

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**SAULT  
COLLEGE**

**COURSE OUTLINE**

**COURSE TITLE:** ELECTRICAL & ELECTRONIC CONTROLS II  
**CODE NO. :** ELR213 **SEMESTER:** THREE  
**PROGRAM:** MECHANICAL ENGINEERING TECHNICIAN –  
MANUFACTURING  
**AUTHOR:** AL GOODERHAM  
**DATE:** SEPT 2012 **PREVIOUS OUTLINE  
DATED:** SEPT 2011  
**APPROVED:**

*“Corey Meunier”*

**CHAIR**

**DATE**

**TOTAL CREDITS:** ONE  
**PREREQUISITE(S):** ELR111  
**HOURS/WEEK:** ONE

**Copyright ©2012 The Sault College of Applied Arts & Technology**  
*Reproduction of this document by any means, in whole or in part, without prior  
written permission of Sault College of Applied Arts & Technology is prohibited.*

***For additional information, please contact Corey Meunier, Chair  
Technology & Skilled Trades  
705-759-2554, Ext. 2610***

**I. COURSE DESCRIPTION:**

This course covers the basic knowledge of electrical and electronic controls. Students will learn about safely removing and resetting electrical and electronic devices such as fuses, circuit breakers and about lockouts and shutoff procedures. The student will appreciate diagnostic testing and applications of electronic devices in control systems

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

**1. To develop the student's basic knowledge concerning electrical and electronic theory.**Potential Elements of the Performance:

- Review the use of basic electrical testing instruments
- Review and safely demonstrate the troubleshooting, removal, and resetting of electrical and electronic overload devices such as:
  - Fuses
  - Circuit breakers
  - Ground fault circuit interrupters GFCI
- Review and safely demonstrate the following:
  - Basic general lock-out and tag-out equipment and procedures
  - General shut off procedures

**2. To develop the student's basic knowledge concerning control systems.**Potential Elements of the Performance:

- Introduce open and closed loop control systems.
- Differentiate between analog and digital signals
- Describe, briefly, the devices used in a control system such as:
  - Limit switches
  - Proximity switches
  - Photo cells
  - Inductive and capacitive sensors
  - Solenoids
  - Linear variable differential transformers (LVDT)
  - Vibration transducers
  - Displacement, velocity and accelerometer devices

Thermal devices such as:

- Thermostats
- Thermocouples
- Bimetallic strip devices
- Metal resistance thermometers
- Thermistors
- Thermal expansion devices

Miscellaneous transducers such as:

- Bourdon tube
- Pressure switches
- Diaphragm
- Bellows
- Piezoelectric
- Strain gauge

### **III. TOPICS:**

1. Overload Devices / Disconnects
2. Open and Closed loop control systems
3. Digital and Analog Signals and where they apply to industry
4. Various types of instrumentation found in industry

### **IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

- Handouts

**V. EVALUATION PROCESS/GRADING SYSTEM:**

Theory testing, 2 tests, 40% each	80%
Application assignments, 2 , 10% each	<u>20%</u>
	100%

While marks are not given for attendance, 1% marks will be deducted for classes missed.

**See Special Notes Section**

The following semester grades will be assigned to students:

<b>Grade</b>	<b><u>Definition</u></b>	<b><i>Grade Point Equivalent</i></b>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

**VI. SPECIAL NOTES:**Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

**VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located on the portal form part of this course outline.