

**COURSE ELT3110: AMPLIFIERS****Level:** Advanced**Theme:** Communication Systems**Prerequisite:** ELT3100 Analog Communication 3**Description:** Students demonstrate knowledge of various types and classes of amplifiers.**Parameters:** CAI package, assorted types of amplifiers and related resources.**Supporting Courses:** ELT2050 Electronic Power Supply  
ELT3100 Analog Communication 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"> <li>explain the differences among various types and classes of amplifiers</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>describing the application of various amplifiers such as: <ul style="list-style-type: none"> <li>class A, class AB, class B, class C</li> <li>operational amplifiers (OP amps)</li> <li>metal-oxide semiconductor field effect transistors (MOSFETs) and junction field effect transistors (JFETs)</li> <li>direct current (DC) amplifiers</li> <li>Darlington-pair amplifiers</li> <li>integrated current (IC) amplifiers</li> </ul> </li> <li>explaining the difference between amplifiers, using the following criteria: <ul style="list-style-type: none"> <li>transistor circuit configuration</li> <li>impedance matching (input/output)</li> <li>multistage</li> <li>types of coupling</li> <li>voltage and power gain in decibels (dB)</li> </ul> </li> <li>identifying and explaining amplifiers using the following terms: <ul style="list-style-type: none"> <li>complementary</li> <li>push-pull</li> <li>symmetry</li> </ul>           and using schematic and block diagrams generated by the student or obtain from reference sources or computer simulation programs. </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 3 for each applicable task</i></p>	<p>20</p>





**COURSE ELT3110: AMPLIFIERS (continued)**

Concept	Specific Outcomes	Notes
<p>Fundamentals/ Applied Mathematics (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• explain the function and operation of DC, audio, video, power, RF and IF amplifiers</li> <li>• describe a Darlington-pair arrangement</li> <li>• explain how a differential amplifier operates</li> <li>• identify three different types of power amplifiers</li> <li>• explain how volume and tone can be controlled in an audio amplifier</li> <li>• explain the basic differences between IF and RF amplifiers</li> <li>• list three ways of increasing the bandwidth in RF and IF amplifiers</li> <li>• draw a block diagram of a multistage audio amplifier</li> <li>• describe the operation of operational amplifiers using inverting and non-inverting circuits</li> <li>• choose the appropriate amplifier configuration for an application</li> <li>• calculate voltage gain and power gain in decibels (dB).</li> </ul>	
<p>Designing and Prototyping</p>	<ul style="list-style-type: none"> <li>• construct and experiment with amplification circuits such as:               <ul style="list-style-type: none"> <li>– DC amplifier</li> <li>– Class A amplifier</li> <li>– complementary Class B Amplifier</li> <li>– Class B push-pull circuit</li> <li>– Class AB amplifier</li> <li>– a two-stage, RC-coupled audio amplifier</li> <li>– a basic audio power amplifier</li> <li>– push-pull power amplifier</li> <li>– IC amplifiers used in large audio system, e.g., car cassette systems, consumer audio systems</li> <li>– use a JFET as a common-drain amplifier</li> <li>– use a JFET as a common-gate amplifier</li> <li>– a basic differential operational amplifier.</li> </ul> </li> </ul>	<p>Students may use traditional laboratory methods or any CAI amplifier package.</p> <p>Additional time may be required. Link this with a Career Transitions course.</p>

**COURSE ELT3110: AMPLIFIERS** (continued)

Concept	Specific Outcomes	Notes
Real-world Applications/ Troubleshooting	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• troubleshoot a multistage common-emitter amplifier to determine which amplifier stage is faulty.</li> </ul>	<p>Additional time may be required. Link this with a Career Transitions course.</p>
Fabricating/Testing	<ul style="list-style-type: none"> <li>• construct a 25 watt amplifier project (audio or video)</li> <li>• evaluate completed project.</li> </ul>	<p>Additional time may be required. Link this with a Career Transitions course.</p> <p>References:</p> <ul style="list-style-type: none"> <li>• <i>Incredible Audio and Video Projects You Can Build</i> (Rudolf F. Graf William Sheets)</li> <li>• <i>Electronic Power Control</i> (Irving Gottlieb).</li> </ul>

