

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE OUTLINE: AUTOMATIC CONTROL SYSTEMS

CODE NO.: ELR 315-6

PROGRAM: ELECTRICAL TECHNOLOGY

SEMESTER: SIX

DATE: JANUARY 1997

**PREVIOUS
OUTLINE DATED: SEPTEMBER 1995**

AUTHOR: ENO LUDAVICIUS

NEW: ___ REV.: X ___

APPROVED:

Bill Armstrong
COORDINATOR

April 18, 1997
DATE

[Signature]

APRIL 21, 1997

DEAN

DATE

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TOTAL CREDIT HOURS: 90

PREREQUISITE (S): ELR 233

PHILOSOPHY/GOALS:

THE STUDENT WILL DEVELOP THE UNDERSTANDING OF CONTROL SYSTEM INTEGRATION OF PLC'S, MMI'S, AC & DC DRIVES AND INSTRUMENTATION. THE STUDENT WILL USE ADVANCED PLC TECHNIQUES & MMI SOFTWARE TO DESIGN & DOCUMENT AND COMMISSION AUTOMATED CONTROL SYSTEMS. THE STUDENT WILL ALSO INTERFACE PLC CONTROL WITH MMI'S TO CONTROL INDUSTRIAL DRIVES OR PROCESS CONTROL LOOPS. THE STUDENT ALSO WILL BE INTRODUCED TO INDUSTRIAL NETWORKING.

STUDENT PERFORMANCE OBJECTIVES:

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

- 1) DEFINE AND DISCUSS INDUSTRIAL AUTOMATION TERMINOLOGY AND PRINCIPLES.
- 2) DISTINGUISH THE HARDWARE AND SOFTWARE COMPONENTS OF AN INTEGRATED AUTOMATED SYSTEM.
- 3) UTILIZE INDUSTRIAL AUTOMATED SOFTWARE TOOLS WITH DOS/ WINDOW FORMAT.
- 4) PRODUCE DRAWINGS AND DOCUMENTS THAT CAN BE USED EFFECTIVELY IN INDUSTRY TO MANUFACTURE, CONSTRUCT AND ASSEMBLE PRODUCTS.
- 5) PROGRAM ADVANCED PLC INSTRUCTIONS USING PLC DEVELOPMENT SOFTWARE.
- 6) PROGRAM MMI'S TO RUN PROCESS CONTROL LOOPS WITH PLC'S AND AUTOMATION CONTROLLERS.
- 7) DESIGN, DEVELOP AND DEMONSTRATE THE OPERATION OF AUTOMATED CONTROL SYSTEM.

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TOPICS TO BE COVERED:

- 1) OVERVIEW OF AUTOMATION TERMINOLOGY AND PRINCIPLES.
- 2) OVERVIEW OF INDUSTRIAL CONTROLS AND AUTOMATION HARDWARE/SOFTWARE.
- 3) OVERVIEW OF ROCKWELL WINVIEW MMI SOFTWARE.
- 4) INTRODUCTION TO RSVIEW - MONITORING, CONTROL AND DATA ACQUISITION SOFTWARE.
- 5) INTRODUCTION TO AB PLC 5/E (ETHERNET) FAMILY HARDWARE & SOFTWARE.
- 6) OVERVIEW TO THE ROCKWELL PLC DEVELOPMENT SOFTWARE
- 7) INTRODUCTION TO ADVANCED SET OF INSTRUCTIONS FOR THE PLC 5/ SLC 500 FAMILY.
- 8) INTRODUCTION TO AB DRIVE TOOLS SOFTWARE.
- 9) INTRODUCTION TO FMS STRATEGIES AND PROCESS CONTROL.

UPON SUCCESSFUL COMPLETION OF EACH UNIT, THE STUDENT WILL BE ABLE TO:

LEARNING OUTCOMES

REQUIRED RESOURCES

1.0 OVERVIEW OF AUTOMATION TERMINOLOGY & PRINCIPLES

1.1) RELATE AUTOMATION TERMS & CONCEPTS TO THE INDUSTRIAL ENVIRONMENT

1.2) DISCUSS AUTOMATION OBJECTIVES @ SAULT COLLEGE.

1.3) DISTINGUISH THE ADVANTAGES AND DISADVANTAGES OF USING AUTOMATION TOOLS FOR THE THIRD YEAR PROJECT.

2.0) OVERVIEW OF INDUSTRIAL CONTROLS AND AUTOMATION HARDWARE & SOFTWARE

2.1) DISCUSS AND OVERVIEW THE FOLLOWING TOPICS:

- MOTOR STARTING/PROTECTION
- MEDIUM VOLTAGE CONTROLLERS
- SOLID STATE CONTROLLERS
- AC & DC ADJUSTABLE SPEED DRIVES.
- RELAYS AND TIMERS
- POWER QUALITY PRODUCTS
- PUSHBUTTONS & TERMINATIONS

CD ROM : AB CATALOG CD

INTERNET: <http://www.ab.com/>
<http://www.rockwell.com/>
(OTHER SITES ALSO CAN BE SURFED!)

-AB CENTERLINE MOTOR CONTROL CENTERS
- SMARTSPEC SOFTWARE

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- 3.0) OVERVIEW OF ROCKWELL WINVIEW MMI SOFTWARE
 - 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.

 - 4.0) INTRODUCTION TO RSVIEW
 - 4.1) DISCUSS THE NATURE OF LISP AND IT'S HISTORY.
 - 4.2) OUTLINE AUTOLISP INSIDE AUTOCAD.
 - 4.3) DESCRIBE AUTOLISP BUILDING BLOCKS.
 - 4.4) DEFINING AUTOLISP FUNCTIONS.

 - 5.0) INTRODUCTION TO AB PLC 5/E (ETHERNET) FAMILY
 - 5.1) OUTLINE THE VARIOUS AUTOCAD FEATURES
 - 5.2) DISCUSS THE AUTOCAD COMMAND SUMMARY.
 - 5.3) DESCRIBE THE AUTOCAD MENU STRUCTURE.
 - 5.4) UTILIZE AUTOCAD TO DRAW.

 - 6.0) OVERVIEW OF ROCKWELL PLC DEVELOPMENT SOFTWARE
 - 6.1) DISCUSS THE NATURE OF LISP AND IT'S HISTORY.
 - 6.2) OUTLINE AUTOLISP INSIDE AUTOCAD.
 - 6.3) DESCRIBE AUTOLISP BUILDING BLOCKS.
 - 6.4) DEFINING AUTOLISP

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7.0) OVERVIEW OF ADVANCED PLC
INSTRUCTIONS |

- 7.1) OUTLINE THE VARIOUS
AUTOCAD FEATURES |
- 7.2) DISCUSS THE AUTOCAD
COMMAND SUMMARY. |
- 7.3) DESCRIBE THE AUTOCAD
MENU STRUCTURE. |
- 7.4) UTILIZE AUTOCAD TO DRAW. |

8.0) INTRODUCTION TO AB
DRIVE TOOLS |

- 8.1) DISCUSS THE NATURE OF
LISP AND IT'S HISTORY. |
- 8.2) OUTLINE AUTOLISP INSIDE
AUTOCAD. |
- 8.3) DESCRIBE AUTOLISP
BUILDING BLOCKS. |
- 8.4) DEFINING AUTOLISP
FUNCTIONS. |

9.0) INTRODUCTION TO FMS
STRATEGIES |

- 9.1) OUTLINE THE VARIOUS
AUTOCAD FEATURES |
- 9.2) DISCUSS THE AUTOCAD
COMMAND SUMMARY. |
- 9.3) DESCRIBE THE AUTOCAD
MENU STRUCTURE. |
- 9.4) UTILIZE AUTOCAD TO DRAW. |
- 9.5) DISCUSS THE NATURE OF
LISP AND IT'S HISTORY. |
- 9.6) OUTLINE AUTOLISP INSIDE
AUTOCAD. |
- 9.7) DESCRIBE AUTOLISP
BUILDING BLOCKS. |
- 9.8) DEFINING AUTOLISP
FUNCTIONS. |

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METHOD(S) OF EVALUATION

THE FINAL GRADE FOR COURSE WILL BE DERIVED FROM THE
RESULTS OF TEACHER ASSIGNED TESTS, AND PROJECTS:

	TESTS	50%
FOUR	PROJECTS	50%
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	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