

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: AC CIRCUITS & MACHINES I
Code No.: ELR 107-6
Program: ELECTRICAL/ELECTRONIC/COMPUTER
Semester: TWO
Date: JUNE, 1983
Author: J. HAMILTON

New: _____ Revision: ^X _____

APPROVED: J.P. Crozier Date 5/3/06/06
Chairperson

AC CIRCUITS & MACHINES I

ELR 107-6

Course Name

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PHILOSOPHY/GOALS:

When the student has completed this course he will have a good understanding of single phase and three phase AC circuits. He will also have the basic fundamentals of DC and AC generation, types of DC and AC motors and control equipment.

METHOD OF ASSESSMENT (GRADING METHOD):

Students will be assessed by periodic quizzes, a mid-term and a final exam. Formal practical tests will also be conducted during the semester.

TEXTBOOK(S):

Fundamentals of Electric Circuits - David A. Bell

Electrical Machines DC and AC - Siskind

AC Circuits - David A. Bell

Electrical Machines D.C. & A.C. - Siskind

REFERENCE TEXTS:

Industrial Electricity - W. H. Timble

Direct and Alternating Current Machinery - Rosenblatt & Friedman

Maintenance Hints - Westinghouse Corporation

TOPIC	PERIODS		TOPIC DESCRIPTION
	THEORY	LAB	
1	12		<u>AC Circuit Analysis - Review</u> Using polar and rectangular notation analyze single phase AC circuits using: Impedance - Voltage and power diagrams, Series impedance, Parallel Impedance, Series-Parallel Impedance.
2	8	3	<u>Network Analysis Theorems</u> Thevenin Superposition Norton
3	10		<u>Three Phase Circuits</u> Star connected alternator - relationship of phase and line voltages, and phase and line currents. Delta connected alternator - relationship of phase and line voltage and phase and line currents. Analysis of conditions in star loads and delta loads. Line flattening using synchronous motors and capacitors. Star - Delta conversion.
4	4		<u>Harmonic Aspects of AC Circuits</u> Analysis of periodic waveforms.
5	6		<u>Magnetic Circuit Calculations</u> Analysis of magnetic circuits using S.I. units of measurement.
6	4		<u>Dynamos</u> Principle of generator action Faraday's Law, Commutation, Construction, Principle of Motor Action, Solution of problems using generator voltage, equation, torque

and force

equations.

7	3		<u>Armature Windings</u> Coil Pitch Lap Winding and Wave Winding Winding Calculations
8	5		<u>Types of DC Generators</u> Magnetization Curve Output Voltage Build Up Characteristics of Series, Shunt and Compound Generators Solution of Problems Pertaining to DC Generators
9	4	3	<u>DC Motors</u> Classification of DC Motors Counter Emf Speed Regulation Calculation and Measurement of Torque and Force
10	1		Efficiency, Rating and Application of DC Machines
11	2	3	<u>Alternators</u> Construction Types of Winding, Pitch Factor and Distribution Factor Calculations
12	4	3	<u>Transformers</u> Principle Types and Construction Calculations Current and Potential Transformers
13	2		<u>Single Phase Motors</u> Principle of Operation Construction Speed Control
14	2		<u>Polyphase Induction Motors</u> Principles and Construction Development of Rotating Field Rotor Speed and Slip Line Resistance Starter Automatic Starter with Resistance Breaking