

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE OUTLINE: AUTOMATIC ELECTRICAL SYSTEMS

CODE NO.: ELR 320-6

PROGRAM: ELECTRICAL TECHNOLOGY

SEMESTER: FIVE

DATE: SEPTEMBER 1995

**PREVIOUS
OUTLINE DATED: SEPTEMBER 1993**

AUTHOR: ENO LUDAVICIUS

NEW: ___ REV.: X ___

APPROVED: *Bill Armstrong*
COORDINATOR

April 18, 1997
DATE

[Signature]

APRIL 21, 1997

DEAN

DATE

AUTOMATED ELECTRICAL SYSTEMS
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TOTAL CREDIT HOURS: 90

PREREQUISITE(S): ELN 228

PHILOSOPHY/GOALS:

THE STUDENT WILL DEVELOP THE ABILITY TO USE THE COMPUTER IN A DRAFTING AND DESIGN ROLE IN A WIDE VARIETY OF INDUSTRIAL APPLICATIONS USING A LEADING TOOL FOR COMPUTER AIDED DRAFTING AND DESIGN; AUTOCAD.

THE STUDENT WILL USE ADVANCED PLC TECHNIQUES & SOFTWARE TO DESIGN & DOCUMENT AUTOMATED ELECTRICAL SYSTEMS.

THE STUDENT WILL ALSO INTERFACE PLC CONTROL TO AN INDUSTRIAL ROBOT. THIS COURSE WILL FAMILIARIZE THE STUDENT WITH INDUSTRIAL AUTOMATION OF ELECTRICAL, HYDRAULIC AND PNEUMATIC SYSTEMS.

STUDENT PERFORMANCE OBJECTIVES:

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

- 1) DEFINE AND DISCUSS COMPUTER AIDED DRAFTING AND DESIGN TERMINOLOGY AND PRINCIPLES.
- 2) DISTINGUISH THE HARDWARE AND SOFTWARE COMPONENTS OF A COMPUTER AIDED DRAFTING AND DESIGN ENVIRONMENT.
- 3) UTILIZE AUTOCAD MENU STRUCTURES AND DIFFERENT COMMAND ENTRY FORMS.
- 4) PRODUCE DRAWINGS THAT CAN BE USED EFFECTIVELY IN INDUSTRY TO MANUFACTURE, CONSTRUCT AND ASSEMBLE PRODUCTS.
- 5) PROGRAM ADVANCED PLC INSTRUCTIONS USING PLC DEVELOPMENT SOFTWARE.
- 6) PROGRAM AND RUN INDUSTRIAL ROBOTS WITH PLC'S AND AUTOMATION CONTROLLERS.

AUTOMATED ELECTRICAL SYSTEMS
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TOPICS TO BE COVERED:

- 1) OVERVIEW OF CAD/CADD TERMINOLOGY AND PRINCIPLES.
 - 2) OVERVIEW OF CAD/CADD WORKSTATION HARDWARE & SOFTWARE.
 - 3) RECAP OF AUTOCAD MENU STRUCTURES UTILIZING DIFFERENT COMMAND ENTRY FORMS.
 - 4) OVERVIEW OF PLC CLASSIFICATIONS & MANUFACTURES.
 - 5) RECAP OF AB PLC FAMILY HARDWARE & SOFTWARE.
 - 6) INTRODUCTION TO ADVANCED SET OF INSTRUCTIONS FOR THE PLC 5 FAMILY.
 - 7) INTRODUCTION TO THE ALLEN BRADLEY DEVELOPMENT SOFTWARE.
 - 8) INTRODUCTION TO FMS STRATEGIES AND IN-PROCESS CONTROL.
 - 9) PROGRAMMING THE HERCULES ROBOT WITH A PLC 5/25.
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LEARNING ACTIVITIES

REQUIRED RESOURCES

1.0 OVERVIEW OF CAD/CADD
TERMINOLOGY & PRINCIPLES

- 1.1) DEFINE THE TERMS CAD & CADD.
- 1.2) DISCUSS CAD/CADD AT SAULT COLLEGE.
- 1.3) DISCUSS CAD/CADD APPLICATION.
- 1.4) DISTINGUISH THE ADVANTAGES AND DISADVANTAGES OF USING AUTOCAD.

TEXT: AUTOCAD AND ITS
APPLICATIONS
CHAPTER #1

2.0) OVERVIEW OF CAD/CADD
WORKSTATION
HARDWARE & SOFTWARE

- 2.1) DISCUSS THE SELECTION OF A CAD/CADD WORKSTATION.
- 2.2) UTILIZE THE CAD/CADD/CAE SURVEY.
- 2.3) DISCUSS THE CAD/CADD HARDWARE & SOFTWARE CHECKLIST.
- 2.4) DEFINE THE HARDWARE & SOFTWARE COMPONENTS OF CAD/CADD WORKSTATION.

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3.0) INTRODUCTION TO AUTOCAD |
MAIN MENU & COMMANDS |

UPON SUCCESSFUL COMPLETION OF |
THIS UNIT, THE STUDENT WILL |
ABLE TO: |

- 3.1) OUTLINE THE VARIOUS |
- AUTOCAD FEATURES |
- 3.2) DISCUSS THE AUTOCAD |
- COMMAND SUMMARY. |
- 3.3) DESCRIBE THE AUTOCAD |
- MENU STRUCTURE. |
- 3.4) UTILIZE AUTOCAD TO DRAW. |

TEXT: AUTOCAD AND IT'S
APPLICATIONS

BLOCK 2 - ADVANCED PLC DEVELOPMENT

4.0) OVERVIEW OF PLC CLASSIFICATIONS & MANUFACTURES.

5.0) RECAP OF AB PLC FAMILY HARDWARE & SOFTWARE.

HARDWARE

- 5.1) INTRODUCTION TO PLC CONTROLLERS
- HISTORY & DEFINITION
- 5.2) CLASSIFICATION OF PLC CONTROLLERS
- MICROS, SMALL, MEDIUM, LARGE
- 5.3) I/O COMPONENTS
- 5.4) POWER SUPPLIES
- 5.5) PROGRAMMING DEVICES
- 5.6) DATA HIGHWAY & CONFIGURATION
- 5.7) ALLEN BRADLEY PLC-5/25 SYSTEM OVERVIEW

6.0) RECAP OF AB PLC FAMILY HARDWARE & SOFTWARE.

SOFTWARE

6200 AB DEVELOPMENT SERIES

- 6.8) PROGRAM DESCRIPTION & OVERVIEW
- 6.9) OFFLINE PROGRAMMING & DOCUMENTATION
- 6.10) ONLINE PROGRAMMING & DOCUMENTATION
- 6.11) PROGRAMMING FUNCTIONS
- 6.12) DOCUMENTATION & REPORT
- 6.13) UTILITIES - UP/DOWN LOADING PROGRAMS

REQUIRED STUDENT RESOURCES
(INCLUDING TEXTBOOKS & WORKBOOKS)

- 1) T. SHYMAKER/D.A. MADSEN AUTOCAD AND ITS APPLICATIONS
GOODHEART-WILCOX 1990

ADDITIONAL RESOURCE MATERIALS

- 1) D.RAKER & H.RICE, INSIDE AUTOCAD FIFTH EDITION
THOUSAND OAKS, CA91360, U.S.A. NEW RIDERS 1989
- 2) TAYLOR LADDER LOGIC DEVELOPMENT SERIES FOR PLC.
- 3) AMATROL MANUALS - HERCULES ROBOT & WORKCELL

ASSIGNMENTS & PROJECTS 50%

TOTAL 100%

THE GRADING SYSTEM USED WILL BE AS FOLLOWS:

A+	90-100%	CONSISTENTLY OUTSTANDING ACHIEVEMENT
A	80-89%	EXCELLENT ACHIEVEMENT
B	70-79%	ABOVE AVERAGE ACHIEVEMENT
C	65-69%	SATISFACTORY ACHIEVEMENT

- R REPEAT
- X INCOMPLETE