

**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:** 3  
**PROGRAM:** Mechanical Engineering Technician - Manufacturing  
**AUTHOR:** R. Clouthier  
**DATE:** Sept 2009 **PREVIOUS OUTLINE DATED:** Sept 2008  
**APPROVED:**  
*“Corey Meunier”*  
CHAIR DATE  
**TOTAL CREDITS:** 1  
**PREREQUISITE(S):** ELR111  
**HOURS/WEEK:** 2

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*For additional information, please contact Corey Meunier, Chair*  
*School of 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 diagnostic testing and application 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 on instrumentation found in the industrial field

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

- Handouts

### V. EVALUATION PROCESS/GRADING SYSTEM:

|   |            |
|---|------------|
| Theory testing :                                  | 75%        |
| Application experiences                           | <u>25%</u> |
| (Includes, class participation, attendance, labs) | 100%       |

While marks are not given for attendance, marks may 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>   | <i>Grade Point<br/>Equivalent</i> |
|--------------|--|-----------------------------------|
| 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:

### Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

### Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

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.

- Attendance is compulsory, unless discussed with the instructor in advance of the absence and the absence is for a medical or family emergency.
- Any student that is absent for will be required to provide a doctor's note immediately upon returning. Failing to do so will result in a grade of 0% being assigned to the missed activity.
- At the instructor's discretions a deduction of up to 5% may be made from the student's final mark for each class or portion thereof missed.