

**COURSE ELT1030: CONVERSION & DISTRIBUTION****Level:** Introductory**Theme:** Power Systems**Prerequisite:** None**Description:** Students experiment and work with principles of electrical energy conversion and distribution.**Parameters:** Basic hand tools, multimeter and related resources.**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>identify and describe methods of converting nonrenewable and renewable sources of energy into electricity</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>identification and description of six ways of converting energy into electricity in Alberta.</li> </ul> <p><i>Assessment Tool</i>  <i>ELT1030-1: Project Assessment: Electrical Energy Conversion and Distribution</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p>	5
<ul style="list-style-type: none"> <li>construct an electrical distribution system</li> </ul>	<ul style="list-style-type: none"> <li>construction of an electrical distribution system that includes: <ul style="list-style-type: none"> <li>source, load, wiring and control devices</li> <li>series/parallel and combination circuits.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>ELT1030-1: Project Assessment: Electrical Energy Conversion and Distribution</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p>	40

**COURSE ELT1030: CONVERSION & DISTRIBUTION (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate how mechanical, chemical, light and heat energy can be converted into electrical energy</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>prototyping and operating any two energy conversion systems:               <ul style="list-style-type: none"> <li>comparing outputs of the two sources</li> <li>working cooperatively with others.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>ELT1030–1: Electrical Energy Conversion and Distribution</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p>	<p>30</p>
<ul style="list-style-type: none"> <li>determine the cost efficiency, practicality and environmental impact of producing electricity from various sources of energy</li> </ul>	<ul style="list-style-type: none"> <li>presentation of an oral or written report that identifies cost efficiency, practicality and the environmental impact of providing energy from one or more renewable and nonrenewable energy sources.</li> </ul> <p><i>Assessment Tool</i>  <i>ELT1030–1: Electrical Energy Conversion and Distribution</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p>	<p>20</p>
<ul style="list-style-type: none"> <li>demonstrate established laboratory procedures and safe work practices</li> </ul>	<ul style="list-style-type: none"> <li>observed performance related to following:               <ul style="list-style-type: none"> <li>established laboratory procedures</li> <li>safe work practices pertaining to high voltages.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>ELT1030–1: Electrical Energy Conversion and Distribution</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p>	<p>5</p>
<ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

**COURSE ELT1030: CONVERSION & DISTRIBUTION (continued)**

Concept	Specific Outcomes	Notes
Safety	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and follow safety procedures in home/laboratory.</li> </ul>	Describe hazards of working with high voltages.
Designing and Prototyping	<ul style="list-style-type: none"> <li>• build and/or operate one energy conversion system that produces electricity using chemical, light, heat and/or mechanical energy forms.</li> </ul>	Have students produce electricity using: <ul style="list-style-type: none"> <li>• lemon</li> <li>• potato</li> <li>• photo/solar cell</li> <li>• crystals</li> <li>• thermocouple</li> <li>• generator.</li> </ul>
System Identification	<ul style="list-style-type: none"> <li>• identify and describe how energy is converted into electricity in a:               <ul style="list-style-type: none"> <li>– wet/dry cell</li> <li>– photovoltaic cell</li> <li>– thermocouple</li> <li>– generator/alternator</li> <li>– piezoelectrical crystal</li> </ul> </li> <li>• describe electrical power distribution systems from source to consumer</li> <li>• research issues related to electrical generation, transmission and distribution systems, e.g.:               <ul style="list-style-type: none"> <li>– cost efficiencies</li> <li>– environmental impact of fossil fuel, hydro electric and nuclear power plants</li> <li>– conventional (fossil fuel) versus nonconventional (tidal, solar, wind) sources.</li> </ul> </li> </ul>	
Real-world Application	<ul style="list-style-type: none"> <li>• report on issues related to energy efficiency and conservation</li> <li>• identify specific applications of energy conversion used in personal life.</li> </ul>	Bicycle generator, solar panel, wind generator, gas generator.
Fabricating/Testing	<ul style="list-style-type: none"> <li>• wire common lighting and communication circuits:               <ul style="list-style-type: none"> <li>– breadboarding (low voltage)</li> <li>– switches, lights, plugs, bells, buzzers, etc.</li> </ul> </li> <li>• test circuits for continuity and function.</li> </ul>	<p><i>Basic Wiring</i> (Creative Homeowner Press, 1994).</p> <p>Use a variety of load and control devices.</p>

**COURSE ELT1030: CONVERSION & DISTRIBUTION (continued)**

Concept	Specific Outcomes	Notes
Careers	<i>The student should:</i> <ul style="list-style-type: none"><li>• explain employment opportunities in electrical generation and distribution.</li></ul>	Tour substations and/or view videos. <i>Apprenticeship and Industry Training Act.</i>