u> Electrical charge and field, Definition of Capacitance, Capacitance in Series & Parallel, Time constant, Types of Induction, Inductors in Series and Parallel, Inductive and Capacitive Circuits, Problems | CH. 14.15. & 16. |
| 7 | <u>INTRODUCTION TO MAGNETISM</u> Permanent Magnets, Electro- Magnetic theory, Reluctance and Permeability, Hysteresis, Eddy Currents | CH. 11 & 12 |
| 8 | <u>A.C. FUNDAMENTALS</u> Generation of AC Voltage, Analysis of Sine wave, AC Loads, Phasors, Complex Algebra | CH. 17 |
| 9 | <u>POWER IN AC CIRCUITS</u> RL, RC, RLC Series and Parallel Circuits, Power, Power Factor | CH. 18, 19.20 & 21 |
| 10 | <u>TRANSFORMERS</u> Principles of Transformers, Types of Transformers, Load and no Load, Open & Short Circuit Analysis | CH. 24 |

AVIATION:

Basic Aircraft Electrical Circuitry

Instructors
Notes

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V. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.)

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|---------|------|
| TESTS | 60% |
| QUIZZES | 40% |
| TOTAL | 100% |

The grading system used will be as follows:

A+ = 90 - 100 A = 80 - 89 B = 70 - 79 C = 55 - 69

R = REPEAT

V1. ADDITIONAL RESOURCE MATERIAL:

The College library has many books on Electrical Fundamentals and the Librarian is more than willing to assist you in locating any information requested.

NOTES:

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of the students.

*** If a student misses a test, he/she must have a valid reason (eg. medical or family emergency documented in writing).

In addition, the school must be notified before the scheduled test sitting. If the Instructor cannot be reached, a message must be left with the Deans office or the college switch board.

If this procedure is not followed the student will receive a mark of zero on the test.

