SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: AC CIRCUITS & MACHINES I

Code No.: ELR 109

Program: ELECTRICAL/ELECTRONIC

Semester: TWO

Date: FEBRUARY 28, 1989

Author: J. HAMILTON

New: _____ Revision: __X___

APPROVED: _LP Crozutta_   Date _89/03/30_
Chairperson

AC CIRCUITS & MACHINES I   ELR 109
_____   _____
        Course Name   Course Number

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.

METHOD OF ASSESSMENT (GRADING METHOD):

Students will be assessed by periodic quizzes, and tests.

TEXTBOOK(S):

Fundamentals of Electric Circuits - David A. Bell

Electrical Machines DC and AC - Siskind

REFERENCE TEXTS:

Industrial Electricity - W. H. Timble

Direct and Alternating Current Machinery - Rosenblatt & Friedman

Maintenance Hint - Westinghouse Corporation

GRADING POLICY - SEPTEMBER 1989

Semester-End Reporting:

A+ (Numerical Equivalent 4.0) - Consistently Outstanding 90-100
A (Numerical Equivalent 3.75) - Outstanding Achievement 80-89
B (Numerical Equivalent 3.0)-Consistently Above Average Achievement 65-79
C (Numerical Equivalent 2.0)-Satisfactory or Acceptable Achievement 55-64
R (Numerical Equivalent 0.0)- Repeat - Objectives of course not achieved
                                   and course must be repeated.

The following grades are also approved end-of-term grades but are not
assigned numerical equivalence for computing the grade point average.

S - Satisfactory (assigned to non-graded courses or field placements)
U - Unsatisfactory (assigned to non-graded courses or field placements
                        when course objectives not achieved)
X - Temporary grade assigned to student for additional time to complete
    course requirements used ONLY because of extenuating circumstances.
    "X" grade contract form must be completed and submitted for each
    X grade assigned.

Mid-Term Reporting

Student progress will be reported as follows for mid-term reports:

S - Satisfactory Progress
U - Unsatisfactory Progress
R - Repeat (objectives have not been met)
NR - Grade not reported to Registrar's Office. This grade is used to
     facilitate transcript production when faculty, because of extenuating
     circumstances, find it impossible to report grades by due dates.

TOPIC	PERIODS		TOPIC DESCRIPTION
	THEORY	LAB	
1	12	10	**AC Circuit Analysis - Review**

AC Circuit Analysis - Review

Using polar and rectangular notation analyze single phase AC circuits using: Impedance - Voltgage and power diagrams, Series impedance, parallel Impedance, Series-Parallel Impedance.

| 2 | 7 | | |

Network Analysis Theorems

Thevenin
Superposition

| 3 | 6 | 6 | |

Three Phase Circuits

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.

Star - Delta conversion

| 4 | 5 | | |

Magnetic Circuit Calculations

Analysis of magnetic circuits using S.I. units of measurement.

| 5 | 4 | | |

Dynamos

Principle of generator action Faraday's Law, Commutation, Construction, Principle of Motor Action, Solution of problems using generator voltage, equation, torque and force equations.

TOPIC	PERIODS		TOPIC DESCRIPTION
	THEORY	LAB	
6	2		**Armature Windings**
			Coil Pitch
			Lap Winding and Wave Winding
			Winding Calculations
7	4		**Types of DC Generators**
			Magnetization Curve
			Output Voltage Build Up
			Characteristics of Series, Shunt
			and Compound Generators
			Solution of Problems Pertaining
			to DC Generators
8	3	2	**DC Motors**
			Classification of DC Motors
			Counter EMF
			Speed Regulation
			Calculation and Measurement of
			Torque and Force
9	1		Efficiency, Rating and Application
			of DC Machines
10	2	2	**Alternators**
			Construction
			Types of Winding, Pitch Factor and
			Distribution Factor
			Calculation
11	3	2	**Transformers**
			Principle
			Types and Construction
			Calculations
			Current and Potential Transformer

TOPIC	PERIODS		TOPIC DESCRIPTIONS
	THEORY	LABS	
12	2		**Single Phase Motors**
			Principle of Operation
			Construction
			Speed Control
13	2		**Polyphase Induction Motors**
			Principles and Construction
			Development of Rotating Field
			Rotor Speed and Slip
			Line Resistance Starter
			Automatic Starter with Resistance
			Breaking