Urban Forestry
Subject Code: 010740
Course & Unit Descriptions

Course Description:

The learner will promote the care and management of trees for residential and commercial purposes. Learners will apply principles of soil management, dendrology and pest management to the care and management of trees. Learners will analyze budgets; and develop short and long-range management plans that balance environmental and economic goals and that support sustainable land use patterns. Principles of rigging, advanced rope techniques, and chainsaw applications for tree pruning and removal will be learned.

Unit: Safety

Students will demonstrate the proper and safe use of arboriculture-related equipment and climbing technique associated with tree care.

Benchmark: 4.1 Safety Procedures

Level 1 Follow safety procedures in general situations with basic tools and equipment, evaluate work environment and seek assistance to rectify the problem

Level 2 Follow safety procedures in specific situations with specialized tools and equipment, evaluate situation and take corrective action

Indicators

4.1.01 Demonstrate knowledge of safety rules and regulations
4.1.02 Interpret safety signs and symbols
4.1.03 Model safe attitudes and behaviors (e.g., lifting, climbing)
4.1.04 Identify safety hazards and take corrective measures
4.1.05 Use safety equipment in accordance with established procedures
4.1.06 Follow established procedures for the administration of first aid and contact emergency medical personnel when necessary

Academic Standards

English Standards: Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)

Unit: Dendrology

The student will learn to identify and manage plant species important to the arboriculture industry.

Benchmark: 7.4 Plant Production and Management

Level 1 Manage growth of common types of plants
Level 2 Manage growth of specific types of plants using specialized equipment

Indicators

7.4.01 Identify and classify seeds and plants at all stages of growth
7.4.02 Identify plant anatomical structures and tissues (e.g., roots, stems, flowers, leaves, fruits, seeds)
7.4.03 Describe physiological functions of plants (e.g., photosynthesis, respiration, transpiration, absorption)
7.4.04 Identify and classify plants using taxonomy

Academic Standards

English Standards:	Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math Standards:	Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Science Standards:	Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological). (Life Sciences D, 9-10)

Unit: Plant Growth and Structure

The student will develop and evaluate commercial plant production and management plans associated with pest management, plant propagation and management of plant production.

Benchmark: 7.4 Plant Production and Management

Level 1 Manage growth of common types of plants
Level 2 Manage growth of specific types of plants using specialized equipment

Indicators

7.4.05 Select seeds and plants (e.g., production, ornamental, erosion control, genetically modified organism [GMO], moisture control, bioremediation)
7.4.06 Manipulate abiotic and biotic factors (e.g., irrigation, mulch, lighting, temperature, drainage) to alter plant germination, growth and development
7.4.07 Evaluate and demonstrate planting practices (e.g., population rate, germination/seed vigor, inoculation, seed and plant treatments, cuttings and pot in pot, type of planter)
7.4.08 Evaluate and implement transplanting practices
7.4.09 Evaluate/select and prepare soil/media for planting
7.4.10 Control plant growth (e.g., pruning, pinching, chemical, disbudding)
7.4.11 Determine maintenance schedule for plant management plan
7.4.12 Analyze and satisfy plant water requirements
7.4.13 Identify characteristics (e.g., visual appeal, quality, test weights, final usage) of grains, seeds, vegetables, fruits, and ornamental plants

Academic Standards

English Standards:	Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math Standards:	Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Science Standards:	Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological). (Life Sciences D, 9-10)

Unit: Soils

The student will identify the physical, biological, and chemical properties of soil and other plant growing media. The learner will develop and implement an appropriate plan for soil uses.

Benchmark: 5.1 Soils

Level 1 Determine and analyze the physical, biological and chemical properties of soils and other plant growing media
Level 2 Utilize knowledge of soil characteristics and soil information resources to overcome any existing soil use limitations

Indicators

5.1.01 Classify soil types based on composition (e.g., aggregate size, organic matter, texture)
5.1.02 Inventory soils and determine land use capabilities

5.1.03 Interpret soil survey data to implement conservation practices
5.1.05 Evaluate soil limitations (e.g., wildlife/wetlands habitats, septic systems, drainage, agriculture and socioeconomic considerations, preservation easements)
5.1.06 Explain current and historical interactions between human activities and soils (e.g., wetlands use, urbanization, desertification, finite resources, habitat change, climate change)

Academic Standards

English Standards:	Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)
Math Standards:	Describe and interpret rates of change from graphical and numerical data. (Algebra J, 8-10)
Science Standards:	Describe the finite nature of Earth's resources and those human activities that can conserve or deplete Earth's resources. (Earth and Space Sciences D, 9-10)
Social Studies Standards:	Use appropriate data sources and geographic tools to analyze and evaluate public policies. (Geography C, 11-12)

Unit: Equipment Operation and Maintenance

The student will develop and analyze a design for specific programmatic applications. Students will develop and implement a maintenance program for arboriculture.

Benchmark: 4.10 Design and Estimate
Level 1 Utilize elements and principles of design for an agricultural application
Level 2 Design a basic agricultural application for a desired outcome

Indicators
4.10.11 Estimate material, construction and equipment needs and costs

Academic Standards

English Standards:	Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)
Math Standards:	Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Social Studies Standards:	Use appropriate data sources and geographic tools to analyze and evaluate public policies (Geography C, 11-12)

Benchmark: 4.2 Stationary and Mobile Equipment Maintenance
Level 1 Inspect and provide basic maintenance to basic machinery, instruments, stationary and mobile equipment and facility
Level 2 Inspect and maintain specialized machinery and equipment according to schedule

Indicators
4.2.01 Perform a machine condition inspection
4.2.02 Lubricate machinery and equipment
4.2.03 Ensure presence and function of safety systems and hardware
4.2.04 Service basic electrical systems (e.g., fuses and bulbs)
4.2.05 Perform machine adjustments (e.g., belts, clippers, drive chains)
4.2.06 Service filtration systems
4.2.07 Identify, select and maintain fluid levels
4.2.08 Maintain machinery, equipment, instruments and facility cleanliness, appearance, and safety
4.2.09 Inspect and maintain fluid conveyance and storage components (e.g., hoses and lines, valves, nozzles)
4.2.10 Conduct preventative maintenance and identify causes of malfunctions and failures
4.2.12 Inspect and maintain tooling

4.2.13 Maintain lifting equipment (e.g., cranes, chains, slings)

Academic Standards

English Standards: Use appropriate self-monitoring strategies for comprehension. (Reading Process C, 8-10; Reading Process C, 11-12)

Math Standards: Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Mathematical Processes B, 8-10)

Benchmark: 4.3 Equipment Operation

Level 1 Inspect and safely operate recalibrated equipment

Level 2 Inspect and safely operate specialized equipment with some limitations to adjustments and functions

Indicators

4.3.01 Follow manufacturer's recommended operating procedures and adjustment specifications

4.3.02 Describe function, limitations, and proper use of equipment, equipment controls and instrumentation

4.3.03 Perform pre-operation inspection and adjustments

4.3.04 Perform appropriate start-up, operating and shut-down procedures

4.3.05 Identify, select and exhibit the desired application of hand and power tools

Academic Standards

English Standards: Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)

Math Standards: Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Mathematical Processes B, 8-10)

Unit: Rope Systems and Climbing

The student will inspect arboriculture equipment, develop emergency management procedures and implement approved safety policy using ANSI and OSHA standards.

Benchmark: 4.1 Safety Procedures

Level 1 Follow safety procedures in general situations with basic tools and equipment, evaluate work environment and seek assistance to rectify the problem

Level 2 Follow safety procedures in specific situations with specialized tools and equipment, evaluate situation and take corrective action

Indicators

4.1.01 Demonstrate knowledge of safety rules and regulations

4.1.03 Model safe attitudes and behaviors (e.g., lifting, climbing)

4.1.05 Use safety equipment in accordance with established procedures (eg. ANSI, OSHA)

Academic Standards

English Standards: Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)

Benchmark: 4.2 Stationary and Mobile Equipment Maintenance

Level 1 Inspect and provide basic maintenance to basic machinery, instruments, stationary and mobile equipment and facility

Level 2 Inspect and maintain specialized machinery and equipment according to schedule

Indicators
4.2.03 Ensure presence and function of safety systems and hardware
4.2.08 Maintain machinery, equipment, instruments and facility cleanliness, appearance, and safety
4.2.10 Conduct preventative maintenance and identify causes of malfunctions and failures
4.2.13 Maintain lifting equipment (e.g., cranes, chains, slings)

Academic Standards
English Standards: Use appropriate self-monitoring strategies for comprehension. (Reading Process C, 8-10; Reading Process C, 11-12)
Math Standards: Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Mathematical Processes B, 8-10)

Unit: Plant Diseases and Damage

Students will determine conservation and restoration practices based on specific arboriculture ecosystem characteristics. Students will identify plant pests and levels of controlling methods.

Benchmark: 5.3 Ecosystems
Level 1 Identify ecosystems and compare components of ecosystems
Level 2 Inventory and evaluate habitats of specific ecosystems

Indicators
5.3.02 Explain biotic (plant and animal) interactions with the abiotic (non-living) environment
5.3.09 Determine the impact that native and non-native invasive species have on ecosystems

Academic Standards
Math Standards: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Science Standards: Explain that many processes occur in patterns within the Earth's systems. (Earth and Space Sciences B, 9-10)
Social Studies Standards: Evaluate the consequences of geographic and environmental changes resulting from governmental policies and human modifications to the physical environment. (Geography B, 11-12)

Benchmark: 7.1 Plant Nutrition
Level 1 Select and apply macronutrients, using basic application methods, and recognize the effect on plants and environment
Level 2 Diagnose macronutrient and common micronutrient deficiencies in specific plants and select and apply macronutrients and micronutrients, using specialized application methods

Indicators
7.1.04 Identify symptoms and causes of plant nutrient deficiencies
7.1.05 Collect and test soil and/or plant tissue
7.1.07 Determine the biotic and abiotic factors that influence and optimize availability of nutrients to plants (e.g., pH, microorganisms, growth media)
7.1.09 Select application methods, determine time of application, and apply nutrients
7.1.10 Interpret fertilizer labels

Academic Standards
English Standards: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science Standards: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 7.3 Pest Management

Level 1 Identify common types of plant pests and apply basic pest management control methods

Level 2 Scout and identify specific plant pests and plant damage and apply specialized pest management control methods

Indicators

7.3.01 Identify and classify plant pests (i.e., insects, pathogens, weeds, diseases, animals)

7.3.02 Examine interrelationships between plants, pests, humans and environment (e.g., non-native species, climate change)

7.3.03 Analyze and calculate economic threshold of pest damage

7.3.04 Determine and implement pest management safety practices (e.g., MSDS, EPA, OSHA, PPE)

7.3.05 Develop an integrated pest management plans based on pest life cycles, available treatments and application methods

7.3.06 Select application methods, implement pest control plan (i.e. organic and non-organic) and evaluate effectiveness and impact on environment

Academic Standards

English Standards:	Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math Standards:	Find, use and interpret measures of center and spread, such as mean and quartiles, and use those measures to compare and draw conclusions about sets of data. (Data Analysis D, 8-10)
Science Standards:	Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)
Social Studies Standards:	Evaluate the consequences of geographic and environmental changes resulting from governmental policies and human modifications to the physical environment. (Geography B, 11-12)

Benchmark: 7.4 Plant Production and Management

Level 1 Manage growth of common types of plants

Level 2 Manage growth of specific types of plants using specialized equipment

Indicators

7.4.06 Manipulate abiotic and biotic factors (e.g., irrigation, mulch, lighting, temperature, drainage) to alter plant germination, growth and development

Academic Standards

English Standards:	Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math Standards:	Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Science Standards:	Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological). (Life Sciences D, 9-10)

Unit: Business Management

The student will use marketing strategies to maximize profits and optimize cost by developing a comprehensive marketing plan for arboriculture industry and services.

Benchmark: 3.1 Marketing

Level 1 Promote a product or service using basic strategies for packaging, display and publicity

Level 2 Develop and market a product or service to maximize profits and optimize cost

Indicators

3.1.01 Select target market and consumers
3.1.05 Set prices using supply and demand curves and commodity and non-commodity pricing
3.1.06 Identify and evaluate methods of marketing products and services
3.1.07 Promote products and services
3.1.08 Develop public relations campaigns
3.1.09 Select and implement a marketing option (e.g., cash sales, hedge, speculate, options, forward contract, government programs)
3.1.10 Identify and evaluate purchase options (e.g., finance options, lease, cash, rental)

Academic Standards

English Standards: Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)
Math Standards: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)
Social Studies Standards: Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices. (Economics A, 11-12)

Benchmark: 3.10 Business Regulation, Law and Related Issues

Level 1 Identify and describe government regulations and societal issues related to a specific business enterprise or environmental project
Level 2 Determine the impact of government regulations and societal issues on an environmental project or the performance of a business enterprise

Indicators

3.10.01 Explain the nature and appropriateness of different types of business contracts
3.10.02 Explain the purpose and impact of government regulations
3.10.03 Identify local, state and federal regulations relative to compliance
3.10.04 Assess business liability and describe the consequences of noncompliance
3.10.05 Adhere to business-related documentation requirements
3.10.06 Identify governmental agencies and non-governmental organizations that impact agricultural/environmental issues
3.10.08 Assess the impact of issues affecting the industry and recommend solutions

Academic Standards

English Standards: Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)
Math Standards: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Social Studies Standards: Evaluate the consequences of geographic and environmental changes resulting from governmental policies and human modifications to the physical environment. (Geography B, 11-12)

Benchmark: 3.2 Sales and Customer Service

Level 1 Use customer service and sales techniques to foster positive relationships with customers and conduct sales
Level 2 Use sales techniques to close the sale of a product/service and handle complex customer issues

Indicators

3.2.02 Develop sales goals and incentive programs
3.2.03 Forecast sales and delivery times
3.2.04 Prospect for new customers

3.2.06 Develop and conduct sales presentation
3.2.08 Build and develop customer relationships
3.2.09 Apply appropriate questioning techniques to determine client needs and wants
3.2.13 Handle customer complaints

Academic Standards

English Standards: Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)

Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Benchmark: 3.3 Management

Level 1 Select and organize resources to develop a product or a service to be rendered
Level 2 Analyze performance of an enterprise and reallocate resources to achieve goals

Indicators

3.3.04 Identify organizational structures of businesses
3.3.05 Plan operational capacity
3.3.06 Develop a continuous-improvement management program
3.3.07 Establish business relationships
3.3.08 Document business activities
3.3.12 Perform human-resource management functions (e.g., recruit, select, evaluate, terminate employees)
3.3.13 Identify crisis management techniques

Academic Standards

English Standards: Analyze the features and structures of documents and critique them for their effectiveness. (Reading: Informational Text A, 11-12)

Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Social Studies Standards: Identify factors which inhibit or spur economic growth and cause expansions or recessions. (Economics B, 11-12)