

**COURSE ELT1060: DIGITAL TECHNOLOGY 1****Level:** Introductory**Theme:** Computer Logic Systems**Prerequisite:** ELT1010 Electro-assembly 1**Description:** Students construct and demonstrate logic systems and their unique functions.**Parameters:** Five-volt power supply, logic probe 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>describe the binary numbering system and logic gates</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance related to: <ul style="list-style-type: none"> <li>identifying and converting binary and base 2, 8 and 16 numbering systems</li> <li>identifying the symbols for basic logic gates</li> <li>stating the function of basic logic gates</li> <li>writing a truth table for a logic gate circuit.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>ELT1060–1: Presentations/Reports: Binary Numbering System</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p>	20
<ul style="list-style-type: none"> <li>construct and verify basic logic gates</li> </ul>	<ul style="list-style-type: none"> <li>observed performance when constructing a binary logic circuit and verifying it with a truth chart using a logic probe.</li> </ul> <p><i>Assessment Tool</i>  <i>ELTLAB–3: Assessment Checklist: Laboratory Practice</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p>	35
<ul style="list-style-type: none"> <li>construct a simple logic circuit, and explain its functions</li> </ul>	<ul style="list-style-type: none"> <li>observed performance using logic gates or hardwired contact to solve a design problem.</li> </ul> <p><i>Assessment Tool</i>  <i>ELT1060–1: Presentations/Reports: Binary Numbering System</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p>	35

**COURSE ELT1060: DIGITAL TECHNOLOGY 1 (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• identify the major integrated circuit (IC) families, and describe their unique functions</li> <li>• demonstrate established laboratory procedures and safe work practices</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• identifying and knowing the function of selected integrated circuit (IC) families.</li> </ul> <p><i>Assessment Tool</i>  <i>ELT1060–1: Presentations/Reports: Binary Numbering System</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>• observed performance in following:                             <ul style="list-style-type: none"> <li>– established laboratory procedures</li> <li>– when and how to perform electrostatic discharge.</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 1 for each applicable task</i></p>	5
	<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
<p>Safety/Resource Management</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and follow laboratory safety procedures</li> <li>• explain how to avoid electrostatic discharges around IC chips</li> <li>• demonstrate an understanding of grounding, voltage and current rating of various IC families.</li> </ul>	<p>Grounding, power supplies.</p>

**COURSE ELT1060: DIGITAL TECHNOLOGY 1 (continued)**

Concept	Specific Outcomes	Notes
System Identification	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• distinguish between analog and digital systems</li> <li>• identify major component sections of a logic system, such as:               <ul style="list-style-type: none"> <li>– random access memory (RAM)</li> <li>– read only memory (ROM)</li> <li>– central processing unit (CPU)</li> <li>– registers</li> <li>– input/output (I/O) ports</li> </ul> </li> <li>• identify the application, pinouts and use of various IC chips from manufacturing codes</li> <li>• identify characteristics of various IC chips from different manufacturers which do similar functions using ECG, NTE and other replacement guides</li> <li>• identify the pinouts and function of any IC using the IC master reference texts</li> <li>• identify the difference between various logic families</li> <li>• identify/explain differences between various logic systems</li> <li>• use a digital probe.</li> </ul>	<p>TTL, CMOS, DTL , RTL, MOS.</p> <p>Refer to <i>Semiconductor Reference Handbook</i>.</p> <p>Note: Many replacement guides are produced for computers in CD ROMs.</p> <p>Digital displays, password strips, combination locks, security controls, counters, digital multimeters.</p>
Fundamentals	<ul style="list-style-type: none"> <li>• develop the circuits and tables for the following logic gates:               <ul style="list-style-type: none"> <li>– AND</li> <li>– OR</li> <li>– NOT</li> <li>– X-OR</li> <li>– NAND</li> <li>– NOR</li> <li>– XNOR, etc.</li> </ul> </li> </ul>	
Fabricating/Testing	<ul style="list-style-type: none"> <li>• construct digital probes</li> <li>• test digital probes.</li> </ul>	<p>Logic probe kit or perforated board.</p>

**COURSE ELT1060: DIGITAL TECHNOLOGY 1 (continued)**

Concept	Specific Outcomes	Notes
Designing and Prototyping	<i>The student should:</i> <ul style="list-style-type: none"><li>• breadboard a digital system, such as combination locks and keyboard</li><li>• use emulation software; e.g., electronics workbench.</li></ul>	
Problem Solving	<ul style="list-style-type: none"><li>• solve a digital problem and build a digital system for a solution (two or three inputs for a single output).</li></ul>	Two input gates to make a three-input gate.
Careers	<ul style="list-style-type: none"><li>• research areas of certification:<ul style="list-style-type: none"><li>– trade certification</li><li>– vendor certification</li><li>– professional associations</li><li>– equipment standards.</li></ul></li></ul>	