

**COURSE FOR3090: FOREST ECOLOGY 2 (SILVICS & SUCCESSION)****Level:** Advanced**Theme:** Management and Conservation**Prerequisites:** FOR1090 Forest Ecology 1 (Ecosystem Dynamics) or Biology 20  
Emergency First Aid (current certification)**Description:** Students investigate the interrelationships among soil, water, air, trees and the environment, and explain how forests change over time as a result of these interrelationships.**Parameters:** Access to a forest environment.

Instructor training (current certification) in Standard Level First Aid is required.

See Section C (Planning for Instruction) and Section H (Linkages/Transitions) for further information on instructor training and certification.

**Supporting Courses:** AGR2120 and AGR3120 Soils Management 1 and 2

Students must have a general knowledge of basic first aid and survival techniques relevant to a forest environment prior to engaging in field-based investigations. See Planning for Instruction in Section C for further information on student safety.

**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 effects of soil, air and water characteristics on forest ecosystems</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>identifying and describing: <ul style="list-style-type: none"> <li>organic and inorganic components of forest soils and their function in forest ecosystems</li> <li>major types of air pollutants and their affect on forest ecosystems.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Knowledge/Application Assessment: Soil, Air and Water Characteristics, FOR3090–1</i></p> <p><i>Standard</i>  <i>Respond to a standard of 3 on the rating scale</i></p>	40

**COURSE FOR3090: FOREST ECOLOGY 2 (SILVICS & SUCCESSION) (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• identify factors that determine the presence of tree species and forest ecosystems in particular environments</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• conducting field investigations on the effects of soil pH, temperature and water quantity on plant growth. <i>Assessment Tool</i> <i>Field Investigations: Soil, Air and Water Characteristics, FOR3090-2</i> <i>Standard</i> <i>Conduct field investigation to a standard of 3 on the rating scale</i></li> <li>• describing causal relationships and making inferences regarding the effects of:               <ul style="list-style-type: none"> <li>– local forests on soil, water, weather and biotic factors</li> <li>– global forests on global climate.</li> </ul>  <i>Assessment Tool</i> <i>Guide to Inferences: Forest Ecosystems, FOR3090-3</i> <i>Standard</i> <i>Make <u>ten</u> inferences (as outlined in FOR309-3) to a standard of 3 on the rating scale</i> </li> <li>• completing a field-based research project on forest associations. Research to include:               <ul style="list-style-type: none"> <li>– the silvics of five common Alberta tree species, including climatic, soil and moisture requirements</li> <li>– the structural characteristics and environments of three common Alberta forest associations, and factors that have determined their existence.</li> </ul>  <i>Assessment Tools</i> <i>Research Process: Forest Associations, FOR3090-4</i> <i>Alberta’s Focus on Forests (Section 3.1: A Lot Depends on Location)</i> <i>Common Forest Associations in Alberta, FOR3090-5</i> <i>Standard</i> <i>Complete all components of research to a standard of 3 on the rating scale</i> </li> </ul>	<p>30</p>



**COURSE FOR3090: FOREST ECOLOGY 2 (SILVICS & SUCCESSION) (continued)**

Concept	Specific Outcomes	Notes
Forest Ecosystems	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe physical characteristics used to classify forest soils, and the effect of different soils on plant growth; e.g.:               <ul style="list-style-type: none"> <li>– texture</li> <li>– porosity</li> </ul> </li> <li>• explain the function of organic and inorganic components of forest soils; e.g.:               <ul style="list-style-type: none"> <li>– micro- and macro-organisms</li> <li>– gases and minerals</li> <li>– organic matter</li> <li>– water</li> </ul> </li> <li>• describe the effects of soil acidity, alkalinity and temperature on the growth of trees and other forest plants</li> <li>• describe indicators of water quantity in the forest, and its effects on trees and other plants; e.g.:               <ul style="list-style-type: none"> <li>– surface water</li> <li>– ground water</li> </ul> </li> <li>• describe the effects of known air pollutants on forest ecosystems; e.g.:               <ul style="list-style-type: none"> <li>– ozone</li> <li>– particulate matter</li> <li>– oxides and nitrogen</li> <li>– sulphur dioxide</li> </ul> </li> <li>• describe the effects of a forest on the local environment; e.g.:               <ul style="list-style-type: none"> <li>– soil and water</li> <li>– weather</li> <li>– wildlife</li> </ul> </li> <li>• infer the effects of forests worldwide on global climates.</li> </ul>	<p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> <li>• Activity 1.4–How Forests Affect the Environment</li> <li>• Activity 1.5–Biosphere.</li> </ul> <p>Investigate soil characteristics by digging a soil pit.</p> <p>Analyze soil samples using a soil test kit.</p> <p>Design and perform experiments that monitor the effects of soil composition, air quality and water quality on tree growth.</p> <p>For additional information, obtain <i>Diagnosis of Air Pollutant and Natural Stress Symptoms on Forest Vegetation in Western Canada</i> (available at no cost from the Canadian Forestry Service, Natural Resources Canada).</p> <p>Measure/infer rates of transpiration and subsequent effect on weather and wildlife.</p>

**COURSE FOR3090: FOREST ECOLOGY 2 (SILVICS & SUCCESSION) (continued)**

Concept	Specific Outcomes	Notes
Forest Associations	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• explain how each tree species has unique site and climatic requirements that determine its ability to grow in particular environments</li> <li>• describe the general characteristics, life history, site and climatic requirements of five Alberta tree species; e.g.:               <ul style="list-style-type: none"> <li>– tree form</li> <li>– growth patterns and life cycle</li> <li>– soil</li> <li>– moisture</li> <li>– aspect and elevation</li> </ul> </li> <li>• describe the general structural characteristics and environments of some common forest associations in Alberta; e.g.:               <ul style="list-style-type: none"> <li>– soil</li> <li>– moisture</li> <li>– position on slope.</li> </ul> </li> </ul>	<p>Conduct field trips to classify growth sites.</p> <p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> <li>• Activity 2.4– Differences in Design</li> <li>• Activity 3.1–A Lot Depends on Location.</li> </ul> <p>Discuss the “most likely site” to find a particular tree species.</p>
Forest Change	<ul style="list-style-type: none"> <li>• identify living and nonliving agents of change in a local forest environment</li> <li>• infer structural and/or behavioural adaptations of living organisms to particular changes in the forest environment; e.g.:               <ul style="list-style-type: none"> <li>– adaptations to site conditions</li> <li>– reproductive adaptations</li> </ul> </li> <li>• describe the impacts of specific environmental changes on a forest community; e.g.:               <ul style="list-style-type: none"> <li>– short-term consequences</li> <li>– long-term consequences</li> </ul> </li> <li>• give examples of primary and secondary successional stages in a local forest environment</li> <li>• describe Alberta's natural forest history; e.g.:               <ul style="list-style-type: none"> <li>– role of fire</li> <li>– role of other agents.</li> </ul> </li> </ul>	<p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> <li>• Activity 1.6–Change in Forest Ecosystems</li> <li>• Activity 3.5– Controlling Fire</li> </ul> <p>Relate to forest associations.</p> <p>Example: aspen/spruce understorey.</p> <p>Visit a mature forest and clearcut area. Compare and contrast the two areas and make predictions for each forest environment in five years.</p>

