



## COURSE OUTLINE: ELR111 - ELECTRONIC CONTROLS

Prepared: Randy Clouthier

Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	ELR111: ELECTRIC AND ELECTRONIC CONTROLS
<b>Program Number: Name</b>	4039: MECH. ENG. TN-MANUFA
<b>Department:</b>	ELECT./INSTRUMENTATION PS
<b>Semesters/Terms:</b>	20W, 20S
<b>Course Description:</b>	This course introduces the student to the fundamentals of electricity and electrical controls. Safety issues, provincial and national codes relating to electrical installations, and characteristics of electric circuits are also introduced.
<b>Total Credits:</b>	1
<b>Hours/Week:</b>	1
<b>Total Hours:</b>	15
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>Substitutes:</b>	ELR100, ELR130, ELR206
<b>This course is a pre-requisite for:</b>	ELR213
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4039 - MECH. ENG. TN-MANUFA</b> VLO 1 Complete all work in compliance with current legislation, standards, regulations and guidelines. VLO 3 Comply with current health and safety legislation, as well as organizational practices and procedures.
<b>Essential Employability Skills (EES) addressed in this course:</b>	EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 11 Take responsibility for ones own actions, decisions, and consequences.
<b>General Education Themes:</b>	Civic Life Science and Technology
<b>Course Evaluation:</b>	Passing Grade: 50%, D
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00



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F (Fail)49% and below 0.00

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W Student has withdrawn from the course without academic penalty. Smart watches and similar devices are not allowed during tests and quizzes.

**Course Outcomes and Learning Objectives:**

<b>Course Outcome 1</b>	<b>Learning Objectives for Course Outcome 1</b>
1. List and describe the purpose of various codes associated with electrical installations.	1.1 Describe the purpose and scope of the Canadian Electrical Code (CSA Standard C22.1). 1.2 Describe the purpose and scope of the Ontario Electrical Safety Code and how it is related to the Canadian Electrical Code.
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
2. Describe the purpose and function of electrical components as they relate to safety.	2.1 Describe the purpose and function of fuses. 2.2 Describe the purpose and function of circuit breakers. 2.3 Describe the purpose, function and limitations of isolating switches. 2.4 Describe the purpose and function of lock-outs. 2.5 Describe the purpose and function of shut-off procedures.
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
3. Describe atomic theory and electricity.	3.1 List and describe the components of an atom. 3.2 Define molecule, element and compound. 3.3 Describe static charges and electromotive force. 3.4 List sources of electromotive force. 3.5 Describe the characteristics of conductors, insulators and semiconductors. 3.6 Define voltage, current and resistance. 3.7 Describe alternating current (ac) and direct current (dc) listing sources and applications of each. 3.8 Describe the characteristics of a simple electric circuit. 3.9 State and perform calculations using Ohm's Law.
<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
4. Analyze simple series and parallel circuits with a direct current supply.	4.1 Describe characteristics and applications of series circuits. 4.2 Use Ohm's Law to solve for current, voltages and resistances in series circuits. 4.3 Describe characteristics and applications of parallel circuits. 4.4 Use Ohm's Law to solve for voltage, currents and resistances in parallel circuits. 4.5 Describe applications of series-parallel circuits.
<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>
5. Identify, select and use electrical test instruments safely.	5.1 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. 5.2 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. 5.3 Describe how resistance of components and circuits is measured. 5.4 Describe how insulation of electrical components and circuits is tested and how the test equipment can differ from a standard ohm-meter. 5.5 Describe the consequences of incorrectly connecting or applying various electrical test instruments.						
	<b>Course Outcome 6</b>	<b>Learning Objectives for Course Outcome 6</b>						
	6. Describe the principles of grounding as it pertains to safety.	6.1 Describe how electrical systems are grounded. 6.2 Define bonding. 6.3 Describe how grounding and bonding are related and how they differ. 6.4 Describe how grounding and bonding assist the operation of protective devices such as fuses and circuit breakers. 6.5 Describe how grounding and bonding reduce the risk and severity of electric shock.						
<b>Evaluation Process and Grading System:</b>	<table><tr><th>Evaluation Type</th><th>Evaluation Weight</th></tr><tr><td>Assignments</td><td>20%</td></tr><tr><td>Tests</td><td>80%</td></tr></table>		Evaluation Type	Evaluation Weight	Assignments	20%	Tests	80%
Evaluation Type	Evaluation Weight							
Assignments	20%							
Tests	80%							
<b>Date:</b>	August 27, 2019							
<b>Addendum:</b>	Please refer to the course outline addendum on the Learning Management System for further information.							

