Horticulture Cluster
Mississippi Curriculum Framework

Horticulture Service Operations and Management - CIP: 01.0601 (Applied Horticulture/Horticulture Operations, General)
Landscaping Technology- CIP: 01.0605 (Landscaping an Groundskeeping)
Turf Management Technology - CIP: 01.0607 (Turf and Turfgrass Management)

2018

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The Office of Curriculum and Instruction (OCI) was founded in 2013 under the Division of Workforce, Career, and Technical Education at the Mississippi Community College Board (MCCB). The office is funded through a partnership with The Mississippi Department of Education (MDE), who serves as Mississippi's fiscal agent for state and federal Career and Technical Education (CTE) Funds. The OCI is tasked with developing statewide CTE curriculum, programming, and professional development designed to meet the local and statewide economic demand.

For information, please contact curriculum@mccb.edu

Contents

ADOPTION OF NATIONAL CERTIFICATION STANDARDS

The Bureau of Plant Industry is a regulatory and service division of the Mississippi Department of Agriculture and Commerce. It was established under the Mississippi Plant Act to protect the agricultural and horticultural interests of the state from harmful insects, diseases, and weeds.

The Bureau administers state and federal laws, regulations and programs that deal with plant pests, pesticides, honeybees, plants, professional plant and pest control services, animal feeds, seed, fertilizer, lime and amendments (additives) to soils and plants. It also maintains cooperative agreements with the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA) and other state and federal agencies.

Certain objectives for the Landscape Horticulturist License Examination are mapped to this curriculum framework. However, eligibility requirements for licensure go beyond this 2-year program of study. For more information on Landscape Horticulturist License requirements, please refer to the Mississippi Department of Agriculture & Commerce, P.O. Box 5207, Mississippi State University, MS 39762.

INDUSTRY JOB PROJECTION DATA

The **Horticulture Technology** occupations require an education level of associate degree. There is expected to be a 4.54% increase in occupational demand at the regional level and 4.54% increase at the state level. Median annual income for this occupation is $39,104.00 at the state level. A summary of occupational data from the State Workforce Investment Board Data Center is displayed below:

Table 1: Education Level

Program Occupations	Education Level
Farmers, Ranchers, and other Agricultural Managers	High School Diploma
First- Line Supervisors/ Managers of Landscaping, Lawn Service, and Grounds keeping Workers	Work Experience in Related Field

Table 2: Occupational Overview

	Region	State	United States
2014 Occupational Jobs	842	842	278084
2024 Occupational Jobs	879	879	254947
Total Change	37	37	-23137
Total % Change	4.39%	4.39%	-8.32%
2014 Median Hourly Earnings	$18.80	$16.08	$24.56
2014 Median Annual Earnings	$39,104.00	$33,454.40	$51,081.96
Annual Openings	3	3	-2313

Table 3: Occupational Breakdown

Description	2014 Jobs	2024 Jobs	Annual Openings	2014 Hourly Earnings	2014 Annual Earnings 2,080 Work Hours
Farmers, Ranchers, and other Agricultural Managers	27	27	0	$22.01	$45,780.80
First- Line Supervisors/ Managers of Landscaping, Lawn Service, and Grounds keeping Workers	815	852	3	$15.59	$32,427.20
TOTAL	842	879	3	$18.80	$39,104.00

Table 4: Occupational Change

Description	Regional Change	Regional % Change	State % Change	National % Change
Farmers, Ranchers, and other Agricultural Managers	0	0.00%	0.00%	-14.37%
First- Line Supervisors/ Managers of Landscaping, Lawn Service, and Grounds keeping Workers	37	4.54%	4.54%	2.59%

The **Landscaping and Turf Management occupations** require an education level of associate degree. There is expected to be a 4.54% increase in occupational demand at the regional level and 4.54% increase at the state level. Median annual income for this occupation is $25,636.00 at the state level. A summary of occupational data from the State Workforce Investment Board Data Center is displayed below:

Table 1: Education Level

Program Occupations	Education Level
First-Line Supervisors/ Managers of Landscaping, Lawn Service, and Grounds keeping Workers	Work Experience In Related Field
Pesticide Handlers, Sprayers, and applicators, Vegetation	Moderate-Term On- The-Job Training

Table 2: Occupational Overview

	Region	State	United States
2014 Occupational Jobs	889	889	125140
2024 Occupational Jobs	926	926	127802
Total Change	37	37	2662
Total % Change	4.16%	4.16%	2.13%
2014 Median Hourly Earnings	$12.33	$13.96	$17.89
2014 Median Annual Earnings	$25,636.00	$29,031.60	$37,200.80
Annual Openings	3	3	266

Table 3: Occupational Breakdown

Description	2014 Jobs	2024 Jobs	Annual Openings	2014 Hourly Earnings	2014 Annual Earnings 2,080 Work Hours
Farmers, Ranchers, and other Agricultural Managers	815	852	3	$15.59	$32,427.20
First- Line Supervisors/ Managers of Landscaping, Lawn Service, and Grounds keeping Workers	74	74	0	$9.06	$18,844.80
TOTAL	889	926	3	$12.33	$25,636.00

Table 4: Occupational Change

Description	Regional Change	Regional % Change	State % Change	National % Change
First-Line Supervisors/ Managers of Landscaping, Lawn Service, and Grounds keeping Workers	37	4.54%	4.54%	2.59%
Pesticide Handlers, Sprayers, and applicators, Vegetation	0	0.00%	0.00%	0.37%

ARTICULATION

Articulation credit from Secondary Horticulture Cluster to Postsecondary Horticulture Cluster will be awarded upon implementation of this curriculum by the college. The courses to be articulated are Applied Principles of Plan Propagation (HLT 1213), Leadership Management (HLT 1411), and Applied Principles of Plant Production (AGT 1313) with the stipulation of passing the MS-CPAS3.

Articulated Secondary Course	Postsecondary Program	Articulated Postsecondary Course
Horticulture (CIP: 01.0601)	PS 2010 Horticulture Cluster: Landscape Management (CIP 01.0601)	HLT 1213 Applied Principles of Plan Propagation HLT 1411 Leadership Management AGT 1313 Applied Principles of Plant Production

TECHNICAL SKILLS ASSESSMENT

Colleges should report the following for students who complete the program with a career certificate, technical certificate, or an Associate of Applied Science Degrees for technical skills attainment. To use the approved Alternate Assessment for the following programs of study, colleges should provide a Letter of Notification to the Director of Career Technical Education at the MS Community College Board. Please see the following link for further instructions: http://www.mccb.edu/wkfEdu/CTDefault.aspx.

CIP Code	**Program of Study**	
01.0601	Horticulture Service Operations and Management	
Level	**Standard Assessment**	**Alternate Assessment**
Career	MS-CPAS 3	
Level	**Standard Assessment**	**Alternate Assessment**
Technical/AAS	MS-CPAS 3	

CIP Code	**Program of Study**	
01.0605	Landscaping	
Level	**Standard Assessment**	**Alternate Assessment**
Career	MS-CPAS 3	
Level	**Standard Assessment**	**Alternate Assessment**
Technical/AAS	MS-CPAS 3	

CIP Code	Program of Study	
01.0607	Turf Management	
Level	**Standard Assessment**	**Alternate Assessment**
Career	MS-CPAS 3	
Level	**Standard Assessment**	**Alternate Assessment**
Technical/AAS	MS-CPAS 3	

Online and Blended Learning Opportunities

Course content includes lecture and laboratory semester credit hours. Faculty members are encouraged to present lecture related content to students in an online or blended learning environment. Training related to online and blended learning will be available to faculty members through the MS Community College Board.

Instructional Strategies

Instructional strategies for faculty members implementing the curriculum can be found through the Office of Curriculum and Instruction's professional development.

Assessment Strategies

The Office of Curriculum and Instruction's professional development offer assessment strategies to faculty members implementing the curriculum. Additionally, standards were included in course content when appropriate.

RESEARCH ABSTRACT

In the fall of 2017, the Office of Curriculum and Instruction (OCI) met with the different industry members who made up the advisory committees for the Horticulture cluster. An industry questionnaire was used to gather feedback concerning the trends and needs, both current and future, of their field. Program faculty, administrators, and industry members were consulted regarding industry workforce needs and trends.

Industry advisory team members from the college involved with this program were asked to give input related to changes to be made to the curriculum framework. Specific comments related to soft skills needed in this program include having a communication skills, professionalism, trainable, and math skills. Occupation-specific skills stated include knowing how to communicate with the customers, basic math skills, understanding irrigation systems, understand how to appropriately use equipment, mechanical knowledge, and plant knowledge.

Included in this curriculum revision four courses were deleted which include Entomology (HLT 2133), Plant Pathology (HLT 2143), Integrated Production Systems (HLT 2724), and Water Garden Design (HLT 2734). Two of the following courses were modified in this framework; Landscape Equipment Operation and Maintenance (HLT (1614) and Landscape Maintenance and Weed Control (HLT 2124).

REVISION HISTORY:

2010, Research and Curriculum Unit, Mississippi State University
2018 Mississippi Community College Board

PROGRAM DESCRIPTIONS

Horticulture Technology

Horticulture Technology is an instructional program that prepares individuals to produce, process, and market plants, shrubs, and trees used principally for ornamental, recreational, and aesthetic purposes and to establish, maintain, and manage horticultural enterprises such as arboriculture, floriculture, greenhouse operation and management, landscape management, nursery operation and management, and turf management. Included is instruction in machinery and equipment necessary for each horticultural enterprise.

Landscape Management Technology

The Landscape Management Technology program is designed to provide students with skills that could lead to employment in the landscape maintenance and landscape construction industries. Specific instruction is offered in the areas of landscape design; selection and care of plants; hard construction including concrete, wood, electrical, irrigation, and lighting; equipment use and maintenance; and business management.

Golf/ Recreational Turf Management Technology

The Golf/Recreational Turf Management Technology program is designed to prepare individuals to establish, maintain, and manage turf areas for golf/recreational and other purposes. The curriculum includes instruction in business management, design, turfgrass management, irrigation, and operation/maintenance of equipment and machinery.

VALIDATION

SUGGESTED COURSE SEQUENCE

Accelerated Integrated Career Pathway

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1113	Plant Materials I	3	2	2	60			
HLT 2713	Landscape Construction	3	2	2	60			
	Electives	9						
	Total	**15**						

Career Certificate Required Courses (Horticulture)

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1113	Plant Materials I	3	2	2	60			
HLT 1123	Plant Materials II	3	2	2	60			
HLT 1213	Applied Principles of Plant Propagation	3	3	0	45			
HLT 1313	Greenhouse and Nursery Production I	3	2	2	60			
HLT 1323 **OR** AGR 1313 **OR** AGT 1313	Plant Science **OR** Plant Science **OR** Applied Principles of Plant Production	3	2	3	60			
HLT 2333 **OR** AGR 2314 **OR** AGT 1714	Soil Science **OR** Basic Soils **OR** Applied Soils- Conservation Use	3	2	4	90			
HLT 2713	Landscape Construction	3	2	2	60			
	Electives	9						
	Total	**30**						

VALIDATION

Technical Certificate Requirement (Horticulture)

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1513	Landscape Design I	3	2	2	60			
HLT 2124	Landscape Management and Weed Control	4	3	2	75			
HLT 2323	Greenhouse and Nursery Production II	3	1	4	75			
HLT 2813	Ornamental and Turf Pest Management	3	2	2	60			
	Elective	2						
	Total	**15**						

VALIDATION

Accelerated Integrated Career Pathway (landscaping)

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1113	Plant Materials I	3	2	2	60			
HLT 1614	Landscape Equipment Operation and Maintenance	4	2	4	90			
	Electives	8						
	Total	**15**						

Career Certificate Required Courses (Landscaping)

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1113	Plant Materials I	3	2	2	60			
HLT 1123	Plant Materials II	3	2	2	60			
HLT 2713	Landscape Construction	3	2	2	60			
HLT 1614 **OR** GTT 1614	Landscape Equipment Operation and Maintenance **OR** Golf Course Equipment Operation and Maintenance	4	2	4	90			
HLT 2113	Turfgrass Management	3	2	2	60			
HLT 2124	Landscape Management and Weed Control	4	3	2	75			
HLT 2313	Landscape Business Management	3	3	0	45			
	Electives	7						
	Total	**30**						

VALIDATION

Technical Certificate Required Courses (Landscaping)

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1513	Landscape Design I	3	2	2	60			
HLT 2813	Ornamental and Turf Pest Management	3	2	2	60			
HLT 2824	Irrigation and Light Systems	4	2	4	90			
	Electives	5						
	Total	**15**						

VALIDATION

Accelerated Integrated Career Pathway (Turf Management)

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1113	Plant Materials I	3	2	2	60			
HLT 2713	Landscape Construction	3	2	2	60			
	Electives	8						
	Total	**15**						

Career Certificate Required Courses (Turf Management)

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1113	Plant Materials I	3	2	2	60			
HLT 1123	Plant Materials II	3	2	2	60	6		
HLT 2124	Landscape Management and Weed Control	4	3	2	75			
HLT 2713	Landscape Construction	3	2	2	60			
HLT 2813	Ornamental and Turf Pest Management	3	2	2	60			
GTT 1614	Golf Course Equipment Operation and Maintenance	4	2	4	90			
GTT 2813	Turfgrass Management for Golf Courses	3	2	2	60			
	Electives	7						
	Total	**30**						

VALIDATION

Technical Certificate Required Courses (Turf Management)

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1513	Landscape Design I	3	2	2	60			
GTT 2313	Golf Course Business Management	3	3	0	45			
GTT 2824	Irrigation Systems: Design and Maintenance	4	2	4	90			
	Electives	5						
	Total	**15**						

VALIDATION

Horticultures Courses

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
HLT 1113	Plant Materials I	3						
HLT 1123	Plant Materials II	3						
HLT 1213	Applied Principles of Plant Propagation	3						
HLT 1222	Green Industry Seminar	2						
HLT 1313	Greenhouse and Nursery Production I	3						
HLT 1411	Leadership Management I	1						
HLT 1421	Leadership Management II	1						
HLT 1431	Leadership Management III	1						
HLT 1441	Leadership Management IV	1						
HLT 1513	Landscape Design I	3						
HLT 1614	Landscape Equipment Operation and Maintenance	4						
HLT 2113	Turfgrass Management	3						
HLT 2124	Landscape Management and Weed Control	4						
HLT 2313	Landscape Business Management	3						
HLT 2323	Green House and Nursery Production II	3						
HLT 2413	Floral Design	3						
HLT 2423	Advanced Floral Design	3						
HLT 2513	Garden Center Management	3						
HLT 2523	Landscape Design II	3						
HLT 2713	Landscape Construction	3						
HLT 2813	Ornamental and Turf Pest Management	3						
HLT 2824	Irrigation and Light Systems	4						

HLT 291 (1-3)	Special Problem in Horticulture Cluster	1-3						
HLT 292(1-6)	Supervised Work Experience in Horticulture Cluster	1-6						
GTT 1614	Golf Course Equipment Operation and Maintenance	4						
GTT 2313	Golf Course Business Management	3						
GTT 2813	Turfgrass Management for Golf Courses	3						
GTT 2824	Irrigation Systems: Design and Maintenance	4						
HLT 1323 **OR** AGR 1313 **OR** AGT 1313	Plant Science **OR** Plant Science **OR** Applied Principles of Plant Production	3						
HLT 2333 **OR** AGR 2314 **OR** AGT 1714	Soil Science **OR** Basic Soils **OR** Applied Soils- Conservation Use	3						
	Other Instructor Approved Electives							

General Education Core Courses – Horticulture and Landscape Technology

To receive the Associate of Applied Science Degree, a student must complete all of the required coursework found in the Career Certificate option, Technical Certificate option and a minimum of 15 semester hours of General Education Core. The courses in the General Education Core may be spaced out over the entire length of the program so that students complete some academic and Career Technical courses each semester or provided primarily within the last semester. Each community college will specify the actual courses that are required to meet the General Education Core Requirements for the Associate of Applied Science Degree at their college. The Southern Association of Colleges and Schools (SACS) Commission on Colleges Standard 2.7.3 from the Principles of Accreditation: Foundations for Quality Enhancement1 describes the general education core.

Section 2.7.3 In each undergraduate degree program, the institution requires the successful completion of a general education component at the collegiate level that (1) is substantial component of each undergraduate degree, (2) ensures breadth of knowledge, and (3) is based on a coherent rationale. For degree completion in associate programs, the component constitutes a minimum of 15 semester hours or the equivalent. These credit hours are to be drawn from and include at least one course from the following areas: humanities/fine arts, social/behavioral sciences, and natural science/mathematics. The courses do not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession.

General Education Courses

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
	Humanities/Fine Arts	3						
	Social/Behavioral Sciences	3						
	Math/Science	3						
	Academic electives	6						
	TOTAL	**15**						

1 Southern Association of Colleges and Schools Commission on Colleges. (2012). *The principles of accreditation: Foundations for quality enhancement*. Retrieved from http://www.sacscoc.org/pdf/2012PrinciplesOfAcreditation.pdf

HORTICULTURE/ LANDSCAPE MANAGEMENT TECHNOLOGY COURSES

Course Number and Name: **HLT 1113 Plant Materials I**

Description: A survey of common ornamental plants used in landscaping including deciduous and evergreen trees, shrubs, vines, ground covers, and annuals and perennials, this course includes instruction in basic classification and identification procedures and in identifying characteristics, maintenance, and use of the plants in a horticulture setting. This course is designed to be offered in the fall semester.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	1	4	75

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Demonstrate an understanding of identifying and classifying plant materials
   a. Classify plants using the Latin system from kingdom to variety and cultivar (if applicable)
   b. Implement the rules for writing proper botanical names of plants including punctuation, capitalization, and spelling
   c. Identify growth characteristics and leaf shapes of indigenous plants
   d. Describe the different environmental requirements of plants including the concepts of microclimates and zone hardiness requirements
   e. Describe the different types of ornamental uses of plants
   f. Identify a minimum of 100 plants including deciduous and evergreen trees, shrubs, vines, ground covers, and annuals and perennials by botanical name and common name
   g. Describe characteristics, maintenance, propagation, and use of plant materials
   h. Identify common insects and diseases associated with all plant materials

Landscape Horticulturist License Examination

IS 1141 Landscaping to Conserve Energy
P 666 Selecting Landscape Plants
P2402 Natural Resource Enterprises Wildlife and Recreation MS Recreational Gardens Establishing a Backyard Wildlife Habitat

VALIDATION

Course Number and Name: **HLT 1123** **Plant Materials II**

Description: A continuation of Plant Materials I with emphasis on foliage and interior and flowering plants, this course is designed to be taught in the spring semester.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	1	4	75

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Demonstrate an understanding of identifying and classifying plant materials
   a. Classify plants using the Latin system from kingdom to variety and cultivar (if applicable).
   b. Implement the rules for writing proper botanical names of plants including punctuation, capitalization, and spelling
   c. Describe growth characteristics and leaf shapes of indigenous plants
   d. Describe the different environmental requirements of plants including the concepts of microclimates and zone hardiness requirements
   e. Describe the different types of ornamental uses of plants
   f. Identify a minimum of 100 plants including deciduous and evergreen trees, shrubs, vines, ground cover, interior plants, annuals, and perennials by botanical name and common name
   g. Describe characteristics, maintenance, propagation, and use of plant materials
   h. Identify common insects and diseases associated with all plant materials

Landscape Horticulturist License Examination

IS 656 Growing Azaleas
IS 1141 Landscaping to Conserve Energy
IS 1523 Caladiums for the Landscape
IS1562 Easy to Grow Herbs for the Landscape
P 456 Espalier Shrubs
P 529 Roses in Mississippi
P 666 Selecting Landscape Plants
P1736 Planting and Care of Bulbs, Corms, Rhizomes and Roots
P 1826 Annual and Perennial Flowers for Mississippi Gardens
P 2007 Crapemyrtle-Flower of the South
P 2402 Natural Resource Enterprises Wildlife and Recreation MS Recreational Gardens Establishing a Backyard Wildlife Habitat

VALIDATION

Course Number and Name: **HLT 1213 Applied Principles of Plant Propagation**

Description: This course develops expertise and knowledge of plant propagation methods including seeding, separation, division, grafting, and layering. This course also includes an introduction to tissue culture methods.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	3	0	45
3	2	2	60
3	1	4	75

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Describe the advantages and disadvantages of vegetation and sexual propagation, and list examples of each
2. Demonstrate techniques used in planting and collecting seed
   a. State requirements and components of a seeding medium
   b. Describe requirements for successful propagation by seed (timing, planting depth, media preparation, etc.)
   c. Identify and describe scarification and stratification treatments for seeds containing immature embryos, dormant embryos, and/or hard seed coats
   d. Propagate plants from purchased seed and from collected seed
   e. Describe symptoms of damping off. Identify chemical and cultural control methods
   f. Describe proper timing of transplanting seedlings and procedures used in hardening off
3. Describe the environmental factors for optimum propagation of cuttings. Block 23
   a. State requirements and components of a cutting propagation medium
   b. Describe the uses of rooting hormones, and state the advantages/disadvantages of liquid as opposed to talc
   c. Describe how the physical appearance of softwood, semi-hardwood, and hardwood cuttings vary
   d. Propagate at least five of the following types of cuttings: softwood, semi-hardwood, hardwood, root, leaf, tip, mallet, and cane cuttings
   e. Describe components used to make a mist bench for commercial propagation of cuttings, and discuss their functions
4. Demonstrate concepts involved in other vegetative propagation techniques
   a. Describe the procedures used in layering plants including simple, air, trench, mound, tip, and serpentine layering
   b. Propagate a plant by one of the layering methods listed
   c. Describe specialized roots and stems (including tubers, corms, rhizomes, stolen, and bulbs) used in separation and division
   d. Propagate plants by separation and division
   e. Itemize the benefits of grafting and budding
   f. Describe the factors to consider in collecting and storing scion and bud wood
   g. Identify the cambium layer of a stem, and describe its role and importance in grafting
   h. Describe the advantages and disadvantages of propagation by tissue culture

VALIDATION

Course Number and Name: **HLT 1222 Green Industry Seminar**

Description: This course is designed to provide an overview of current Green Industry events and job opportunities in the industry and specific landscape and horticulture related topics.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
2	2	0	30

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Describe and discuss current events in the green industry
    a. Identify and discuss national, state, and local regulations and laws relating to the green industry
    b. Identify and review current green industry periodicals and publications
    c. Identify industry professional and trade associations
2. Identify career opportunities in the green industry
    a. Examine various career choices in the industry through guest speakers and/or field trips
3. Describe and explore sustainable practices in the green industry
4. Explore common terminology used in the landscape/horticulture industry in the following areas
    a. Design or Landscape Architecture
    b. Horticulture (greenhouse, greenhouse propagation, greenhouse management)
    c. Landscape construction (landscaping, irrigation and outdoor lighting)
    d. Landscape maintenance
    e. Turfgrass management
    f. Interiorscapes

VALIDATION

Course Number and Name: **HLT 1313** **Greenhouse and Nursery Production I**

Description: This course develops skills and expertise in the selection, equipping, and management of a greenhouse facility. Emphasis is placed on different media, supplies, and chemicals used in greenhouses and on the scheduling and production of greenhouse crops.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	1	4	75

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Contrast the types of structures, locations, and equipment used in the greenhouse industry
   a. Identify the different types of greenhouse and nursery structures and structure coverings, and state the advantages and disadvantages of each
   b. Describe factors to consider in locating and sizing greenhouse and nursery facilities
   c. Describe the equipment used to control the different environmental factors that affect greenhouse production
2. Explain the process of acclimation of plant materials
   a. Discuss the concept of acclimation as applied to plant production and the different methods that are used to acclimate plants
   b. Identify harmful and useful gases found in greenhouses, and describe their control
3. Produce a plan to illustrate proper watering, lighting, and timing techniques
   a. Describe the importance of proper watering and chemigation techniques on greenhouse nursery production in terms of frequency, amount, method of application, and economic considerations
   b. Develop and implement a watering and lighting schedule for a given greenhouse or nursery crop
4. Determine principles of media selection
   a. Describe the characteristics of organic and inorganic components used in soilless media
   b. Contrast the advantages and disadvantages of soil and soilless media
   c. Adjust the pH of a growing medium to meet the requirements of a specific crop
5. Formulate a seeding schedule
   a. Compare and contrast the advantages and disadvantages of the different methods for starting plants in a greenhouse or nursery including seeds, plugs, liners, and rooted cuttings
   b. Identify available sources for seeds, plants, media, containers, and other supplies necessary for a greenhouse and nursery operation
6. Prepare and complete production schedule for a spring crop
   a. Develop a crop program for spring production of greenhouse plants to include the selection of plant species to be grown, timing of operations, supplies, marketing, production costs, and spacing for optimum production
   b. Contrast the differences in greenhouse and nursery crop programming.
8. Create appropriate merchandising strategies for crop production
   a. Develop a marketing plan for a greenhouse or nursery crop to include program evaluation, review techniques, PERT or other charts, scheduling difficulties, costing and pricing of plants, advertising, storing and holding, and shipping

VALIDATION

Course Number and Name: **HLT 1411, HLT 1421, HLT 1431, HLT 1441 Leadership Management (I-IV)**

Description: This course develops an awareness of interpersonal skills essential for job success. Topics include self-image, team building, leadership skills, time and stress management, and human resources management.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
1	1	0	15
1	0	2	30

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Formulate personal educational and professional goals, and develop a plan to accomplish those goals
2. Find, plan, and implement a minimum of one community service project
3. Prepare for exit exam

VALIDATION

Course Number and Name: **HLT 1513** **Landscape Design I**

Description: An introduction to concepts, principles, and elements of landscape design, this course includes instruction and practice in the use of drawing instruments and/ or CAD software program and supplies and in conducting a site analysis.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	1	4	75

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Demonstrate the use of drawing instruments and or CAD software programs landscape plans
   a. Complete various drawings using basic drawing instruments and/or CAD software programs
   b. Define and apply drawing terms related to plant materials and structures used in the landscape
   c. Draw standard landscape symbols to scale, and use consistent freehand lettering techniques to label drawings and/or CAD software programs
2. Describe and utilize site inventory and analysis processes and elements and principles of design
   a. Conduct a site inventory and analysis
   b. Appraise client needs, preferences, and interests
   c. Create a basic landscape design plan using basic presentation methods and media and the elements and principles of design

Landscape Horticulturist License Examination

IS 209 Foundation Plantings
IS 1141 Landscaping o Conserve Energy
IS 1564 Amending the Planting Site for Landscape Plants

VALIDATION

Course Number and Name: **HLT 1614/GTT 1614 Landscape Equipment Operation and Maintenance/ Golf Course Equipment Operation and Maintenance**

Description: This course aims to provide instruction and practice in the safe and proper operation and maintenance of landscape and turf equipment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	2	4	90

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Demonstrate proper maintenance, handling, and storage of landscape and turf equipment and supplies
   a. Identify power equipment used in landscaping, and describe their function or use
   b. Describe storage procedures for power tools and supplies
   c. Use an operator's manual to determine maintenance and storage procedures, fuel and lubricant specifications, and operating procedures for a specific piece of equipment
2. Describe basic first aid and safety precautions for using landscape maintenance equipment
   a. Describe basic first aid procedures for treating shock, heat stroke, cuts, burns, poisoning, and so forth
   b. Describe safety precautions to be followed in working with landscape and turf equipment and supplies
3. Demonstrate safe and proper operation of landscape and turf equipment and supplies
   a. Demonstrate the ability to properly and safely operate the following equipment: mowers, string trimmer, edger, chain saw, hedge trimmer, blowers, backpack sprayer, tiller, spreader, tractors, box blade, front-end loader, spray rigs, and so forth
   b. Demonstrate the ability to properly and safely use landscape and turf supplies
   c. Load, secure, and transport equipment and supplies safely
4. Demonstrate maintenance of two- and four-stroke gasoline engines
   a. Differentiate between two-stroke and four-stroke gasoline engines
   b. Perform owner–operator maintenance on a two-stroke and four-stroke engine to include mixing oil and fuel, servicing air filters, replacing spark plugs, and so forth
5. Explain a working knowledge of small engine nomenclature, function, and purpose
   a. Demonstrate the ability to perform repairs on equipment in the field and troubleshooting as needed

VALIDATION

Course Number and Name: **HLT 2113** **Turfgrass Management**

Description: A course to provide instruction and practice in the identification, selection, installation, and management/maintenance of turfgrass.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	1	4	75

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Discuss the role of turfgrass and its importance in the green industry
   a. Discuss the role of turfgrass in landscape management
   b. Describe the role of the turfgrass manager
   c. Identify the different types of turfgrasses, and discuss their classification, growth habits, advantages, and disadvantages
   d. Identify different types of mowing equipment, and describe the uses and limitations of each type
   e. Describe the role of sod farming and seed harvesting in the green industry
2. Describe the steps to establish turfgrass
   a. Associate soil types and soil modification techniques with management of different turfgrasses
   b. Discuss the advantages and disadvantages of the different methods of turfgrass establishments.
   c. Establish turfgrasses by seeding, plugging, sprigging, and sodding
   d. Calculate the proper amount and apply fertilizer and other amendments to meet soil test requirements for fertility and pH adjustment
3. Describe the maintenance procedures to manage a healthy turf
   a. Plan fertilization programs and application schedules for different turfgrasses
   b. Discuss factors to consider in planning a mowing program for different turfgrasses including frequency of mowing and mower height
   c. Discuss irrigation needs of turf and signs that indicate when irrigation is needed
   d. Describe cultural procedures of turfgrass management including dethatching and aeration
4. Discuss golf course design and management
   a. Discuss the basic design and layout procedures of a golf course
   b. Discuss maintenance practices for greens, tees, fairways, traps, and roughs
5. Discuss soil modification for athletic fields and golf courses
   a. Discuss complete soil modification
   b. Discuss partial soil modification
   c. Discuss nutrient management of both modified and partial modified soils
6. Discuss the management practices that affect the speed of play
   a. Discuss sequence of events prior to a golf tournament
   b. Discuss cultural practices relating to turfgrass and their effects on putting speed
7. Describe over seeding choices for golf courses
   a. Identify the grass species used for golf course over seeding
   b. Describe techniques for over seeding success on golf courses and sports turf
   c. Identify alternatives and hazards for over seeding grasses
8. Discuss turfgrass stresses
   a. Explain what agents cause stress to grasses
   b. Explain how stress can affect grasses
   c. Discuss ways to manage and produce turfgrass stresses
9. Discuss turfgrass pests and methods to scout for pests

VALIDATION

Landscape Horticulturist License Examination
IS 372 Soil pH & Fertilizers
P1322 Establish and Manage Your Lawn

VALIDATION

Course Number and Name: **HLT 2124** **Landscape Management and Weed Control**

Description: This course aims to provide instruction and practice in the maintenance of trees, shrubs, and other greenscape features. This course includes instruction in the use of herbicides and other weed control measures.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	3	2	75
4	2	4	90

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Describe the scope of landscape maintenance
   a. Describe job opportunities in landscape maintenance and related areas of work
   b. Discuss job search and resume posting to include online sources and placement office listings
2. Identify and perform the proper method and timing of pruning operations for specific trees and shrubs
   a. Describe storage procedures for hand tools
   b. Perform routine hand tool maintenance to include oiling, cleaning, and sharpening
   c. Prune a shrub by thinning
   d. Prune a shrub by heading back
   e. Prune a tree to a central leader
   f. Prune a tree as a multi-stem
   g. Prune a tree to repair storm damage
   h. Provide wound care for trees
3. Explain the laws and regulations governing licensure
   a. Describe the laws and regulations of licensure of tree surgeons
   b. Describe the laws and regulations of licensure of commercial ornamental and turf weed control applicators
4. Describe the different types of weeds and herbicides
   a. Identify weeds, and describe their life cycle and developmental stages
   b. Describe the characteristics of the different types of herbicides
   c. Describe the practices utilized for weed control
5. Develop a 1-year maintenance schedule for residential and commercial applications
   a. Plan a maintenance schedule to include routine shrub and tree care, lawn care, fertilization, fixture maintenance, winter care, and plantings including winter grasses, replanting and re-mulching of shrubs, and scheduling of seasonal color
6. Demonstrate proper procedures for applying chemicals to turfgrasses
   a. Explain an appropriate method for calibrating a backpack sprayer and a boom sprayer
   b. Demonstrate an appropriate method for calibrating rotary and drop spreading equipment for application of granular chemicals

VALIDATION

Landscape Horticulturist License Examination
IS 201 Pruning Ornamental Plants
IS 372 Soil pH & Fertilizers
IS 411 Fertilizing Trees and Shrubs
IS 965 Transplanting Trees and Shrubs in the Landscape
IS 1564 Amending the Planting Site for Landscape Plants
M 1194 Mississippi's Ten Worst Invasive Weeds
P 456 Espalier Shrubs
P2007 Crapemyrtle-Flower of the South

VALIDATION

Course Number and Name: **HLT 2313 Landscape Business Management**

Description: This course aims to provide instruction and practice regarding the management of a landscape operation. This course includes instruction in estimating and bidding; personnel management, supervision, and development; and business practices.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	3	0	45

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Discuss entrepreneurship opportunities in the green industry
   a. Describe factors to consider in making a decision to open a business
   b. State sources and procedures for funding a small business
   c. Describe the advantages and disadvantages of the different forms of business ownership
2. Demonstrate proper record-keeping procedures associated with business ownership
   a. Describe the uses of records in managing a landscape business
   b. Maintain records for a small landscaping business including income and expense statements, cash flow, inventory, and a net worth statement
3. Describe procedures and techniques for hiring and retaining employees
   a. Discuss methods for training employees
   b. Describe factors related to employer–employee relationships including insurance, wages and benefits, withholding taxes, performance evaluation, employer liability, and terminations
   c. Examine laws and regulatory agencies relating to hiring migratory and immigrant labor
4. Describe and utilize the steps in developing and submitting a bid
   a. Interpret specifications and working drawings
   b. Complete sample forms required for submitting estimates and bids
   c. Write a bid for a specific job that includes direct and indirect costs
   d. Write a contract for a specific job that includes the following essential elements: working drawings and specifications, general and specific conditions, and methods of payment
   e. Develop a work schedule for a landscape business

VALIDATION

Course Number and Name: **HLT 2323 Greenhouse and Nursery II**

Description: This course is a continuation of Greenhouse and Nursery Production I with emphasis on production practices associated with fertilization, pest control, environment control, and marketing.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	1	4	75

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Prepare a complete production schedule for a fall crop
    a. Develop a crop program for fall production of greenhouse plants to include selection of plant species to be grown, timing of operations, supplies, marketing, production costs, and spacing for optimum production
2. Examine fertilization principles
    a. Identify and describe the use of fertilizer proportions in greenhouse and nursery production
    b. Describe factors that influence fertilizer application rates and methods on different plants
    c. Contrast the advantages and disadvantages of different fertilizer formulations
    d. Calculate the amount of chemicals and water needed to produce a solution that contains the recommended parts-per-million mixture of active ingredients for a specific crop
    e. Apply different fertilizer formulations
3. Calculate and use growth regulators
    a. Describe the use of and apply growth regulators on specific greenhouse and nursery crops
4. Identify and develop pest and pest management procedures
    a. Identify major greenhouse pests including insects, viruses, bacteria, fungi, and weeds, and describe their life cycle and control
    b. Develop and implement an integrated pest management system for greenhouse or nursery operation
5. Recognize lighting concepts for crop production
    a. Describe methods for maximizing and minimizing light intensity for greenhouse crops
    b. Describe the concept of photoperiod manipulation, and apply it to the production of greenhouse crops
6. Evaluate nursery production techniques and methods
    a. Describe, contrast, and apply nursery production techniques for bare root, container, and field grown stock
    b. Use the American Standards for Nursery Stock to grade nursery plants

VALIDATION

Course Number and Name: **HLT 2413 Floral Design**

Description: A course to develop knowledge and skills associated with retail floristry, this course includes instruction in preparing arrangements with fresh and dried materials, seasonal pieces, funeral sprays, and the use of floral wire services.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	1	4	75

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Explain the uses of different pieces of equipment and supplies used in floral design
    a. Describe the uses of different pieces of equipment used in floral design
    b. Describe the uses of supplies used in floral design
2. Explain the use of cut flowers and other plant materials used in floral design
    a. Describe the use of cut flowers and other plant materials used in floral design
3. Examine floral preservation techniques
    a. Describe and apply factors to consider in conditioning and storing flowers and plant materials
4. Create floral designs in commercially applicable styles
    a. Prepare a circular arrangement with fresh flowers
    b. Prepare a horizontal arrangement with fresh flowers
    c. Prepare a triangular arrangement with fresh flowers
    d. Prepare an angle design with fresh flowers
    e. Prepare specialty designs including corsages, boutonnieres, and wedding bouquets
    f. Prepare a standing wreath for a funeral
    g. Prepare a basket arrangement for a funeral
    h. Prepare a bud vase
    i. Prepare a Christmas arrangement
    j. Prepare a seasonal dried arrangement
5. Illustrate knowledge of practical delivery
    a. Organize a delivery schedule for floral orders
    b. Demonstrate procedures for delivering floral times
6. Explain floral wire capabilities

VALIDATION

Course Number and Name: **HLT 2423 Advanced Floral Design**

Description: A course designed to continue to build on techniques from Floral Design, this course will include instruction on developing business skills needed every day and specialty design skills needed every day and specialty designs used in the floral industry.

Hour Breakdown:

Semester Credit Hours	Lecture	Clinical	Contact Hours
3	1	4	75

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Explain the uses of different pieces of equipment and supplies used in floral design
    a. Describe the uses of different pieces of equipment used in floral design
    b. Describe the uses of supplies used in floral design
2. Explain the use of cut flowers and other plant materials used in floral design
    a. Describe the use of cut flowers and other plant materials used in floral design
3. Examine floral preservation techniques
    a. Describe and apply factors to consider in conditioning and storing flowers and plant materials
4. Create floral designs in commercially applicable styles
    a. Prepare seasonal arrangements
    b. Prepare balloon creations
    c. Prepare and demonstrate the care of tropical designs
    d. Prepare sympathy pieces including casket pieces, basket, pots, and standing sprays
    e. Prepare European designs
    f. Prepare and design window and floor designs
    g. Prepare and plan wedding decorations and designs
    h. Prepare everyday arrangements
    i. Plan and prepare party decorations
5. Demonstrate knowledge of business organization
    a. Explain seasonal business needs and organization
    b. Explain everyday business needs and organization
6. Demonstrate knowledge of basic accounting practices of a floral business

VALIDATION

Course Number and Name: **HLT 2513 Garden Center Management**

Description: A course to develop knowledge and skills associated with management of a retail garden center, this course includes instruction in basic principles of entrepreneurship as applied to garden centers, product display and advertising and facilities.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	3	0	45
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe the business principles associated with acquiring, organizing, and operating a garden center
    a. Describe the advantages and disadvantages of the different forms of business ownership
    b. Discuss considerations to be taken into account in purchasing an existing business
    c. Generate a budget for going into business to include facility and inventory acquisition expenses, operating expenses, and income for 1 year
    d. Identify capital sources for start-up of a garden center business
2. Explain the concepts necessary to build a garden center business to include choosing a location, merchandising and promotion techniques, facilities maintenance, and public relations
    a. Describe factors to include in a personnel management and training program for employees
    b. Describe factors that affect the development of an image for a business
    c. Discuss factors to consider in selecting a location for a garden center business
    d. Describe factors to consider in organizing and displaying products and plant materials for optimum merchandising
    e. Discuss and contrast the different means of advertising
    f. Develop a plan for keeping facilities, display area, and plants in the inventory clean, attractive, and well-maintained
3. Design a profitable financial management system
    a. Develop a pricing system that takes into account overhead costs and provides a reasonable profit

VALIDATION

Course Number and Name: **HLT 2523 Landscape Design II**

Description: This course is a continuation of Landscape Design I with emphasis on planting design and preparation and presentation of landscape plans using computer-aided CAD software.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	1	4	75

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe and illustrate basic planting design techniques
   a. Produce appropriate plant combinations
   b. Incorporate site amenities with appropriate plant combinations
   c. Complete landscape design to include plant combinations and site amenities
2. Describe and explore the use of CAD software used in the preparation of landscape plans and drawings pertaining to the green industry
   a. Review different CAD software used in preparing landscape plans and drawings
   b. Prepare residential and commercial landscape plans utilizing CAD software

VALIDATION

Course Number and Name: **HLT 2713 Landscape Construction**

Description: This course provides instruction and practice in the installation of a landscape plan to include site preparation, installation of site amenities, bed preparation and planting, and shrub and tree planting.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	1	4	75

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Develop a plan for sequencing and timing the different events and operations required for a landscape installation job
   a. Develop a plan for basic site preparation operations to include grading, filling, addition of soil amendments, and soil tillage and preparation
   b. Describe the installation of hardscape in the landscape industry
   c. Describe the process for booking and scheduling materials used on a landscape job
   d. Lay out and install a landscape bed
   e. Install trees and shrubs as per specifications on drawings
   f. Describe the concept and implication of a landscape warranty
2. Discuss drainage problems in the landscape
   a. Describe and contrast the different ways to solve drainage and erosion problems in a landscape
   b. Measure grades and elevations
   c. Calculate volumes of landscape materials
3. Explain state regulations required to obtain a landscape gardener's license
   a. Describe state regulations required to obtain a landscape gardener's license
4. Demonstrate the ability to solve mathematical exercises related to the landscape/horticulture industry
   a. Identify geometric measures, and complete practice exercises relating to perimeter, area, and volume
   b. Calculate sales discounts and markup pricing procedures
   c. Calculate area, quantity, and sizes for planting, and area, quantity, and volume of fertilizers and chemicals
5. Interpreted and implement landscape plans and designs

Landscape Horticulturist License Examination

IS 209 Foundation Plantings
IS 372 Soil pH & Fertilizers
IS 965 Transplanting Trees and Shrubs In The Landscape
IS 1141 Landscaping to Conserve Energy
P 2301 Mulches for the Landscape

VALIDATION

Course Number and Name: **HLT 2813 Ornamental and Turf Pest Management**

Description: This course provides instruction and practice in the identification and control of ornamental turf pests and diseases. This course includes instruction in pest identification, pesticide use and safety, and legal aspects of pest control.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	3	0	45

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe and explain the different types of insects associated with landscape and horticulture plant material
   a. Identify a minimum of 16 orders of insect phylum, and describe the characteristics common to each
   b. Describe the different life cycles of insects
   c. Identify and describe the damage caused by insects, and state the control methods
   d. Collect samples of a minimum of 10 orders and 25 insects
2. Describe and explain the different types of disease common to ornamental and turf plants
   a. Identify a minimum of 10 bacterial and fungi diseases
   b. Describe the different life cycles of diseases
   c. Identify and describe the damage caused by diseases, and state the control methods
   d. Collect samples of a minimum of 10 diseases common to ornamental and turf plants
3. Describe control methods for insects and disease management
   a. Identify the different pesticide formulations, and describe the application procedures
   b. Describe pesticide safety to include toxicity and health, storage, material safety data sheets, application procedures, first aid, and the effects on the environment
   c. Interpret information found on pesticide labels
   d. Discuss integrated pest management (IPM) and holistic pest management (HPM)
   e. Identify laws and regulations governing pesticide applicators
   f. Apply for and take private/commercial pesticide applicator's certification exam and ornamental and turf pesticide applicator's exam (Category 3)

Landscape Horticulturist License Examination

P 1322 Establish and Manage Your Lawn

VALIDATION

Course Number and Name: **HLT 2824 Irrigation and Lighting Systems**

Description: This course is designed to investigate the types of irrigation and lighting systems. Discussion will include the installation and maintenance of these systems.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	2	4	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe the basic components of an irrigation system
   a. Discuss the past, present, and future types of irrigation systems
   b. Describe the basic components such as sprinkler heads, controllers, fitting, emitters, valves, back flow devices, and pipe
2. Describe and discuss the general design of an irrigation system
   a. Differentiate between commercial and residential irrigation systems
   b. Determine the correct location of the sprinkler head/emitters for even water distribution
   c. Calculate the correct pipe sizes to reduce friction loss
   d. Compare the efficiencies of spray, rotary, and impact drive heads
   e. Explain static pressure, working pressure, surge pressure, velocity, and friction loss on a simple irrigation system
   f. Determine watering time needed per week depending on type of irrigation system and soil type
3. Calculate the cost estimate of a simple irrigation system
   a. Determine the price of the irrigation components from the information supplied
   b. Determine the cost estimate for installation of the irrigation system to include labor, equipment, supplies, and contingencies
4. Describe the methods and procedures to follow in the installation of an irrigation system
   a. Explain the laying out of an irrigation system to include the tools and equipment necessary
   b. Describe the installation process including pipe fitting, starting and finishing points, system testing, and cleanup
5. Discuss the procedures to follow and the equipment to be used in maintaining and troubleshooting an irrigation system
   a. Explain the process to follow when locating hydraulic leaks and electrical or mechanical failure
   b. Identify and use the equipment necessary to maintain an electrical or hydraulic sprinkler system
6. Describe the types and basic components of outdoor lighting
   a. Discuss uses of landscape lighting
   b. Identify and discuss basic components of an outdoor lighting system
7. Discuss the design of a lighting system
   a. Differentiate between residential and commercial lighting systems
   b. Differentiate between low-voltage and high-voltage lighting systems and the installation process for each
   c. Discuss automated and manual systems
   d. Calculate wiring to install a lighting system
   e. Install an outdoor lighting system
8. Calculate a cost estimate of an outdoor lighting system
   a. Determine a component cost of a lighting system
   b. Determine an estimate for installation to include labor, materials, and contingencies

VALIDATION

9. Describe methods in the installation of an outdoor lighting system
    a. Discuss the layout of a lighting system to include tools and equipment necessary
    b. Describe the installation process of the lighting system to include wiring, starting and finishing points, system testing, and cleanup
10. Discuss the procedures to follow and the equipment to be used in maintaining a lighting system

VALIDATION

Course Number and Name: **HLT 1323 Plant Science**

Description: A course to provide information related to the growth, nutrition, and general culture of agricultural and horticultural crops. It includes instruction on photosynthesis and transpiration, plant nutrition, pest control, and reproduction.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	3	60
3	1	4	75

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe the interrelationship of the major parts of a plant and how they have adapted to the environment
    a. Describe the interrelationship of plant roots, stems, and leaves and how they have adapted to the environment
2. Identify the components of a typical plant cell, and describe their function(s)
    a. Identify the structure and function of each plant cell organelle
    b. Describe the different tissue systems of plants
3. Describe the processes and interrelationship of photosynthesis and respiration in green plants
    a. Explain the effects of temperature, light, water, and air on green plants
    b. Discuss the translocation of water from the roots to the leaves
4. Describe the methods of weed, insect, and plant disease control
    a. Describe different methods of pest control (chemical, mechanical, cultural, and biological)
    b. Identify the different types of plant pests
    c. Describe the damage caused by agricultural crop pests
5. Describe the genetics of plant breeding
    a. Describe the advantages and disadvantages of sexual and asexual reproduction
    b. Describe the creation of new varieties through plant breeding (hybrids)
6. Explain the nutritional requirements for plants
    a. Describe the functions of micronutrients and macronutrients in plants
    b. Compare the advantages and disadvantages of chemical and organic fertilizers

VALIDATION

Course Number and Name: **HLT 2333 Basic Soils**

Description: A course to introduce students to the general principles of soil conservation and safe use. It includes instruction in the soil formation process, properties of soils, soil texture, and soil management for optimum safe use. Note: AGR 2314 Basic Soils may be substituted for this course.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	2	4	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe the soil formation process
   a. Describe the chemical and biological properties of soils
   b. Discuss the different types of erosion.
   c. Identify the horizons of a soil profile
2. Describe the different physical properties of soils
   a. Define the term soil texture, and relate texture to productivity and management
   b. Classify soils as to general textural class
   c. Describe the effects of soil texture, structure, permeability, and compaction/tilth on soil productivity
3. Develop soil management strategies for sustaining soil productivity
   a. Define and contrast the terms fertility and productivity as applied to a soil
   b. Describe the effects of tillage and traffic as related to soil structure and productivity
   c. Describe how soil pH affects plant growth and nutrient availability, and state methods that can be used to raise or lower pH
4. Describe the properties of soil water
   a. Define the relationship between soil type and water holding capacity
   b. Discuss the need for water conservation
   c. Describe the mechanics of soil drainage (man-made and natural)
   d. Compare the advantages and disadvantages of different types of irrigation systems

VALIDATION

Course Number and Name: **HLT 291 (1-3) Special Problem in Horticulture Cluster**

Description: This course is designed to provide the student with practical application of skills and knowledge gained in other career-technical courses. The instructor works closely with the student to ensure that the selection of a project will enhance the student's learning experience.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
1	0	2	30
2	0	4	60
3	0	6	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Prepare a written agreement
   a. Compile a written training agreement in cooperation with the instructor and student that details a work schedule and specific tasks/skills to be mastered in the program
2. Prepare a written report of activities
   a. Compile a daily log of activities and tasks
   b. Submit weekly reports summarizing activities and tasks completed to the instructor
   c. Submit a final report of activities and experiences
3. Follow written guidelines for work experience programs
   a. Complete all required activities in the training agreement
   b. Adhere to all written and oral instructions for the supervised experience

VALIDATION

Course Number and Name: **HLT 292(1-6) Supervised Work Experience in Horticulture Cluster**

Description: This course is a cooperative program between industry and education and it designed to integrate the student's technical studies with industrial experience. Variable credit is awarded on the basis of 1 semester hour per 45 industrial contact hours.

Hour Breakdown:

Semester Credit Hours	Externship	Contact Hours
1	3	45
2	6	90
3	9	135
4	12	180
5	15	225
6	18	270

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Apply technical skills needed to be a viable member of the workforce
    a. Prepare a description of technical skills to be developed in the supervised work experience
    b. Develop technical skills needed to be a viable member of the workforce
2. Apply skills developed in other program area courses
    a. Perform skills developed in other program area courses
3. Apply human relationship skills
    a. Use proactive human relationship skills in the supervised work experience
4. Apply and practice positive work habits and responsibilities
    a. Perform assignments to develop work habits and responsibilities
5. Work with the instructor and employer to develop written occupational objectives to be accomplished
    a. Perform written occupational objectives in the supervised work experience
6. Assess accomplishment of objectives
    a. Prepare daily written assessment of accomplishment of objectives
    b. Present weekly written reports of activities performed and objectives accomplished to the instructor
7. Utilize a set of written guidelines for the supervised work experience
    a. Develop and follow a set of written guidelines for the supervised work experience

VALIDATION

Course Number and Name: **GTT 1614/HLT 1614 Golf Course Equipment Operation and Maintenance/ Landscape Equipment Operation and Maintenance**

Description: This course aims to provide instruction and practice in the safe and proper operation and maintenance of golf course equipment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	2	4	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Demonstrate proper maintenance, handling, and storage of landscape and turf equipment and supplies
   a. Identify power equipment used in landscaping, and describe their function or use
   b. Describe storage procedures for power tools and supplies
   c. Use an operator's manual to determine maintenance and storage procedures, fuel and lubricant specifications, and operating procedures for a specific piece of equipment
2. Describe basic first aid and safety precautions for using landscape maintenance equipment
   a. Describe basic first aid procedures for treating shock, heat stroke, cuts, burns, poisoning, and so forth
   b. Describe safety precautions to be followed in working with landscape and turf equipment and supplies
3. Demonstrate safe and proper operation of landscape and turf equipment and supplies
   a. Demonstrate the ability to properly and safely operate the following equipment: mowers, string trimmer, edger, chain saw, hedge trimmer, blowers, backpack sprayer, tiller, spreader, tractors, box blade, front-end loader, spray rigs, and so forth
   b. Demonstrate the ability to properly and safely use landscape and turf supplies
   c. Load, secure, and transport equipment and supplies safely
4. Demonstrate maintenance of two- and four-stroke gasoline engines
   a. Differentiate between two-stroke and four-stroke gasoline engines
   b. Perform owner–operator maintenance on a two-stroke and four-stroke engine to include mixing oil and fuel, servicing air filters, replacing spark plugs, and so forth
5. Explain a working knowledge of small engine nomenclature, function, and purpose
   a. Demonstrate the ability to perform repairs on equipment in the field and troubleshooting as needed

VALIDATION

Course Number and Name: **GTT 2313 Golf Course Business Management**

Description: A course to provide instruction and practice regarding the management of a golf course operation, this course includes instruction in estimating and bidding; personnel management and supervision; and business practices.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	3	0	45

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Discuss entrepreneurship opportunities in the golf industry
    a. Describe factors to consider in making a decision to open a business
    b. State sources and procedures for funding a small business
    c. Describe the advantages and disadvantages of the different forms of business ownership
2. Describe procedures and techniques for hiring and retaining employees
    a. Discuss methods for training employees
    b. Describe factors related to employer–employee relationships including insurance, wages and benefits, withholding taxes, performance evaluation, employer liability, and terminations
    c. Examine laws and regulatory agencies relating to hiring migratory and immigrant labor
    d. Describe the uses of records in managing a golf course
3. Describe the steps in purchasing equipment and materials
    a. Interpret specifications and working drawings
    b. Calculate estimates for purchasing process
    c. Develop a contract for a specific job that includes the following essential elements: working drawings and specifics, general and specific conditions, and methods of payment
    d. Develop a work schedule for a golf course
4. Develop evaluation tools to assess job performance
    a. Write a job description for a specific area of employment on a golf course staff
    b. Develop skill sheets for the different golf course maintenance operations to evaluate employee performance
5. Discuss and perform common turfgrass calculations

VALIDATION

Course Number and Name: **GTT 2813 Turfgrass Management for Golf Courses**

Description: This course aims to provide instruction and practice in the identification, selection, installation, and management /maintenance of turfgrass for golf courses.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Discuss the role of turfgrass and its importance in the golf course industry
   a. Discuss the role of turfgrass in golf course management
   b. Describe the role of the turfgrass manager
   c. Identify the different types of turfgrasses, and discuss their classification, growth habits, advantages, and disadvantages
   d. Identify different types of mowing equipment, and describe the uses and limitations of each type
   e. Describe the role of sod farming in the golf course industry
2. Describe the steps to establish turfgrass
   a. Associate soil types and soil modification techniques with management of different turfgrasses
   b. Discuss the advantages and disadvantages of the different methods of turfgrass establishments
   c. Establish turfgrasses by seeding, plugging, sprigging, and sodding
   d. Calculate the proper amount and apply fertilizer and other amendments to meet soil test requirements for fertility and pH adjustment
3. Describe the maintenance procedures to manage a healthy turf. Block 20
   a. Plan fertilization programs and application schedules for different turfgrasses and modified soils versus native soils
   b. Discuss factors to consider in planning a mowing program for different turfgrasses including frequency of mowing and mower height for tees, greens, fairways, and roughs
   c. Discuss and draw a mowing schedule for golf greens relating to direction of daily cut
   d. Discuss irrigation needs of turf and signs that indicate when irrigation is needed
   e. Describe and demonstrate cultural practices of turfgrass management including dethatching, aeration, top dressing, vertical cutting, and brushing
4. Discuss golf course design and management
   a. Discuss the basic design and layout procedures of a golf course
   b. Discuss and demonstrate maintenance practices for greens, tees, fairways, bunkers, and roughs
5. Discuss soil modification for athletic fields and golf courses
   a. Discuss complete soil modification
   b. Discuss partial soil modification
   c. Discuss nutrient management of both modified and partial modified soils
6. Discuss the management practices that affect the speed of play
   a. Discuss sequence of events prior to a golf tournament
   b. Discuss cultural practices relating to turfgrass and their effects on putting speed
7. Describe over seeding choices for golf courses
   a. Identify the grass species used for golf course over seeding
   b. Describe techniques for over seeding success on golf courses and sports turf
   c. Identify alternatives and hazards for over seeding grasses

8. Discuss turfgrass stresses
    a. Explain what agents cause stress to grasses
    b. Explain how stress can affect grasses
    c. Discuss ways to manage and produce turfgrass stresses
9. Discuss turfgrass pests and methods to scout for pests

VALIDATION

Course Number and Name: **GTT 2824 Irrigation Systems: Design and Maintenance**

Description: This course is designed to investigate the types of irrigation systems. Discussion will include the installation and maintenance of these systems.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	2	4	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe the basic components of an irrigation system
    a. Discuss the past, present, and future types of irrigation systems
    b. Describe the basic components such as sprinkler heads, controllers, fitting, emitters, valve, back flow devices, and pipe
2. Describe and discuss the general design of an irrigation system
    a. Differentiate between commercial and residential irrigation systems
    b. Determine the correct location of the sprinkler head/emitters for even water distribution
    c. Calculate the correct pipe sizes to reduce friction loss
    d. Compare the efficiencies of spray, rotary, and impact drive heads
    e. Explain static pressure, working pressure, surge pressure, velocity, and friction loss on a simple irrigation system
    f. Determine watering time needed per week depending on type of irrigation system and soil type
3. Calculate the cost estimate of a simple irrigation system
    a. Determine the price of the irrigation components from the information supplied
    b. Determine the cost estimate for installation of the irrigation system to include labor, equipment, supplies, and contingencies
4. Describe the methods and procedures to follow in the installation of an irrigation system
    a. Explain the layout of an irrigation system to include the tools and equipment necessary
    b. Describe the installation process including pipe fitting, starting and finishing points, system testing, and cleanup
5. Discuss the procedures to follow and the equipment to be used in maintaining and troubleshooting an irrigation system
    a. Explain the process to follow when locating hydraulic leaks and electrical or mechanical failure
    b. Identify and use the equipment necessary to maintain an electrical or hydraulic sprinkler system
6. Discuss different types of pumping stations for golf courses
7. Discuss water quality issues for golf courses

Appendix A: RECOMMENDED TOOLS AND EQUIPMENT

CAPITALIZED ITEMS

1. Plant Presses (12 per program)
2. Plant Collection Strage Unit (4 per program)
3. Blue Print Machine with Ammonia Filter Unit (1 per program)
4. Sprayer Boom Type, Trailer Mount with 100-gal. Tank (1 per program)
5. Color Multi-Pin Plotter
6. Electronic Planimeter (3 per program)
7. Measuring Wheel (3 per program)
8. Stereoscopes without Camera Capabilities (6 per program)
9. Network microcomputer lab server -20 stations to include the following:
   Multimedica computer with CD/DVD-RW, speakers, sound card, internal modem, USB
   Port for jump drive (1 per workstation)
   Network Color Laser Printer (1 per lab)
   Network Inkjet Printer (3 per lab)
   Network Scanner, Color Page (1 per lab)
   Internet Access
10. Data Projector with Screen (1 per lab)
11. Digital Visual Presenter (1per lab)
12. Digital Video Camera (1 per lab)
13. Digital Camera (1 per lab)
14. Commercial Soil Mixer
15. Germination Chamber
16. Tractor, minimum 26 HP (1 per program)
17. Utility Vehicle (1 per program)
18. Box Blade for Tractor (1 per program)
19. Front-End Loader (1 per program)
20. 48-in. Grooming Mover Attachment for Tractor (1 per program)
21. 48-in. Reel Riding Mower (1 per program)
22. 48-in. Rotary Riding Mower (1 per program)
23. Zero-Turn Mower (1 per program)
24. Walk- Behind Reel Mower (1 per program)
25. Walk-Behind Rotary/Self-Propelled, 36 in. (1 per program)
26. Commercial String Trimmer (6 per program)
27. Commericial Stick Edger (4 per program)
28. Commericial Backpack Blower (4 per program)
29. Walk-Behind Power Bed Edger (1 per program)
30. Spreaders, Tractor Mount (1 per program)
31. Top Dresser, Self-Contained (1 per program)
32. Aeratory, Self-Propelled (1 per program)
33. Sod Cutter (1 per program)
34. De-Thatcher (1 per program)
35. Verti- Cutter (1 per program)
36. Truck, V-8, Club Cab, Automatic, Dump Bed, Box Hitch, 1-Ton Min (1 per program)
37. Trailer, Double Axle, 16-ft with Ramp (1 per program)
38. Sod Roller, Water Fill (1 per program)
39. Full Set of Metric Mechanis Tools, 500 piece (1 per program
40. Full Set of Standard Mechanics Tools, 500 piece (1 per program)
41. Bench Work Tables, Wood/ Steel Tops (6 per program)
42. Lapping Machine Sharpener for Reel Mower (2 per program)
43. Shower Area for Containment of Chemicals (1 per program)

44. Ball Carts (2 per program)
45. Tree Carts (2 per program)
46. Nursery Carts (4 per program)
47. Tree Slings, Large and Small (1 each per program)
48. Welders Arc Welder (2 per program)
49. Cutting Torches (1 per program)
50. 50-gal Air Compressor/ Industrial Hose and Attachment (1 per program)
51. Tiller, Rear Tine (1 per program)
52. Tiller, Front Tine (3 per program)
53. Chain Saw (1 per program)
54. Gas- Powered Hedge Trimmer (1 per program)
55. Parts Washer (1 per program)
56. Aerator- Tractor Mounted (1 per program)
57. Floor Model Drill Press (1 per program)
58. Grinder Reel (1 per program)
59. Bed Knife Grinder (1 per program)
60. Laser Leveling System
61. Fertilizers Proportioner
62. Vibratory Plate
63. Vibratory Tamp
64. Convection Oven
65. Chipper/ shredder

NON-CAPITALIZED ITEMS

1. Five-Drawer Flat File Storage (2 per program)
2. Drafting Table, 36-in. by 48 in. min (20 per program)
3. Parallel Bars, 48 in (20 per program)
4. Board Cover, 36 in by 48 in (20 per program)
5. Architect Drafting Table Lights (20 per program)
6. Drafting Chairs (20 per program)
7. Complete Drafting set (1 per program)
8. Electric Eraser (1 per program)
9. Insect Boxes (15 per program)
10. Spreading Boards (15 per program)
11. Tripod for Camera (1 per program)
12. Riker Mount, Various Sixes (100 per program)
13. Insect Nets (12 per program)
14. Scale: 25-lb Capabilities, Metric and Standard Weighing Scale (1 per program)
15. Sprayer, Backpack with Agitator (6 per program)
16. Sprayer Siphon/ Hose On 4 per program)
17. Markers (150 per program)
18. Colored Pencils (150 per program)
19. Tape Measure, 25 ft by 1 in Steel Tape (12 per program)
20. Tape Measure, 100 Fiberglass (6 per program)
21. Tape Measure, 200 Fiberglass (6 per program)
22. Tripod for Level (1 per program)
23. Philadelphia Rod, 1/10ths (1 per program)
24. Paint Stick, Long (2 per program)
25. Paint Stick, Short (2 per program)
26. Marking Paint (2 cases per program)
27. Measuring Cups Assorted Sixes in Plastic Glass, and Stainless (24 per program)
28. Beakers, Various Sizes (24 sets per program)
29. Measuring Spoons, Various Sixes (24 set per program)
30. Handheld Blower (2 per program)

31. Push Brooms with Extra Handles (6 per program)
32. Garden Hoses of Various Sizes (12 per program)
33. Spreaders, Cyclone/ Broadcast (3 per program)
34. Spreaders, Drop Spreaders (1 per program)
35. 40- ft Chain (1 per program)
36. Ratchet Straps (12 per program)
37. Manual Grease Gun (3 per program)
38. Tool Boxes, Lockable with Casters (2per program)
39. Bench Grinders, ¾ HP (2 per program)
40. Bench Vise (6 per program)
41. Deep stainless steel sink for equipment wash- up and floral design (4 per program)
42. Shovel, Round Point (12 per program)
43. Shovel, Square Point (6 per program)
44. Leaf Rake (12 per program)
45. Bow Rake (12 per program)
46. Landscape Rake, 36 in (4 per program)
47. Landscape Rake, 24 in (4 per program)
48. Water Wands (6 per program)
49. Sprinkler, Various Types and Sizes (6 per program)
50. Nozzles, Various Types and Sizes (6 per program)
51. Tamps (2 per program)
52. Wheel Barrow, Steel Tray/ Plastic Tray (6 per program)
53. Complete Soil Test Kit (4 per program)
54. Soil Sample (6 per program)
55. Soil Augers, 1 Power and 2 Manual (3 per program)
56. PH Meter and Soil Probe (6 per program)
57. Soil Electro- Conductivity Meter
58. Pneumatic wrenches, Full Set (1 per program
59. Air Tank, Portable (1 per program)
60. Gas Cans, 22 gal. (12 per program)
61. Concrete Hoe (2 per program)
62. Mattock , Cutting and Digging (2 per program)
63. Railroad Pick (1 per program)
64. Hand Saw (1 per program)
65. Pruning Shears (12 per program)
66. Loppers (6 per program)
67. Pole Pruner (4 per program)
68. Fertilizer Probe (6 per program)
69. Ladder, 24 ft. Extension (1 per program)
70. Ladder, Step (8ft) (2 per program)
71. First Aid Kit (2 per program)
72. Drill, 2 –in. Reversible (2 per program)
73. Disc Grinder, Portable (4 in.) (2 per program)
74. Voltage Meter (1 per program)
75. Short Indicator/ Finder (1 per program)
76. Compression Coupling Wrenches (2 per program)
77. Wire Cutter/ Stripper (6 per program)
78. Valve Wrenches 4 ft. (4 per program)
79. Trenching Shovels (4 per program)
80. Water Key (12 per program)
81. Zurn Key (2 per program)
82. Spades (8 per program)
83. Scoops (4 per program)

84. Circular Saw (1 per program)
85. Compound Miter Saw (2 per program)
86. 1 in Jig Saw (1 per program)
87. 3-in. Belt Sander (1 per program)
88. Finishing Sander (1 per program)
89. Hand Pruners (16 per program)
90. 4-ft. Level (2 per program)
91. Climbing Saddles (4 per program)
92. Safety Lanyard (4 per program)
93. Rope, Climbing (500 ft) (1 per program)
94. Graduated Cylinders (11) (24 per program)

CAPITALIZED EQUIPMENT (GOLF/RECREATIONAL TURF PROGRAM

1. Triplex Green Mover
2. Fairway Reel Mover
3. Global Positioning System Receiver
4. Flow Meter
5. Irrigation System
6. Surface Sweeper

NON –CAPITALIZED ITEMS

1. Stamp Meter

RECOMMENDED INSTRUCTIONAL AIDS

It is recommended that instructors have access to the following items:

1. Flat Screen TV Monitor (1)
2. VCR/DVD Player (1)
3. Computer Software for:
    1. Landscape Design and Estimating
    2. Irrigation Design and Estimating
    3. Words Processing
    4. Spread Sheets
    5. Plant Materials
    6. Greenhouse
    7. Crop Estimating
    8. Accounting
    9. Landscape Maintenance
4. Copier (1)
5. Fax Machine (1)

APPENDIX B: CURRICULUM DEFINITIONS AND TERMS

- Course Name – A common name that will be used by all community colleges in reporting students

- Course Abbreviation – A common abbreviation that will be used by all community and junior colleges in reporting students

- Classification – Courses may be classified as the following:
    - Career Certificate Required Course – A required course for all students completing a career certificate.
    - Technical Certificate Required Course – A required course for all students completing a technical certificate.
    - Technical Elective – Elective courses that are available for colleges to offer to students.

- Description – A short narrative that includes the major purpose(s) of the course

- Prerequisites – A listing of any courses that must be taken prior to or on enrollment in the course

- Corequisites – A listing of courses that may be taken while enrolled in the course

- Student Learning Outcomes – A listing of the student outcomes (major concepts and performances) that will enable students to demonstrate mastery of these competencies

The following guidelines were used in developing the program(s) in this document and should be considered in compiling and revising course syllabi and daily lesson plans at the local level:

- The content of the courses in this document reflects approximately 75% of the time allocated to each course. The remaining 25% of each course should be developed at the local district level and may reflect the following:
    - Additional competencies and objectives within the course related to topics not found in the state framework, including activities related to specific needs of industries in the community college district
    - Activities that develop a higher level of mastery on the existing competencies and suggested objectives
    - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed or revised
    - Activities that include integration of academic and career–technical skills and course work, school-to-work transition activities, and articulation of secondary and postsecondary career–technical programs
    - Individualized learning activities, including work-site learning activities, to better prepare individuals in the courses for their chosen occupational areas

- Sequencing of the course within a program is left to the discretion of the local college. Naturally, foundation courses related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other courses related to specific skill areas and related academics, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors. Programs that offer an Associate of Applied Science Degree must include all of the required Career Certificate

courses, Technical Certificate courses **AND** a minimum of 15 semester hours of General Education Core Courses. The courses in the General Education Core may be spaced out over the entire length of the program so that students complete some academic and Career Technical courses each semester. Each community college specifies the actual courses that are required to meet the General Education Core Requirements for the Associate of Applied Science Degree at their college.

- In order to provide flexibility within the districts, individual courses within a framework may be customized by doing the following:

    - Adding new student learning outcomes to complement the existing competencies and suggested objectives in the program framework
    - Revising or extending the student learning outcomes
    - Adjusting the semester credit hours of a course to be up 1 hour or down 1 hour (after informing the Mississippi Community College Board [MCCB] of the change)

Appendix C: COURSE CROSSWALK

Course Crosswalk Horticulture Cluster CIP 01.0601 – Horticulture Service Operations and Management CIP 01.0605 Landscaping CIP 01.0607 Turf Management					
Note: Courses that have been added or changed in the 2017 curriculum are highlighted.					
Existing			**Revised**		
2010 MS Curriculum Framework			**2017 MS Curriculum Framework**		
Course Number	**Course Title**	**Hours**	**Course Number**	**Course Title**	**Hours**
HLT 1113	Plant Materials I	3	HLT 1113	Plant Materials I	3
HLT 1123	Plant Materials II	3	HLT 1123	Plant Materials II	3
HLT 1213	Applied Principles of Plant Propagation	3	HLT 1213	Applied Principles of Plant Propagation	3
HLT 1222	Green Industry Seminar	2	HLT 1222	Green Industry Seminar	2
HLT 1313	Greenhouse and Nursery Production I	3	HLT 1313	Greenhouse and Nursery Production I	3
HLT 1411 HLT 1421 HLT 1431 HLT 1441	Leadership Management	1	HLT 1411	Leadership Management I	1
			HLT 1421	Leadership Management II	1
			HLT 1431	Leadership Management III	1
			HLT 1441	Leadership Management IV	1
HLT 1513	Landscape Design I	3	HLT 1513	Landscape Design I	3
HLT 1614	Landscape Equipment Operation and Maintenance	4	HLT 1614	Landscape Equipment Operation	4
HLT 2113	Turfgrass Management	3	HLT 2113	Turfgrass Management	3
HLT 2124	Landscape Maintenance and Weed Control	4	HLT 2124	Landscape Management and Weed Control	4
HLT 2133	Entomology	3	HLT 2133	Deleted	
HLT 2143	Plant Pathology	3	HLT 2143	Deleted	
HLT 2313	Landscape Business Manager	3	HLT 2313	Landscape Business Manager	3
HLT 2323	Greenhouse and Nursery Production II	3	HLT 2323	Greenhouse and Nursery Production II	3
HLT 2413	Floral Design	3	HLT 2413	Floral Design	3
HLT 2423	Advanced Floral Design	3	HLT 2423	Advanced Floral Design	3
HLT 2513	Garden Center Management	3	HLT 2513	Garden Center Management	3
HLT 2523	Landscape Design II	3	HLT 2523	Landscape Design II	3
HLT 2713	Landscape Construction	3	HLT 2713	Landscape Construction	3
HLT 2724	Integrated Production Systems	4	HLT 2724	Deleted	
HLT 2734	Water Garden Design	4	HLT 2734	Deleted	

VALIDATION

HLT 2744	Aquarium and Water Garden Production	4	HLT 2744	Deleted	
HLT 2813	Ornamental and Turf Pest Management	3	HLT 2813	Ornamental and Turf Pest Management	3
			HLT 1323	Plant Science	3
			HLT 2333	Soil Science	3
HLT 2824	Irrigation and Light Systems	4	HLT 2824	Irrigation and Light Systems	4
HLT 291 (1-3)	Special Problem in Horticulture	1-3	HLT 291 (1-3)	Special Problem in Horticulture	1-3
HLT 292 (1-6)	Supervised Work Experience in Horticulture Cluster	1-6	HLT 292 (1-6)	Supervised Work Experience in Horticulture Cluster	1-6
GTT 1614	Golf Course Equipment Operation and Maintenance	4	GTT 1614	Golf Course Equipment Operation	4
GTT2313	Golf Course Business Management	3	GTT2313	Golf Course Business Management	3
GTT 2813	Turfgrass Management for Golf Courses	3	GTT 2813	Turfgrass Management for Golf Courses	3
GTT2824	Irrigation Systems: Design and Maintenance	4	GTT2824	Irrigation Systems: Design and Maintenance	4