

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** Electronic Controls  
**CODE NO. :** ELR 111 **SEMESTER:** 2  
**PROGRAM:** Mechanical Techniques: Industrial Maintenance  
Mechanic  
**AUTHOR:** R. McTaggart  
**DATE:** 01/2004 **PREVIOUS OUTLINE DATED:**

**APPROVED:**

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**DEAN** **DATE**

**TOTAL CREDITS:** 1  
**PREREQUISITE(S):** None  
**HOURS/WEEK:** 1

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**I. COURSE DESCRIPTION:**

This course introduces the student to the fundamentals of electricity. Safety issues, provincial and national codes relating to electrical installations, and characteristics of electric circuits are also introduced.

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

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

1. List and describe the purpose of various codes associated with electrical installations.  
Potential Elements of the Performance:
  - Describe the purpose and scope of the Canadian Electrical Code (CSA Standard C22.1).
  - Describe the purpose and scope of the Ontario Electrical Safety Code and how it is related to the Canadian Electrical Code.
2. Describe the purpose and function of electrical components as they relate to safety.  
Potential Elements of the Performance:
  - Describe the purpose and function of fuses.
  - Describe the purpose and function of circuit breakers.
  - Describe the purpose, function and limitations of isolating switches.
  - Describe the purpose and function of lock-outs.
  - Describe the purpose and function of shut-off procedures.
3. Describe atomic theory and electricity.  
Potential Elements of the Performance:
  - List and describe the components of an atom.
  - Define molecule, element and compound.
  - Describe static charges and electromotive force.
  - List sources of electromotive force.
  - Describe the characteristics of conductors, insulators and semiconductors.
  - Define voltage, current and resistance.
  - Describe alternating current (ac) and direct current (dc) listing sources and applications of each.
  - Describe the characteristics of a simple electric circuit.
  - State and perform calculations using Ohm's Law.

4. Analyze simple series and parallel circuits with a direct current supply.  
Potential Elements of the Performance:
  - Describe characteristics and applications of series circuits.
  - Use Ohm's Law to solve for current, voltages and resistances in series circuits.
  - Describe characteristics and applications of parallel circuits.
  - Use Ohm's Law to solve for voltage, currents and resistances in parallel circuits.
  - Describe applications of series-parallel circuits.
5. Identify, select and use electrical test instruments safely.  
Potential Elements of the Performance:
  - Describe how voltage is measured in an electric circuit and how the type (ac or dc) and magnitude of the voltage affects the type of meter used, how the meter is used and how the meter is set up.
  - Describe how current is measured in an electric circuit and how the type (ac or dc) and magnitude of the current affects the type of meter used, how the meter is used and how the meter is set up.
  - Describe how resistance of components and circuits is measured.
  - Describe how insulation of electrical components and circuits is tested and how the test equipment can differ from a standard ohm-meter.
  - Describe the consequences of incorrectly connecting or applying various electrical test instruments.
6. Describe the principles of grounding as it pertains to safety.  
Potential Elements of the Performance:
  - Describe how electrical systems are grounded.
  - Define bonding.
  - Describe how grounding and bonding are related and how they differ.
  - Describe how grounding and bonding assist the operation of protective devices such as fuses and circuit breakers.
  - Describe how grounding and bonding reduce the risk and severity of electric shock.

### III. TOPICS:

1. Electrical Safety Codes.
2. Fuses, circuit breakers and isolating switches.
3. Atomic theory and electricity.
4. Series and parallel circuits.
5. Electrical test instruments.
6. Grounding of electrical systems.

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

The instructor will provide hand-outs and students are expected to take notes during lectures..

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

2 or 3 tests: 100%

The following semester grades will be assigned to students:

<b>Grade</b>	<b>Definition</b>	<i>Grade Point 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:**Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 703 so that support services can be arranged for you.

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.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. 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.

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.

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

If a student misses a test he/she must have a valid reason (i.e. medical or family emergency – documentation may be required). In addition, the instructor must be notified prior to the test sitting. If this procedure is not followed the student will receive a mark of zero on the test with no rewrite option.

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

**VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.