



COURSE OUTLINE: ARB608 - SAFE WORK PRACTICES

Prepared: Jeff Gales

Approved: Sherri Smith, Chair, Natural Environment, Business, Design and Culinary

Course Code: Title	ARB608: ARBORIST SAFE WORK PRACTICES
Program Number: Name	6560: UTILITY ARBORIST I
Department:	UTILITY ARBORIST - APPR.
Academic Year:	2022-2023
Course Description:	Upon successful completion of this reportable subject the apprentice is able to describe safe work practices and requirements for operational planning, ascending, descending trees, pruning and removing limbs and trees, identifying electrical hazards, other hazards, handling and disposal of debris generated on the job site.
Total Credits:	4
Hours/Week:	32
Total Hours:	42
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course:	6560 - UTILITY ARBORIST I VLO 1 Utility Arborist - L1
<small>Please refer to program web page for a complete listing of program outcomes where applicable.</small>	
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.



Course Evaluation:	<p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.</p>								
Other Course Evaluation & Assessment Requirements:	<p>Instruction is presented using a variety of teaching methodologies, lectures, presentations, demonstration and assignments.</p>								
Course Outcomes and Learning Objectives:	<table border="1"> <thead> <tr> <th style="background-color: #cccccc;">Course Outcome 1</th> <th style="background-color: #cccccc;">Learning Objectives for Course Outcome 1</th> </tr> </thead> <tbody> <tr> <td>Describe verbal and written skills required to effectively communicate with colleagues, customers and the general public.</td> <td> <p>1.1 Identify the requirements for locating, accessing and completing documentation and forms (written and electronic) including:</p> <ul style="list-style-type: none"> • Locate the forms and documents commonly used in the sector • Identify the process for completing forms such as: <ul style="list-style-type: none"> - job specifications - work orders - time sheets - material list - company emails, memos and manuals </td> </tr> <tr> <th style="background-color: #cccccc;">Course Outcome 2</th> <th style="background-color: #cccccc;">Learning Objectives for Course Outcome 2</th> </tr> <tr> <td>Describe the procedures for inspecting, adjusting maintaining and wearing personal protective equipment (PPE).</td> <td> <p>1.1 Eye Protection:</p> <ul style="list-style-type: none"> • Goggles appropriate to task • Prescription safety glasses • Non-prescription safety glasses <p>Head Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Hard hats Class E type • Face protection <p>Hearing Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Ear muffs • Ear plugs • Disposable foam plugs <p>Hand Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Work gloves • Chainsaw gloves <p>Foot Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Electrical resistive <p>Leg Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Chainsaw pants • Chaps </td> </tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	Describe verbal and written skills required to effectively communicate with colleagues, customers and the general public.	<p>1.1 Identify the requirements for locating, accessing and completing documentation and forms (written and electronic) including:</p> <ul style="list-style-type: none"> • Locate the forms and documents commonly used in the sector • Identify the process for completing forms such as: <ul style="list-style-type: none"> - job specifications - work orders - time sheets - material list - company emails, memos and manuals 	Course Outcome 2	Learning Objectives for Course Outcome 2	Describe the procedures for inspecting, adjusting maintaining and wearing personal protective equipment (PPE).	<p>1.1 Eye Protection:</p> <ul style="list-style-type: none"> • Goggles appropriate to task • Prescription safety glasses • Non-prescription safety glasses <p>Head Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Hard hats Class E type • Face protection <p>Hearing Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Ear muffs • Ear plugs • Disposable foam plugs <p>Hand Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Work gloves • Chainsaw gloves <p>Foot Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Electrical resistive <p>Leg Protection:</p> <p>CSA and/or ANSI approved:</p> <ul style="list-style-type: none"> • Chainsaw pants • Chaps
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		<p>Fall Arrest:</p> <ul style="list-style-type: none"> • Carabiner • Safety snap, • Shock absorbing lanyard • Full Body Harness <p>Fall Restriction:</p> <ul style="list-style-type: none"> • Harness or saddle, rope • Lanyard • Spurs, • Fall restrict devices: <p>- Pole choker - Bucksqueeze</p>
	<p>Course Outcome 3</p> <p>Describe how to plan work operations in compliance with provincial and municipal legislation.</p>	<p>Learning Objectives for Course Outcome 3</p> <p>3.1 Identify job requirements such as:</p> <ul style="list-style-type: none"> • plans and specifications i.e. cycle clearance • work orders • scope of work • equipment, material and personnel required • determine job site limits • property lines • identify hazards and barriers • Drop zone • worksite and traffic hazards/barriers required • personal protective equipment • safe limits of approach • overhead utilities • buried utilities • tailboard discussion documentation <p>3.2 Identify job sequences, hazards and required barriers to hazards.</p> <ul style="list-style-type: none"> • Determine job communication requirements • Identify when to reevaluate hazards and barriers <p>- Define the concept of hierarchy of hazard controls</p>
	<p>Course Outcome 4</p> <p>Describe how to manage hazards, environmental, tree, ground, underground, overhead and poisonous plants.</p>	<p>Learning Objectives for Course Outcome 4</p> <p>4.1 Environmental Hazards:</p> <ul style="list-style-type: none"> • Restricted visibility, i.e. glare, fog, darkness • Wet/ice/snow conditions • Wind • Thunder & lightning • Temperature extremes/seasonal fluctuations • Storm damage <p>Tree Hazards:</p> <ul style="list-style-type: none"> • Hangers and split branches • Deadwood/severed limbs • Excessive fill over root zone • Root, stem/trunk and branch rot and cavities

	<ul style="list-style-type: none"> • Compression and tension wood • Spring poles • Barber chair • Cracks, seams and ribs • Chicot • Wind-thrown / Free-standing trees and adjacent trees • Wildlife, i.e. stinging insects, raccoons • Falling debris <p>Poisonous Plants:</p> <ul style="list-style-type: none"> • Poison Ivy • Poison Sumac • Poison Wild Parsnip • Giant Hogweed • Monkshood <p>Ground Hazards:</p> <ul style="list-style-type: none"> • Debris • Unstable / slippery ground • Slopes/uneven ground/embankments • Structures, i.e. Bridges, culverts, foundations, retaining walls • Wildlife, holes and dens • Trip hazards • Deep snow <p>Underground Hardware:</p> <ul style="list-style-type: none"> • Natural gas markers • Water line markers • Electrical transformers • Septic systems, wells • Communication lines <p>Overhead Hazards:</p> <ul style="list-style-type: none"> • Live conductor • Danger trees • Drop Zone Hazards <p>4.2 Identify other preventable hazards</p> <ul style="list-style-type: none"> • State the effect of worker competency and/or mental state (due to production pressures, etc.) as a risk factor • Describe methods to prevent Musculoskeletal and strain injuries
Course Outcome 5	Learning Objectives for Course Outcome 5
Describe the reasons, considerations and risk factors for pruning and removing trees and woody plants.	<p>5.1 Identify the considerations/reasons for pruning such as:</p> <ul style="list-style-type: none"> • customer consideration • species characteristics • utility clearance requirements <p>5.2 Identify risk factors and tree conditions prior to pruning and removing trees such as:</p> <ul style="list-style-type: none"> • crown condition

	<ul style="list-style-type: none"> • stem condition • root condition • lean • living/dead • central leader/multi-stemmed • structural defects • conductor location <p>5.3 Identify subject woody plants on site</p> <ul style="list-style-type: none"> • written description • flagging/marketing subject trees • plant names
Course Outcome 6	Learning Objectives for Course Outcome 6
Describe how to determine type of pruning cut, method and equipment.	<p>6.1 Identify pruning cut location on a tree</p> <ul style="list-style-type: none"> • collar • branch bark ridge <p>6.2 Identify types of pruning cuts such as:</p> <ul style="list-style-type: none"> • Drop cut • Hinge cut • Snap/bypass cut <p>6.3 Identify various pruning methods</p> <ul style="list-style-type: none"> • General pruning practices such as: <ul style="list-style-type: none"> - structural thinning - side pruning - utility pruning - dead wooding - crown elevating - crown reduction - crown restoration • Specialized Pruning Practices such as, pollarding, espalier, pleaching, coppicing, topiary and laying
Course Outcome 7	Learning Objectives for Course Outcome 7
Explain the application and maintenance of basic tools and equipment used in pruning and removal operations.	<p>7.1 Identify basic tools and equipment required for pruning operations such as:</p> <ul style="list-style-type: none"> • Handsaw • Rope • Wedges • Chipper • Port a Wrap • Rigging Ropes • Loppers • Rigging blocks • Blower • GRCS • Slings • Secateurs • Chainsaw

	<ul style="list-style-type: none"> • Rigging rings <p>7.2 Describe the types and uses of ladders for working at heights</p> <ul style="list-style-type: none"> • Identify the advantages and disadvantages of ladders • Describe how to inspect and care for ladders, • Describe how to safely position and use ladders <p>7.3 Identify the inspection requirements for hand tools and equipment prior to use in pruning operations according to manufacturer's recommendations.</p> <p>7.4 Describe the operation of various basic tools and equipment used for tree pruning.</p>
	<p>Course Outcome 8</p> <p>Describe knots, hitches and splices used for pruning and removal operations.</p>
	<p>Learning Objectives for Course Outcome 8</p> <p>8.1 Define rope terminology such as:</p> <ul style="list-style-type: none"> • Bight • Working end, lead and fall • Fall • Tail • Loop • Running end, lead and fall • Splice • Turn • Standing part, lead and fall • Bridge • Round Turn • Lead • Bar <p>8.2 Identify rigging knots including:</p> <ul style="list-style-type: none"> • Square or Reef • Single bowline • Double bowline • Figure 8 on a bight • Stirrup hitch • Triple Fisherman • Klemheist • Alpine butterfly • Running bowline • Valdotain tresse • Figure 8 stopper knot • Single sheet bend • Clove hitch and two half hitches • Cow hitch • Running Bowline with a Yosemite Tie off • Zeppelin bend • Double sheet bend • Half hitch • Clove hitch (end) • Clove hitch (middle) • Clove hitch (middle)

		<ul style="list-style-type: none"> • Snubbing hitch • Double Fisherman • Timber hitch <p>8.3 Identify fall climbing knots including:</p> <ul style="list-style-type: none"> • Tautline hitch - Figure 8 Stopper Knot • Blake's hitch • Klemheist • Schwabisch • Prusik 6 coil • Figure 8 on a bight • Cow hitch (Girth Hitch) • Beckett bend - Figure 8 Stopper Knot • Triple fisherman • Anchor hitch • Bowline- Figure 8 Stopper Knot • Bowline on a bight <p>8.4 Identify eye splice and crown splice on a three-strand rope.</p>
	Course Outcome 9	Learning Objectives for Course Outcome 9
	Describe the procedures for inspecting, adjusting maintaining and wearing personal protective equipment (PPE).	<p>9.1 Define fall protection systems and components</p> <ul style="list-style-type: none"> • climbing harness and rope • work positioning lanyard • connecting links • pulleys for redirect • Friction saver • Eye to eye Prusik • Split tail • other mechanical components <p>9.2 Identify the process for inspecting and maintaining fall protection systems and components.</p> <p>9.3 Define the differences between stationary rope systems (formerly SRT) and moving rope systems (formerly DDRT).</p> <p>9.4 Identify factors to consider as part of a pre-climb tree inspection including:</p> <ul style="list-style-type: none"> • Outer perimeter, inner perimeter and aerial inspection • Root zone hazards • Fruiting bodies • Root crown excavation to determine root structure condition • Limbs in proximity <p>9.5 Define crown and stem zone hazards and structural defects including:</p> <ul style="list-style-type: none"> • Deadwood/Hangers • Animals • Conks • Fruiting bodies • Rots

	<ul style="list-style-type: none"> • Included bark • Splits, cracks • Decay • Grade changes <p>9.6 Describe techniques used to ascend and descend trees</p> <ul style="list-style-type: none"> • use of ladder • use of spurs • belay technique • ascenders (hand, foot, knee and chest), split tail, hitch cord • secured body thrust with climbing hitch • secured footlock • split tail <p>9.7 Identify factors to consider for determining an interim (ascending) and final (working) anchor point.</p> <ul style="list-style-type: none"> • size of branch/limb • type of load applied • direction of loading from stem of tree • other loads on the limb (foliage, snow, torque, etc.) • tree species and characteristics • cross sectional area of limb • condition of wood • angle of branch attachment • size of branch relative to stem • characteristics of branch union • season and temperature • location of limb to electrical conductor, worker cannot swing into electrical conductors <p>9.8 Identify equipment used to assist in the accessing of a tree</p> <ul style="list-style-type: none"> • throw line • rope poking tool • pole pruner • ladder <p>9.9 Identify steps used to ascend and work the tree such as:</p> <ul style="list-style-type: none"> • installing the climbing line • determining open or closed climbing systems • load test anchor points • tie, dress, set knots for fall protection • reposition climbing line • employ double tie ins/work positioning lanyard • limb walking- secure self at work location
	<p>Course Outcome 10</p> <p>Calculate quantities of materials required based on linear, area and volume, in Metric and Imperial measurement.</p>
	<p>Learning Objectives for Course Outcome 10</p> <p>10.1 Calculate systems of measurement</p> <ul style="list-style-type: none"> • Compare systems of measurement- Metric and Imperial measures • Calculate conversions from Imperial to Metric and vice versa

	<p>10.2 Calculate dimensions of measurement</p> <ul style="list-style-type: none"> • linear /area measures • volume /mass measures <p>10.3 Calculate quantities of materials using both systems of measurement</p> <ul style="list-style-type: none"> • Determine units of measure based on material requirements • Identify shrinkage and expansion factor • Calculate quantities
Course Outcome 11	Learning Objectives for Course Outcome 11
Explain processes for limb and tree removal using rigging equipment.	<p>11.1 Describe various methods for limb and tree removal and the required tools/equipment.</p> <p>11.2 Describe the principles, concepts and associated calculations required when working with rigging equipment including:</p> <ul style="list-style-type: none"> • Newton`s laws • calculating force • safety margin • heat/ friction • elasticity • wood weight • loading on ropes and equipment • cycles to failure <p>11.3 Determine mechanical advantage when using various types of rigging equipment such as block and tackle equipment, fiddle blocks, hand winches.</p> <ul style="list-style-type: none"> • Identify methodology/principles • calculate forces on Anchor points, pulleys and ropes • Identify rigging equipment materials, safe working load limits, tensile strength <p>11.4 Identify the requirements for routinely inspecting equipment for defects (ropes, carabiners, slings, pulley, blocks, friction devices, quick links and shackles).</p> <p>11.5 Define various felling cuts and notches such as:</p> <ul style="list-style-type: none"> • conventional notch and back cut • open face notch • v notch (birds mouth) and back cut • Humboldt notch and back cut <p>11.6 Identify various felling assist devices such as:</p> <ul style="list-style-type: none"> • wedges • levers • pull ropes • tackle blocks
Course Outcome 12	Learning Objectives for Course Outcome 12

	<p>Calculate load requirements for determining rigging equipment by considering factors such as materials construction, materials, safe working load limits and Tensile strength.</p>	<p>12.1 Describe the use of the Green Log Weight Chart for calculating loads</p> <p>12.2 Use formulas to calculate load requirements</p> <p>12.3 Calculate load weight to determine what pieces of equipment to use for the rigging system</p> <ul style="list-style-type: none"> • Explain the components of a rigging equipment system - ropes - slings - carabiners - pulleys - arborist Blocks - figure 8 - friction device (i.e. Port-a Wrap) - mechanical lowering devices (i.e. GRCS) - quick links and shackles - block and tackle <ul style="list-style-type: none"> • Explain the use and limitations of the various rigging equipment and hardware
	<p>Course Outcome 13</p>	<p>Learning Objectives for Course Outcome 13</p>
	<p>Describe techniques for handling and disposing of debris generated on the job site.</p>	<p>13.1 Identify technique required based on size and location such as:</p> <ul style="list-style-type: none"> • piling brush • piling brush for chipping • bucking and limbing • lifting/carrying brush and large wood • loading brush and large wood on vehicles • site clean-up, lower stumps • clean-up site of small debris
	<p>Course Outcome 14</p>	<p>Learning Objectives for Course Outcome 14</p>
	<p>Describe protocols for handling various emergency situations.</p>	<p>14.1 Identify protocols for handling emergency situations such as:</p> <ul style="list-style-type: none"> • assessing the situation • calling 911 as per job plan • determining if rescue is necessary and can be accomplished safely • applying first aid (a-airway-breathing control, c- circulation) • ensuring workers involved in electrical contact accidents are sent to hospital for treatment <p>14.2 Describe the steps to assess the need to perform a rescue from a tree.</p> <ul style="list-style-type: none"> • assessing the emergency/performing scene survey/determining if rescue is necessary • identifying proximity to other workers/equipment or electrical apparatus • assessing contributing factors - electrical conductors/contact

	<ul style="list-style-type: none"> - struck by limbs, tree sections, lightning - is victim pinned - medical conditions (bug/animal bites, heat exhaustion, etc.) <ul style="list-style-type: none"> • Assessing the victim's condition • Determining feasibility/appropriateness of aerial rescue with consideration of: <ul style="list-style-type: none"> - electrical conductors/contact - rescuers competency in performing tree rescue <ul style="list-style-type: none"> • Determining need for EMS to perform rescue, contacting EMS 										
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Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.										