

COURSE ELT3070: DIGITAL APPLICATIONS**Level:** Advanced**Theme:** Computer Logic Systems**Prerequisite:** ELT2060 Digital Technology 2**Description:** Students experiment with large-scale and very large-scale integrated circuits, and demonstrate their applications to practical situations.**Parameters:** Logic probes, logic analyzer, signature analysis, oscilloscopes and related resources.**Supporting Course:** ELT3060 Digital Technology 3**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"> • identify applications and develop prototypes of large-scale integrated circuits 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> • demonstrating correct handling and use of large-scale integrated circuits (LSICs). Prototyping and troubleshooting digital system such as: <ul style="list-style-type: none"> – microcomputer – liquid crystal display (LCD) timer with alarm – electronic game – digital voltmeter – digital light meter • constructing circuits using LSICs incorporated within any video, stereo, audio or computer systems or advanced project of student choice • experimenting with a practical large digital integration (LDI) system such as: <ul style="list-style-type: none"> – clock – data transmission – video games. <p><i>Assessment Tool</i> <i>ELTLAB-3: Assessment Checklist: Laboratory Practice, Parts 1 and 2</i></p> <p><i>Standard</i> <i>Performance rating of 3 for each applicable task</i></p>	50

COURSE ELT3070: DIGITAL TECHNOLOGY APPLICATION (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> • troubleshoot a digital system or prototype with digital equipment • demonstrate established laboratory procedures and safe work practices • demonstrate basic competencies. 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> • incorporating a LSIC digital system on a given previous student project or a consumer product, using one of the following instruments to analyze and troubleshoot a circuit: <ul style="list-style-type: none"> – logic probes – pulser – logic analyzer – signature analyzer – oscilloscopes using computer simulation, experimental boards, CAI package or actual equipment. <p><i>Assessment Tool</i> <i>ELTLAB-3: Assessment Checklist: Laboratory Practice, Part 3</i></p> <p><i>Standard</i> <i>Performance rating of 3 for each applicable task</i></p> <ul style="list-style-type: none"> • observed performance in following: <ul style="list-style-type: none"> – established laboratory procedures – correct handling and storage of LSIC and VLSIC chips. <p><i>Assessment Tool</i> <i>ELTPSP: Assessment Checklist: Laboratory Procedures and Safety Practices</i></p> <p><i>Standard</i> <i>Performance rating of 3 for each applicable task</i></p> <ul style="list-style-type: none"> • observations of individual effort and interpersonal interaction during the learning process. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>45</p> <p>5</p> <p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
<p>Safety/Resource Management</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • demonstrate correct handling and storage of large integrated circuit (LSIC) and very large integrated circuit (VLSIC) chips. 	

COURSE ELT3070: DIGITAL APPLICATIONS (continued)

Concept	Specific Outcomes	Notes
Real-world Applications	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • prototype and troubleshoot a digital system such as a calculator, computer, adder/subtractor, digital clock, frequency counter, alarms, games • identify the application of pinouts and use of complex IC chips from several manufacturers. 	<p>Any electronic problem with multiple inputs and outputs will do. Truth tables will need to be constructed. Texts: <i>Digital Electronics</i> (Chapter 12), <i>Principles of Digital Audio</i>.</p> <p>Use memory interfacing, drivers, support and advanced support IC.</p>
Fundamentals	<ul style="list-style-type: none"> • research and investigate a complex digital system • identify the function of ICs in a large complex digital circuit • explain, experiment with and demonstrate the differences among digital memories • research memory configuration and organization • construct various memory circuits • explain and demonstrate the differences among various digital displays and drivers • explain and demonstrate the differences among various digital interfacing devices • explain and demonstrate the differences among various support and advanced support ICs. 	<p>Examples of texts that may be helpful: <i>18 Advanced Electronic Projects, Video, Stereo and Opto Electronics. Digital Computer Circuits and Concepts.</i></p> <p>For example, RAM, ROM, PROM, EPROM, magnetic core memory, computer bulk storage devices.</p> <p>LCD, seven segments, etc.</p> <p>Line drivers and receivers, digital to analog converters, analog to digital converters, serial and parallel transfer, UART, RS-232C operational amplifiers.</p> <p>UART, Parallel I/O, 8253 Counter Timer, 8225 Programmable CRT controller, 1535-488 controlled cursor generator.</p>

COURSE ELT3070: DIGITAL APPLICATIONS (continued)

Concept	Specific Outcomes	Notes
Fabricating/Testing	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • construct circuits using LSICs • use one of the following instruments to analyze a complex digital circuit: <ul style="list-style-type: none"> – logic probes – pulser – logic analyzer – signature analyzer – oscilloscopes. 	<p>Could be linked with Electro-assembly 2 or Electro-assembly 3, robotics unit for printed circuit board.</p> <p>In place of some of these actual instruments, student may have to use software such as <i>Electronic Workbench</i>.</p>