SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE OUTLINE:	AC CIRUITS AND MACHINES
CODE NO.:	ELR 200 - 4
PROGRAM:	MECHANICAL TECHNOLOGY
SEMESTER:	THREE
DATE:	SEPTEMBER 1993
PREVIOUS OUTLINE DATED:	SEPTEMBER 1991
AUTHOR:	ALAN GOODERHAM

NEW:____ REV.: __X__

APPROVED: W Filipowich Sept 7/93
COORDINATOR DATE

D M Cowell 93-09-07
DEAN DATE

AC CIRCUITS AND MACHINES — COURSE NAME

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TOTAL CREDIT HOURS: 60

PREREQUISITE(S): ELR110 - 4

PHILOSOPHY/GOALS:

THE STUDENT WILL DEVELOP AN UNDERSTANDING OF SINGLE PHASE AND THREE PHASE AC CIRCUITS. THE STUDENT WILL ALSO ACQUIRE THE BASIC FUNDAMENTALS OF DC & AC GENERATION AND OF DIFFERENT TYPES OF DC AND AC MOTORS & CONTROL EQUIPMENT. THIS COURSE WILL HELP PREPARE THE STUDENT FOR THE ELECTRICAL/MECHANICAL INDUSTRIAL WORK ENVIRONMENT.

STUDENT PERFORMANCE OBJECTIVES:

UPON SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENT WILL BE ABLE TO:

1) DETERMINE THE AC CIRCUIT ANALYSIS OF ELEMENTARY ELECTRICAL NETWORKS.
2) DISTINGUISH THE DIFFERENCE BETWEEN SINGLE AND THREE PHASE AC CIRCUITS.
3) DISCUSS THE AC ENERGY TRANSFERS THROUGH ALTERNATORS, MOTORS AND TRANSFORMERS.

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TOPICS TO BE COVERED:

1) INTRODUCTION TO SINGLE PHASE AC CIRCUIT ANALYSIS.

2) OVERVIEW OF THREE PHASE AC CIRCUITS.

3) INTRODUCTION TO AC POWER DISTRIBUTION WITH TRANSFORMERS.

4) INTRODUCTION TO AC ALTERNATORS AND MOTORS.

LEARNING ACTIVITIES	REQUIRED RESOURCES
1.0 INTRODUCTION TO SINGLE PHASE AC CIRCUIT ANALYSIS	
1.1) OVERVIEW THE FUNDAMENTAL SYSTEM OF UNITS.	BELL TEXT: CHAPTER #3,4,5, 6 & 7
1.2) OVERVIEW BASIC ELECTRICAL LAWS AND CONCEPTS.	
1.3) INTRODUCTION TO ALTERNATING CURRENT.	: CHAPTER #17,18&19
1.4) INTRODUCTION OF SINGLE PHASE CIRCUIT POWER.	: CHAPTER #21
2.0) OVERVIEW OF THREE PHASE AC CIRCUITS	
2.1) DISCUSS THE USES OF THREE PHASE CIRCUITS.	EMANUAL TEXT : CHAPTER #7
2.2) DISCUSS VOLTAGE RELATIONS IN DIFFERENT TYPES OF GENERATORS	
2.3) DISCUSS CURRENT RELATIONS IN DIFFERENT TYPES OF GENERATORS	
2.4) DISCUSS POWER AND LOADING IN THREE PHASE CIRCUITS.	

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3.0) INTRODUCTION TO AC POWER DISTRIBUTION WITH TRANSFORMERS	REQUIRED RESOURCES
3.1) DEFINE TRANSFORMER TERMINOLOGY AND THEORY OF OPERATION. 3.2) DISCUSS THE DIFFERENT TYPES OF TRANSFORMERS & CONNECTIONS 3.3) OVERVIEW OF THREE PHASE TRANSFORMERS. 3.4) DISCUSS TRANSFORMER LOADING, CONSTRUCTION AND EFFICIENCY.	EMANUAL TEXT : CHAPTER #7
4.0) INTRODUCTION TO ALTERNATORS AND MOTORS	
4.1) DISCUSS THE CONSTRUCTION AND OPERATION AC GENERATORS. 4.2) DISCUSS THE CONSTRUCTION AND OPERATION OF INDUCTION MOTORS 4.3) DISCUSS THE CONSTRUCTION AND OPERATION OF SYNCHRONOUS MOTORS 4.4) DISCUSS THE OPERATION OF SINGLE PHASE MOTORS	EMANUAL TEXT : CHAPTER #8 CHAPTER #9 CHAPTER #10 CHAPTER #12

REQUIRED STUDENT RESOURCES
(INCLUDING TEXTBOOKS & WORKBOOKS)

1) MOTORS, GENERATORS, TRANSFORMERS AND ENERGY — PERICLES EMANUEL

2) D. BELL, FUNDAMENTALS OF ELECTRIC CIRCUITS
PRENTIC HALL 1988 FOUR EDITION

ADDITIONAL RESOURCE MATERIALS

1) L. KOSOW, CIRCUIT ANALYSIS
WILEY 1988

2) WEBB & GRESHOCK, INDUSTRIAL CONTROL ELECTRONICS
MERILL, 1990

3) ADAMS & ROCKMAKER, INDUSTRIAL ELECTRICITY PRINCIPLES AND PRACTICES
MCGRAW HILL, 1985 THIRD EDITION

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METHOD(S) OF EVALUATION

THE FINAL GRADE OF THIS COURSE WILL BE DIVIDED BETWEEN THE AC CIRCUIT AND MACHINES THEORY (60%), & LABWORK(40%). EACH UNIT OF THE COURSE WILL BE INDEPENDENTLY ASSESSED, AND EACH MUST BE SUCCESSFULLY COMPLETED TO COMPLETE THE COURSE.

THE FINAL GRADE FOR AC CIRCUITS AND MACHINES WILL BE DERIVED FROM THE RESULTS OF THREE TEACHER ASSIGNED TESTS, FOUR LAB ASSIGNMENTS AND FOUR QUIZZES.

THREE TESTS	60%	(20% PER TEST)
QUIZZES AND LAB ASSIGNMENTS	40%	(5% EACH)
TOTAL	100%	

THE GRADING SYSTEM USED WILL BE AS FOLLOWS:

A+	>= 90%	CONSISTENTLY OUTSTANDING ACHIEVEMENT
A	80-89%	EXCELLENT ACHIEVEMENT
B	70-79%	ABOVE AVERAGE ACHIEVEMENT
C	55-69%	SATISFACTORY ACHIEVEMENT
R		REPEAT
X		INCOMPLETE

NOTE: IF A STUDENT MISSES A TEST HE/SHE MUST HAVE A VALID REASON (ie. MEDICAL OR FAMILY EMERGENCY). 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 DEAN'S OFFICE OR THE COLLEGE SWITCHBOARD. IF THIS PROCEDURE IS NOT FOLLOWED THE STUDENT WILL RECEIVE A MARK OF ZERO ON THE TEST WITH NO CHANCE OF A REWRITE.
LAB ATTENDANCE IS MANDITORY. ALL ASSIGNED LABS MUST BE SUBMITTED NO LATER THAN TWO WEEKS FOLLOWING THE LAB TESTING OR A MARK OF ZERO WILL BE GIVEN.