Course: Forestry
Instructor: Carolyn Wright

Unit	Time Frame	Learning Target(s)/Objective(s)	Standards	Vocabulary	Assessments	Program Materials/ Resources
Tool ID	Daily at the start of class	Identify the tools and equipment commonly used in the Forestry Industry; Describe the function of each tool or piece of equipment	ESS.01.02.02.a. Identify basic environmental monitoring instruments and explain their uses.	Altimeter, Angle gauge, Ascender, Automatic level, Backpack fire pump, Bark gauge, Bulldozer, Canthook, Carabiner, Chainsaw, Chainsaw chaps, Clinometer, Combination tool, Data recorder, Densiometer, Diameter tape, Dot grid, Drip torch, Ear protection, Endloader, Feller buncher, Felling wedge, Fiberglass measuring tape, Fire rake, Fire shelter, Fire weather kit, Fire-swatter, First aid kit, Flow/current meter, GPS receiver, Hand compass, Hand lens/field microscope, Hip chain, Hypo-hatchet, Increment borer, Jacob Staff, Log rule, Logger's tape, Maul, Peavy, pH meter, Planimeter, Plant press, Plastic flagging, Pole Saw, Pulaski Axe, Relaskop, Safety glasses, Safety hard hat, Scale stick, Secchi disc, Soil Sampler, Soil test kit, Staff compass, Stereoscope, Tally book, Tally meter, Timber tongs, Tree caliper, Tree harvester, Tree marking gun, Tree planting hoe or bar, Tree skidder, Water sampler, Water test kit, Wedge prism	Quizzes after every 20 Daily Flashcards	Physical Tools, Paper, Pencil

Dichotomous Keys	September	Apply understanding of leaf, twig, and bud terminology to properly utilize a dichotomous key to identify tree samples.	NRS.01.02.01.b. Apply identification techniques to determine the species of a tree or woody plant.	Dichotomous Key, Twig Arragangement- alternate, opposite, zigzag, Size- stout, slender, Pith- chamber, solid, star, Buds- terminal, not terminal, lateral, clustered, Bud Scales, Needle-like leaves (Coniferous), Broadleaf (Deciduous Trees)	Dichotomous Key Lab	Tree samples, *Know Your Tree* books
Parts of a Leaf	September	Identify the parts of a leaf, Describe the purpose of each leaf part, Describe the different types of leaves.	NRS.01.02.01.b. Apply identification techniques to determine the species of a tree or woody plant. PS.02.02.04.a. Research and summarize leaf morphology and the functions of leaves.	Apex, Veins, Midrib, Base, Leaf Blade (Lamina), Petiole, Stipule, Axil, Simple leaf, Compound leaf, Twice Compound Leaf, Opposite, Alternate, Leaf Margin- entire, serate, doubly serate, toothed, lobed, clefts, Pinnate, Palmate, Shape- ovate, heart, linear, triangular, lanceolate, Base- oblique, rounded, square, Apex- blunt, sharp, truncate	Leaf Press Project	Plywood, Cardboard, Bolts
Tree ID	September	Identify common trees found in the Northeast based on leaves, fruit, and bark.	NRS.01.02.01.b. Apply identification techniques to determine the species of a tree or woody plant.	Red Alder, Ash, Bigtooth Aspen, Quaking Aspen, Baldcypress, American Beech, Black Birch, White Birch, Black Cherry, Eastern Cottonwood, Elm, Balsam Fir, Douglas Fir, Eastern Hemlock, Western Hemlock, Hickory, Red Maple, Sugar Maple, Black Oak, Chestnut Oak, Norther Red Oak, Scarlet Oak, Southern Red Oak, White Oak, Pecan, Eastern White Pine, Loblolly Pine, Lodgepole Pine, Longleaf Pine, Pitch Pine, Ponderosa Pine, Red Pine, Shortleaf Pine, Yellow Poplar, Western Red Cedar, Eastern Red Cedar, Red Spruce, Sitka Spruce, White Spruce, Sweetgum, Sycamore, Black Walnut	Tree ID book, Flagging all maple trees	Flagging Tape, *Know Your Trees* books, Leaf Press, Paper, Pens/Pencils

Orienteering	October	Identify parts of a compass, Describe the purpose of each compass part, Explain the navigational purpose of a compass, Demostrate proper utilization of a compass to navigate and determine bearing.	ESS.01.01.01.c. Collect and prepare sample measurements using appropriate data collection techniques. ESS.05.01.01.c. Demonstrate surveying and cartographic skills to make site measurements in order to address concerns and needs within an environmental service systems situation.	Compass, Base plate, Compass Dial, Direction of Travel Arrow, Orienteering Arrow, Magnetic Needle, Orienteering Lines, Ruler (in inches), Bearing, Pace, Azimuth readings	Measuring Pace; Basic Compass Parts; Finding Direction, Following Direction, Finding Object's Bearing (Obstacle Course)	Compass, Measuring Tape
Topographic Maps	October	Demonstrate how to orient a compass on a topographic map, Interpret a topographic map.	ESS.05.01.01.c. Demonstrate surveying and cartographic skills to make site measurements in order to address concerns and needs within an environmental service systems situation. NRS.03.02.01.a. Summarize how to use maps to identify directions and land features, calculate actual distance and determine the elevations of points.	Topographic Map, Legal description, Parcel, Map Symbols- Contours, Boundaries, Land Survey Systems, Surface Features, Vegetation, Rivers/Lakes/Canals, Buildings/Roads, Transmission Lines/Pipelines	Topographic Map Lab	Compass, Topographic Map

Tree Diameter & Height	October/November	Demonstrate proper use of a Biltmore Stick, Perform a forest inventory, Discuss reasons for Timber Cruising	ESS.01.01.01.c. Collect and prepare sample measurements using appropriate data collection techniques. NRS.01.02.06.c. Conduct an assessment of the resource inventories or population in a given area.	Biltmore Stick, Doyle Scale, Timber Cruising, DBH, Merchantable Height, Circumference, Diameter, Board Foot Volume	Build a Biltmore Stick; Timber Cruising; Remove Flags for Maples under appropriate Tapping Size	Biltmore Sticks, Calculator, Diameter Tapes
Harvest, Deaden, & Leave	November	Perform a forest management evaluation.	ABS.01.02.02.c. Evaluate AFNR business goals and objectives, then make revisions based on data and observations. ABS.04.02.01.c. Make recommendations to improve operational plans for an AFNR business based on best practices. CS.04.01.01.b. Analyze available practices to steward natural resources in AFNR systems (e.g., wildlife and land conservation, soil and water practices, ecosystem management, etc.). NRS.04.01.02.c. Create a timber stand improvement plan for a forest.	Harvest, Deaden, Leave	Scenario Recommendation Presentation (Group)	Marked Wooded Area, Biltmore Sticks, Record Sheet

North American Forestry Regions, Hardwoods/Softwoods, Commercially Important Trees	Filler Topics for Sept-Nov. on bad weather days	Identify the major North American Forestry Regions; Identify major species of trees of economic importance to the United States and internationally	NRS.02.04.02.b. Assess the importance of the use of natural resources on local, state and national economies.	Hardwood, Softwood, DEC stump report	Hardwood/Softwood Project	Hardwood, Softwood
Christmas Trees	November/Dec.	Describe the economic importance of Christmas trees, Explain the advantages and disadvantages of real vs artificial trees	ABS.05.01.01.c. Evaluate and predict future trends for a specific AFNR product as related to markets, trade and price (e.g., corn, oil, wheat, etc.).	Artificial Trees, Real Trees	Wreaths or Swags	Pine boughs, Ribbons, Accessories, Hand Tools

Tree Diseases, Disorders, & Pests	December	Identify forest disorders; Describe management practices for addressing/treating/preventing forest disorders	NRS.01.02.01.c. Evaluate the species of trees present to assess the health of an ecosystem (e.g., presence of native versus invasive species, biodiversity, etc.). NRS.01.02.03.b. Apply identification techniques to determine the species of wildlife or insect. NRS.01.06.02.b. Analyze factors that influence the establishment and spread of invasive species and determine the appropriate steps to prevent or minimize the impact of invasive species. NRS.04.02.01.a. Classify causes of diseases in plants and the correct authorities to whom some diseases should be reported. NRS.04.03.01.a. Categorize harmful and beneficial insects, as well	Aphid, Asian longhorn beetle, Butt or heart rot, Canker, Chemical damage, Cicada, Climatic injury: snow, wind, frost, drought, hail; Damping off, Douglas fir tussock moth, Emerald ash borer, Fir engraver beetle, Fire damage, Gypsy moth, Hemlock woolly adelgid, Ipps engraver beetle, Landscape equipment damage, Lightning damage, Mechanical damage, Mistletoe, Mountain pine beetle, Nematode, Rust, Sawfly, Scale, Spruce budworm, Sunscald, Tent caterpiller, Wetwood or slime flux, Wildlife/Livestock damage, Invasive Specie	Current Event; Disease, Disorder, or Pest Presentation; Disease, Disorder, Pest Quiz	iPad, Computer, Pencil/Pen, Paper

Timber Stand Improvement/ Forest Business Mgmt.	December	Describe the stages of forest succession and their relative mgmt practices, Analyze a forest industry scenario and make recommendations based on economic principles and concepts of management.	ABS.01.01.01.c. Create strategies to maximize the efficiency of AFNR business inputs and outputs using microeconomic principles. ABS.01.02.02.c. Evaluate AFNR business goals and objectives, then make revisions based on data and observations. ABS.04.02.01.c. Make recommendations to improve operational plans for an AFNR business based on best practices. ABS.01.03.01.c. Devise strategies to improve the operation of AFNR businesses using management skills. NRS.01.01.01.c. Devise strategies for the preservation of natural resources based on their classification. NRS.01.05.01.b. Analyze	Forest Succession, Stand Initiation, Stem Exclusion, Understory Reinitiation, Steady State, Stumpage Cost, Profit/Loss, Cost of Operation, Depreciation	Current Event; Forest Industry Scenario (Group Activity)	Forest Industry Scenario

Chainsaws-Parts, Troubleshooting & Safety	January	Identify the external parts of a chainsaw, Describe proper ppe and safety protocol for operating a chainsaw, Identify safety hazards, unsafe practices, and proper safety equipment	CS.03.04.01.a. Identify and differentiate the appropriate protective equipment for the safe use and operation of specific tools. CS.03.04.02.a. Identify standard tools, equipment and safety procedures related to AFNR tasks. CS.03.04.03.b. Assess and demonstrate appropriate operation, storage and maintenance techniques for AFNR tools and equipment. PST.01.02.03.c. Conduct a safety inspection of tools, machines and equipment used in different AFNR related mechanical systems.	Sawchain, (Guide) Bar, Muffler, Oil Cap, Oil Reservoir, Housing, Fuel Cap, Fuel Tank, Trigger, Rear hand guard, Safety Switch, Throttle Control Lever, Protective Case, Air Filter Cover, Starting Pull Handle, Front Handle, Front Hand Guard, Chain Brake	Cardboard Chainsaw	Cardboard, Glue, Markers, Scissors, Utility Knives
Dendrochronology/Internal Tree Anatomy	Filler Topic for bad weather days Sept-Nov.	Identify the internal anatomy of a tree, Determine the ages of trees based on knowledge of growth rings, Describe the significance of dendrochronology to the forestry industry	PS.02.02.03.a. Identify and summarize the components and the functions of plant stems.	Dendrochronology, Tree (Growth) Rings, Cambium, Dead bark, Sapwood (Xylem), Heartwood, Live bark, Pith, Medullary rays	Tree Cookies; Current Event	Cross Sections of tree, handsaws, paint, craft supplies

Wildfires	January	Identify the anatomy of a wilfire, Demonstrate and Explain the effect topography has on wildfire spread, Create an ecosystem that is impacted by fire	NRS.04.04.01.b. Assess techniques used to fight wildfires, manage prescribed fires and ensure human safety.	Fire Triangle, Fire Anatomy- Spot Fire, Finger, Head, Right/Left Flank, Heal or Rear, Wind Direction, Point of Origin, Bay	Wildfire Lab; Famous Fires; Create Ecosystem impacted by Fire; Current Event	Toothpicks, Drywall, Matches, Foil Pans, Craft Supplies, Natural Elements
Urban Forestry and Arboriculture	January/Feb.	Discuss the role of Urban Forestry and Arboriculture within the Forestry Industry at large. Identify career opportunities within the field, Identify challenges urban foresters face	ABS.05.01.01.c. Evaluate and predict future trends for a specific AFNR product as related to markets, trade and price (e.g., corn, oil, wheat, etc.). ABS.04.02.01.c. Make recommendations to improve operational plans for an AFNR business based on best practices. ABS.01.03.02.c. Devise management or operational strategies to address and adhere to local, state, federal, international and industry regulations. CS.01.01.02.c. Evaluate emerging trends and the opportunities they may create within the AFNR systems.	Urban Forestry, Arboriculture	Current Event; **Forestry Issues Presentation (Group) --> Course Final**	General Forestry Issues Topics, iPad/Laptop

Forest Products	February (Transition to Maple Course)	Discuss the economic advantages and disadvantages of developing added value products.	NRS.02.04.01.a. Compare and contrast how the economic value of a natural resource affects its availability. CS.01.01.02.c. Evaluate emerging trends and the opportunities they may create within the AFNR systems. ABS.05.01.01.c. Evaluate and predict future trends for a specific AFNR product as related to markets, trade and price (e.g., corn, oil, wheat, etc.).	Added Value Products	Cutting Boards, Wooden Spoons	Wood, Shop Tools, Engraving Knives