

**COURSE FOR3110: SILVICULTURE (GROWING THE FOREST)****Level:** Advanced**Theme:** Management and Conservation**Prerequisite:** None**Description:** Students demonstrate knowledge of the techniques used to establish, grow and harvest tree crops.**Parameters:** Access to a demonstration forest.

Off-campus learning may support the development of knowledge and skills in stand establishment and tending practices; consultation with the work-site supervisor will ensure that relevant safety considerations are addressed.

See the *Off-Campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education, 1997) for further information regarding off-campus learning.

**Supporting Course:** CTR2210 Workplace Safety (Practices) [Career Transitions Strand]

Students must have a general knowledge of potential hazards and accepted safety practices relevant to stand management prior to engaging in off-campus learning experiences. 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>describe silviculture and the silvics of Alberta tree species</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>major components of silviculture, including stand establishment, stand management and harvest</li> <li>the silvics of five Alberta tree species.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Knowledge/Application Assessment: Silviculture, FOR3110-1</i>  <i>Sample Format: Silvics of a Tree Species, FOR3110-2</i></p> <p><i>Standard</i>  <i>Respond to a standard of 3 on the rating scale</i></p>	20

**COURSE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate practices used to establish a stand of trees and manipulate growing conditions to favour particular species</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>conducting laboratory and/or field-based investigations that demonstrate regeneration by:               <ul style="list-style-type: none"> <li>natural methods, including natural seed supply and vegetative reproduction</li> <li>artificial methods, including direct seeding, bare-root and container seedlings.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Lab Investigations: Natural and Artificial Regeneration, FOR3110-3</i>  <i>Observation Checklist for Field-based Investigations, FOROBS</i></p> <p><i>Standard</i>  <i>Conduct lab investigations to a standard of 3 on the rating scale <u>and/or</u> complete all sections of the observation checklist for field-based investigations</i></p> <ul style="list-style-type: none"> <li>a teacher-prepared assessment in which the student demonstrates knowledge of practices used to establish and manage a stand of trees.</li> </ul> <p><i>Assessment Tool</i>  <i>Sample Assessment Items: Stand Establishment and Management, FOR3110-4</i></p> <p><i>Standard</i>  <i>Response indicating 80% mastery</i></p>	<p>60</p>

**COURSE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• describe and compare methods of harvesting tree species</li> <li>• explain career opportunities relevant to silviculture</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstrating (or explaining) practical field techniques used to establish and tend a stand of trees. Tasks to include: <ul style="list-style-type: none"> <li>– site preparation</li> <li>– cone collection and seed extraction</li> <li>– planting stock</li> <li>– spacing, thinning, pruning, fertilizer use.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Checklist: Stand Establishment and Tending, FOR3110-5</i>  <i>Lab Assessment: Outdoor Forest Experiences, FORLAB</i>  <i>Observation Checklist for Field-based Investigations, FOROBS</i></p> <p><i>Standard</i>  <i>Achieve a performance rating of :</i> <ul style="list-style-type: none"> <li>– 2 in areas identified on the task checklist</li> <li>– 3 in applicable areas of lab assessment.</li> </ul> <i>Complete all sections of the observation checklist for field-based investigations</i></p> <ul style="list-style-type: none"> <li>• given access to current publications on harvest methods (e.g., clearcutting, seed tree, shelterwood, selection), completing a research project on: <ul style="list-style-type: none"> <li>– the benefits and costs of different methods of harvest</li> <li>– appropriate methods of harvest (as determined by silvics) for each of seven Alberta tree species.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Forest Harvest Methods, FOR3110-6</i></p> <p><i>Standard</i>  <i>Complete all components of research to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• given current information on career opportunities in silviculture (e.g., labourer, technician, professional worker), completing a research project on one or more related careers.</li> </ul> <p><i>Assessment Tool</i>  <i>Career Search: Advanced Level, FORCAR-3</i></p> <p><i>Standard</i>  <i>Conduct research to a standard of 3 on the rating scale</i></p>	<p></p> <p>10</p> <p>10</p>

**COURSE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)**

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>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>Silviculture and Silvics</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>define silviculture</li> <li>identify major components of silvicultural systems; e.g.:               <ul style="list-style-type: none"> <li>stand establishment</li> <li>stand management</li> <li>harvest and re-establishment</li> </ul> </li> <li>explain how individual tree species have unique ecological requirements that determine suitable silvicultural practices</li> <li>compare and contrast the ecological requirements and silvics for two or more Alberta tree species</li> <li>describe one or more research programs designed to improve silvicultural practices; e.g.:               <ul style="list-style-type: none"> <li>genetic selection</li> <li>geographic information systems</li> <li>harvesting operations.</li> </ul> </li> </ul>	<p>Discuss silviculture as the science and art of growing and tending forest crops to obtain more and better benefits from forests including wood.</p> <p>Invite a professional forester to explain components of silviculture.</p>

**COURSE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)**

Concept	Specific Outcomes	Notes
<p>Regeneration and Stand Treatment</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate methods of regeneration where seedlings are established by natural methods; e.g.:               <ul style="list-style-type: none"> <li>– naturally supplied seeds</li> <li>– vegetative reproduction</li> </ul> </li> <li>• demonstrate methods of regeneration where seedlings are established by artificial methods; e.g.:               <ul style="list-style-type: none"> <li>– planting bare-root and container seedlings</li> <li>– broadcasting seeds</li> </ul> </li> <li>• compare natural methods of regeneration with artificial methods</li> <li>• demonstrate techniques for site preparation and the care and planting of seeds and seedlings</li> <li>• demonstrate intermediate stand tending techniques; e.g.:               <ul style="list-style-type: none"> <li>– cleaning</li> <li>– thinning</li> <li>– pruning</li> <li>– fertilizing</li> <li>– protecting</li> </ul> </li> <li>• identify safety practices and policies relevant to site preparation, tree planting and stand tending</li> <li>• distinguish between intensive and extensive stand management practices.</li> </ul>	<p>Contact Land and Forest Services (Alberta Environmental Protection) prior to course delivery for information regarding:</p> <ul style="list-style-type: none"> <li>• seedling availability</li> <li>• tour sites</li> <li>• equipment availability.</li> </ul> <p>See <i>Alberta's Focus on Forests</i> (Activity 5.4–Reforestation: Forests or Tree Farms).</p> <p>Plan for practical field experiences in establishing a stand of trees and manipulating growing conditions to favour particular species.</p> <p>Opportunities may also exist for practical field experiences in seed collection and tree planting.</p> <p>Consider linking silviculture activities with school fundraising initiatives.</p> <p>Grow container plants and apply different levels of fertilization.</p> <p>Compare the nutrient requirements of young and mature stands.</p>

**COURSE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)**

Concept	Specific Outcomes	Notes
Cutting Methods	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify factors important in choosing a suitable method of harvest; e.g.:               <ul style="list-style-type: none"> <li>– growth characteristics</li> <li>– intended utilization</li> <li>– regeneration of species</li> </ul> </li> <li>• describe current applications of different methods of harvesting trees; e.g.:               <ul style="list-style-type: none"> <li>– clearcutting method</li> <li>– seed tree method</li> <li>– shelterwood method</li> <li>– selection method</li> </ul> </li> <li>• compare different methods of harvesting trees</li> <li>• relate appropriate harvest methods to individual tree species.</li> </ul>	<p>See <i>Alberta's Focus on Forests</i> (Activity 4.6–Cutting Styles).</p> <p>For additional information, obtain <i>Timber Harvesting Guidelines</i> (available from Land and Forest Services, Alberta Environmental Protection).</p> <p>Select three or more sites that exhibit different timber characteristics. Examine each site to determine timber condition and relevant harvest considerations.</p>
Career Opportunities	<ul style="list-style-type: none"> <li>• outline potential careers and the range of occupational opportunities in silviculture:               <ul style="list-style-type: none"> <li>– professional</li> <li>– technical</li> <li>– labour-based</li> </ul> </li> <li>• present the results of research on one or more employment opportunities in silviculture; e.g.:               <ul style="list-style-type: none"> <li>– nature of the work</li> <li>– number of workers/employment trends</li> <li>– entry requirements/competencies</li> <li>– education/training opportunities</li> <li>– opportunity for advancement.</li> </ul> </li> </ul>	<p>Review National Occupational Profiles (NOC).</p> <p>Interview persons involved in silviculture practices.</p> <p>Provide opportunities for work experience and job shadowing.</p>