Sault College of Applied Arts and Technology Sault Ste. Marie, Ontario Course Outline Course Title: Electrical Fundamentals Code No.: ELR 104-3 Program: Aviation

Program: Aviation Author: A. Gooderham

Date: Aug.31, 1993 Previous Outline Date: Aug.1992

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Approved: Coordinator_____ Date____

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_____Date____

-2-Course Name: Electrical Fundamentals

Code No.: ELR 104-3

Total Credit Hours: 51 Prerequisites: None

I. Philosophy/Goals:

An introduction to electrical quantities and units; Ohm's and Kirchhoff's Laws; DC series, parallel, series/parallel circuits; DC network analysis; magnetism and electromagnetism; capacitance and inductance; sine wave characteristics and phasors; basic series and parallel RLC circuit analysis; electronic devices and power supplies; fundamental digital electronics

II. Student Performance Objectives:

Upon successful completion of this course the student will:

- Have a fundamental knowledge of AC and DC circuit theory
 Be able to simplify and analyze basic AC and DC circuits
- comprised of resistors, capacitors and inductors
- 3) Understand basic magnetic and electromagnetic principles
 4) Use phasors and complex numbers to assist in analysis of
- AC circuits
- 5) Be able to identify basic electronic components and analyze power supply operations
- 6) Be able to identify and analyze basic digital electronic components and circuits

III Topics To Be Covered:

- Electrical units
 Conductors and insulators
 Series circuits
- 4) Parallel circuits
- 5) Series/parallel circuits
- 6) Magnetism
- 7) Magnetic circuits
- 8) Inductance
- 9) Capacitance
- 10) Alternating current fundamentals
- 11) AC circuit analysis
- 12) Electronic devices
- 13) Power supplies
- 14) Digital components
- 15) Digital circuits

ELECTRICAL FUNDAMENTALS

1V. LEARNING ACTIVITIES

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REQUIRED RESOURCES

BELL TEXT

- SYSTEM OF UNITS Fundamental Units, Scientific Notation, Electric Current, Resistance, Conductance, Potential Difference, Voltage (EMF), Ohm's Law, Electrical Power and Energy, Electrical Measurement
- CONDUCTORS, INSULATORS, RESISTORS 2 Construction, Temperature Effect, Resistor Colour Code, Dry Cells
- SERIES CIRCUITS 3 Voltage and Current in a Series Circuit, Voltage Drops in a Series Circuit, Voltage Divider, Power, Open & Short Circuit, Problems
 - PARALLEL CIRCUITS Voltage, Current, Resistance in a Parallel Circuit, Parallel equivalent Circuits, Open & Short Circuits, Problems
 - SERIES-PARALLEL CIRCUITS 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

CH. 1 & 3

CH. 4

CH.5

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CH. 6

-3-

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clectrical	Fundamentals	ELR104-3
	LEARNING ACTIVITIES	REQUIRED RESOURCES
6	CAPACITANCE & INDUCTANCE Definition of capacitance, Capacitance in series & parallel, Time constants, Types of Induction, Inductors in series & parallel, Inductive & capacitive circuits, Pro	CH. 14,15 & 16
7	INTRODUCTION TO MAGNETISM Permanent magnets, Electro-magnetic theory, Reluctance and permeability Hysteresis, Eddy currents	CH. 11 & 12
8	A.C. FUNDAMENTALS Generation of AC voltage, Analysis of sinewaves,	СН. 17
	AC loads, Phasors and complex number Problems	rs,
9	POWER IN AC CIRCUITS An overview of impedance, RL,RC,RLC series & parallel circuits, Power & power factor correction	CH. 18,19,20 & 21
10	PRINCIPLES OF DIODE AND TRANSISTOR OPERATION	INSTRUCTORS NOTES
11	POWER SUPPLY ANALYSIS, REGULATED AND FILTERED	
12	BASIC GATES, AND, OR, NAND, FLIP FL	OPS
13	CIRCUIT OPERATION, TIMING DIAGRAMS	
OPTIONAL:	BASIC AIRCRAFT ELECTRICAL CIRCUITRY DC 8 SCHEMATIC ANALYSIS DASH 8 SCHEMATIC ANALYSIS LABORATORY EQUIPMENT FAMILIARIZATIO	N

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EVALUATION METHODS:

TESTS Four Section Tests, 25% each

TOTAL 100%

The grading system used will be as follows:

-5-

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

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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.

Also, quizzes may be given without notice (maximum 5% each) This grade will be applied as part of the 25% for the section for example; 20% + 5% for section number 2,

chapters 11,12,14,15 &16

LECTION CALL FURMINMENTALS

EVALUATION REPORTS

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