

**COURSE FOR1090: FOREST ECOLOGY 1 (ECOSYSTEM DYNAMICS)****Level:** Introductory**Content Focus:** Management and Conservation**Prerequisite:** None**Description:** Students investigate forest ecosystems, and explain the structure and functioning of trees.**Parameters:** Access to a science laboratory and/or forest environment.**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 interrelationships among elements in the forest ecosystem</li> <li>• describe structural units of the tree and their function in performing life processes</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• given access to information on forest ecology, completing a research project that examines: <ul style="list-style-type: none"> <li>– interrelationships among at least three living and three nonliving elements</li> <li>– predator–prey–decomposer relationships</li> <li>– distribution of species on the basis of habitat requirements.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Research Process: Forest Ecosystems, FOR1090–1</i></p> <p><i>Standard</i> <i>Complete all components of research to a standard of 1 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• identifying and describing major tree parts (including roots, trunk, branches, leaves, flowers), their function and relationship to one another.</li> </ul> <p><i>Assessment Tool</i> <i>Knowledge/Application Assessment: Structural Units of the Tree, FOR1090–2</i> <i>Assessment Criteria: Diagrams and Technical Drawings, FORDRA</i></p> <p><i>Standard</i> <i>Respond to a standard of 1 on the rating scale</i></p>	<p>50</p> <p>50</p>

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General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <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>conducting directed laboratory and/or field investigations that demonstrate three or more vital life processes performed by trees; e.g., nutrient uptake, photosynthesis, respiration, transpiration, reproduction.</li> </ul> <p><i>Assessment Tool</i>  <i>Lab Investigations: Tree Biology, FOR1090–3</i></p> <p><i>Standard</i>  <i>Complete lab and/or field investigations to a standard of 1 on the rating scale</i></p> <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>

Concept	Specific Outcomes	Notes
<p>Forest Ecosystems</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>define and provide examples of: <ul style="list-style-type: none"> <li>ecology/ecosystems</li> <li>abiotic/biotic factors</li> <li>abiotic/biotic interactions</li> <li>populations</li> <li>communities</li> <li>succession</li> </ul> </li> <li>identify living and nonliving elements within a local forest ecosystem; e.g.: <ul style="list-style-type: none"> <li>soil characteristics</li> <li>land form</li> <li>climate</li> <li>flora and fauna</li> <li>soil organisms</li> </ul> </li> </ul>	<p><b>This course involves the application of ecosystem concepts within a forest environment.</b></p> <p>Use field trips to provide opportunities for the first-hand observation of components of a forest ecosystem.</p> <p>Observe forest layers; e.g., canopy, understory.</p> <p>Observe succession at the edge of clearings and fields, spruce under a pine forest, erosion along a river bank, old burn, etc.</p>

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Concept	Specific Outcomes	Notes
Forest Ecosystems (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe the interrelatedness of elements within a local forest environment; e.g.:               <ul style="list-style-type: none"> <li>– relationship of soil, air and water characteristics to plant growth</li> <li>– interactions and dependencies among living organisms</li> </ul> </li> <li>• explain the role of trees within a local forest ecosystem; e.g.:               <ul style="list-style-type: none"> <li>– exchange of gases</li> <li>– water cycle</li> <li>– nutrient cycling</li> <li>– wildlife habitat</li> <li>– soil conservation</li> </ul> </li> <li>• describe food relationships among living organisms within a local forest environment; e.g.:               <ul style="list-style-type: none"> <li>– role of producers, consumers and decomposers</li> <li>– food chains and webs</li> </ul> </li> <li>• compare the ecological niches of selected plant and animal species native to Alberta.</li> </ul>	<p>Conduct experiments to demonstrate the interrelatedness of air, water, soil and plant growth.</p> <p>Observe evidence of plant growth being affected by particular environmental conditions; e.g., light, soil, moisture, crowding.</p> <p>Draw food webs/energy chains based on observations; e.g.:</p> <ul style="list-style-type: none"> <li>• fungal damage</li> <li>• insect damage</li> <li>• wildlife browsing.</li> </ul> <p>Observe evidence of insect or other animal life living on a tree or shrub. Collect and observe samples of insects by placing a sheet of plastic under the plant and tapping branches with a stick.</p>
Tree Biology	<ul style="list-style-type: none"> <li>• explain the vital life processes performed by trees and other forest plants; e.g.:               <ul style="list-style-type: none"> <li>– nutrient intake and transportation</li> <li>– photosynthesis</li> <li>– respiration and transpiration</li> <li>– reproduction</li> <li>– phrenology (leaf flushings, leaf fall, flowering and cone production)</li> </ul> </li> </ul>	<p>Conduct laboratory experiments and demonstrations to examine life functions.</p> <p>Draw and label a cross-section of a tree (top to bottom) that illustrates structural units and component parts.</p>

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Concept	Specific Outcomes	Notes
<p>Tree Biology (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe structural units and component parts of the tree, and their function in performing vital life processes; e.g.:               <ul style="list-style-type: none"> <li>– root</li> <li>– trunk/stem</li> <li>– leaf</li> <li>– flower</li> </ul> </li> <li>• infer interrelationships among tree structures, their functions, and vital life processes that are performed</li> <li>• show the approximate range of one or more tree species throughout North America.</li> </ul>	<p>Use a microscope to observe and draw stomata and cells.</p> <p>Prepare a model by using a small tree; label all parts of the tree.</p> <p>Make tree discs; identify cross-sectional parts; e.g., cambium, sapwood, heartwood.</p> <p>Consider relationships among root, trunk, branch, leaf and flower.</p> <p>Discuss information conveyed through annual tree rings; examine the grain in dimensional lumber.</p>