

**COURSE ELT2130: MAGNETIC CONTROL DEVICES****Level:** Intermediate**Theme:** Robotic and Control Systems**Prerequisite:** ELT1010 Electro-assembly 1**Description:** Students demonstrate the fundamentals of electromagnetic control devices.**Parameters:** Multimeter, clamp-on ammeter, power supply, hand tools 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 state the function of electromagnetic control devices</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• observation of work related to:               <ul style="list-style-type: none"> <li>– identifying the components in an electromagnetic system</li> <li>– identifying the symbols of contactor, magnetic starter, overload protection device, overcurrent protection device, safety disconnect, mechanical relay and solid-state relay components</li> <li>– stating the function of contactor, magnetic starter, overload protection device, overcurrent protection device, safety disconnect, mechanical relay and solid-state relay</li> <li>– drawing the wiring schematic diagram for various electromagnetic systems.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>CTSPRE: Assessment Framework:</i>  <i>Presentations/Reports</i></p> <p><i>Standard</i>  <i>Performance rating of 2 for each applicable task</i></p>	<p>20</p>



**COURSE ELT2130: MAGNETIC CONTROL DEVICES (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate established laboratory procedures and safe work practices</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance in following:                             <ul style="list-style-type: none"> <li>established laboratory procedures</li> <li>prevention procedures for current leakage in solid-state relays</li> <li>correct use of protective devices for circuits.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>ELTPSP: Assessment Checklist: Laboratory Procedures and Safety Practices</i></p> <p><i>Standard</i>  <i>Performance rating of 2 for each applicable task</i></p>	5
<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>	Integrated throughout

Concept	Specific Outcomes	Notes
Safety/Resource Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>demonstrate safety in all practices including solid-state relay current leakage</li> <li>follow safe wiring practices</li> <li>use protective devices for all circuits.</li> </ul>	<p>Breakers, fuses, O/L coils and safety disconnects.</p> <p>Observe lockout and tagout procedures.</p>
Fundamentals	<ul style="list-style-type: none"> <li>research the benefits and drawbacks of electro-magnetic and solid-state relays</li> <li>identify coil voltage and frequency rating</li> <li>identify contact voltage and current ratings</li> <li>compare and contrast the use of relays, solenoids, actuators in electrical circuits</li> </ul>	<p>Better circuit isolation.</p> <p>Nameplate ratings.</p>

**COURSE ELT2130: MAGNETIC CONTROL DEVICES (continued)**

Concept	Specific Outcomes	Notes
Fundamentals (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate knowledge of electromagnetism</li>   <li>• demonstrate knowledge of activation principles.</li> </ul>	<p>Magnetic fields around:</p> <ul style="list-style-type: none"> <li>• single conductor</li> <li>• coil</li> <li>• magnetic polarity</li> <li>• left-/right-hand rule.</li> </ul> <p>Solenoid principles. Relay principle.</p>
Designing and Prototyping	<ul style="list-style-type: none"> <li>• draw a schematic and wiring diagram and construct the following electromagnetic circuits: <ul style="list-style-type: none"> <li>– toggle switch controls load</li> <li>– stop/start button controls loads</li> <li>– stop/start from two locations</li> <li>– jogging</li> <li>– reversing</li> <li>– annunciator and indicators</li> <li>– limit switches.</li> </ul> </li>   <li>• create a flow chart of various magnetic control systems.</li> </ul>	<p>Electric valve control. Circuit initiation control.</p> <p>Elevator, ski lift, light control, fail-safe latching control, AC/DC isolation relay, assembly line.</p>
Careers	<ul style="list-style-type: none"> <li>• research application in industry of magnetic control devices and employment opportunities.</li> </ul>	