

**HLTSBS Program Assessment Report
Horticulture Department
University of Arkansas
Academic Year 2024-2025**

Department of Horticulture

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Department Mission

The mission of the Department of Horticulture at The University of Arkansas is to conduct applied and basic research and support and enhance the Arkansas horticulture industries and to conduct high quality teaching and student research programs leading to B.S., M.S. and Ph.D. degrees in a diverse, equitable, and inclusive environment. Our department head and dedicated faculty and staff have set specific goals for executing our mission.

Program Goals

The goal of the Department of Horticulture is to serve the people of Arkansas and assist the nation and the world through education, research, and service. Through dedicated teaching, pursuit of knowledge and interaction with society, we seek to improve our contributions to general welfare. The Department of Horticulture has, as perhaps no other department, a goal to create quality of life for all citizens – economic, aesthetic, and social well-being by educating students in horticultural and turfgrass sciences, conducting research that makes a difference, and to communicate those findings to industry and the public.

General Learning Outcomes Being Assessed in This Report:

Written Communication Skills – Written communication is the development of ideas in writing. Written communication involves learning to work in many genres and styles. Written communication abilities develop through iterative experiences across the curriculum.

Oral Communication Skills - Oral communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.

Critical Thinking Skills – The comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

Horticulture Specific Skills - Appreciate and communicate the diverse impacts of horticulture on people and culture.

Assessment Measures for General Skills:

Student Learning Outcome – Written Communication

- (1) Achievement will be assessed using a written communication rubric on the required reflective essay where the student has reflected on the impact of previous course work on preparation for the internship experience.
- (2) This is a direct measure of student learning.

Student Learning Outcome – Oral Communication.

- (1) Achievement will be assessed using an oral communication rubric during oral presentations where the student has compiled and evaluated the scientific literature as part of a class project and/or completed an independent research project as part of a special problems, research project or internship class.
- (2) This is a direct measure of student learning.

Student Learning Outcome – Critical Thinking Skills

- (1) Achievement will be measured using critical thinking VALUE rubric included in the department assessment plan.
- (2) This is a direct measure of student learning.

Assessment Measures for Discipline Specific Skills:

Discipline Specific Skills Student Learning Outcome 4: Appreciate and communicate the diverse impact of horticulture on people. See attachment 4, Table 5. Benchmarks for achieving discipline specific skills.

Goal 1: Describe the various ways plants impact human well-being (mental, psychological, and restorative, physical, medicinal).

Goal 2: Describe and assess the influence of plants and their management on environmental sustainability, habitat restoration or low-impact development.

Goal 3: Quantify the economic importance of horticultural food crops in food systems.

Goal 4: Describe the social, spiritual, and cultural importance of plants to historical and contemporary communities.

Goal 5: Understand the connection between plants and diverse peoples for food, fiber, medicinal, and spiritual-faith systems.

Methodology:

For this report two courses are assessed. HORT 31103 Herbaceous and Indoor Plants (3 hr spring semester) and HORT 4720V (2 hrs.) HTLS Internship Assessment. HORT 31103 is a horticulture elective. The course covers a wide range of plant material including annual bedding plants, perennials, herbs, spices, plants for green roofs and interiorscapes and recommended for students focusing on ornamental and landscape horticulture. HORT 4720V is the assessment component of our capstone course composed of upper-level students, normally seniors within their last two semesters of completing their degree. This course is the assessment part of the required 3-hour internship requirement with the other course being HORT 4602V which is the internship experience component.

HORT 4720V Internship Assessment course meets the general education learning outcome (GELO) 6.1 requirement for the university student learning outcome (SLO) assessment plan and was assessed using the General Skills Student Learning Outcomes 1: Written Communication Skills, 2: Oral Communication Skills, and 3: Critical Thinking Skills. Data were used from the fall 2024-2025 academic year. At the end of the semester, each student was given an assessment ranking from 0 to 4 and was entered into a General Education Learning Outcome (GELO) column in the course Blackboard site as per university reporting requirements.

HORT 31103 Herbaceous and Indoor Plants was assessed using the Student Learning Outcomes 1: Written Communication Skills and 3: Critical Thinking Skills under the sub-category Discipline Specific Skills for horticulture. Data were used from the spring semester of the 2024-2025 academic year.

Written Communication Component Assessed:

HORT 4720V HLTS Internship Assessment: This course underwent a major restructuring in the fall of 2024. The class met weekly as a cohort and was split out of the normal internship student presentations traditionally given during the regularly scheduled weekly department seminar series. Two reasons necessitated this change. The first was an increase in the number of students who completed the internship experience in the summer of 2024 and were enrolled in HORT 4720V. This increase in students going out on internship experiences is expected to continue in the future. Twenty-eight students were too numerous to work into the normal department seminar series. The second reason was the result of an action plan submitted in last year's assessment report to focus on enhancing student presentation preparation and career development at the terminal stage of a student's academic tenure. The instructors (McDonald and Wisdom) delivered instructional content, and the students were required to submit written assigned activities in conjunction with their final formal oral presentation. Data are reported in Table 1. Specific recommendations will be incorporated into the Summary of Findings section of this report.

HORT 31103 Herbaceous and Indoor Plants: Students were expected to learn and correctly write out the scientific (Latin) names of around 150 plant species. The students had to correctly spell and punctuate the names to reflect botanical nomenclature conventions and systems. The students were assessed weekly on these skills during the lab component.

Oral Communication Skills Assessed:

HORT 4720V HTLS Internship Assessment: Students are required to prepare a professional oral seminar based on their internship experience. The expected duration is 12 minutes of presentation and 3 minutes for questions. Students followed a rubric developed to match the department assessment plan criteria for oral communication skills and critical thinking skills (see Appendix 1). Students were rated by their class cohort. The course instructors also evaluated the students using the same rubric (See Table 1).

Critical Thinking Skills Components Assessed:

HORT 4720V HTLS Internship Assessment: Students are required to apply scientific methods and hypothesis testing to their internship experience and activities. Students were expected to demonstrate competencies in activities related to the internship experience. Students were expected to reflect on their experience and evaluate the effectiveness of the internship experience and the effectiveness of their course work in preparing them for the internship.

HORT 31103 Herbaceous and Indoor Plants: Students are expected to master basic concepts in plant taxonomy and nomenclature to understand how plants are classified and named. Students use critical thinking skills to identify about 150 plants and understand how those plants are cultivated, related and used in differing plant communities in the built environment. Students are assessed on their knowledge gained in critical thinking skills.

Discipline Specific Skills Assessed:

HORT 31103 Herbaceous and Indoor Plants: Students were assessed on Goals 1-5 on the department's Student Learning Outcome Plan for discipline specific skills. See above and Attachment 4, Table 5. Benchmarks for achieving discipline specific skills.

Acceptable and Ideal Targets for General Outcome Skills: Student Learning Outcome - Written Communication.

- (1) Acceptable target: Students must demonstrate skills in the continuum between Milestones 2 and 3 in the student learning outcomes for written communication, oral communications and critical thinking outlined in the rubrics.
- (2) Ideal target: Students will be able to master skills outlined in Level 4 (Capstone) for oral communication.

Acceptable and Ideal Targets for General Outlook Skills: Student Learning Outcome- Oral Communication.

- (1) Acceptable target: Students must demonstrate skills in the continuum between Milestones 2 and 3 in the student learning outcomes for written communication, oral communications and critical thinking outlined in the rubrics.
- (2) Ideal target: Students will be able to master skills outlined in Level 4 (Capstone) for oral communication.

Acceptable and Ideal Targets for the General Outlook Skills: Student Learning Outcome- Critical Thinking Skills.

- (1) Acceptable target: Students must demonstrate skills in the continuum between Milestones 2 and 3 in the student learning outcomes for critical thinking outlined in the rubrics.
- (2) Ideal target: Students will be able to master skills outlined in Level 4 (Capstone) for critical thinking skills.

Acceptable and Ideal Targets for the Discipline Specific Skills: Student Learning Outcome – Horticulture Discipline Specific Skills.

- (1) Acceptable target: At the end of the course, students must demonstrate skills in the continuum between Levels (Milestones) 2 and 3.
- (2) Ideal target: Students will be able to master skills outlined in Levels 4 (Capstone).

Information on Benchmarks and rubrics used is included in Attachments 1-4 at the end of this report.

Summary of Findings:

General Learning Outcomes (GELO 6.1 Capstone) for Written, Oral, and Critical Thinking: HORT 4720V. Twenty-eight students were assessed during the fall 2024 semester. Data are reported in Table 1. All students reached the acceptable benchmark (level 2) on the parameters measured. No student reached the mastery level 4. The assessment rating for oral communication was 2.80 compared to an average rating of 2.85 from the previous assessment period. Written Communication score averaged 2.15 and the critical thinking component averaged 2.65. Overall ratings were slightly lower than the previous assessment. This was attributed to a greater number of students and changes in assessment criteria and expectations from the students. Recommendations are given in the Recommendation/ Action Section.

Horticulture Discipline Specific Skills:

HORT 4720V Internship Assessment: In the fall semester of 2024 twenty-eight students were assessed. Students were assessed on the application of their discipline specific skills to their internship experience. Student performance on the horticulture discipline specific skills was greater than general learning outcomes for written, oral, and critical thinking. Twenty-three students reached benchmark 3 and 4. See Table 2.

HORT 31103 Herbaceous and Indoor Plants: In the spring semester of 2025, twenty-eight students were assessed. Summarized data for HORT 31103 are given in Table 3. Students were assessed on their ability to appreciate and communicate the diverse impacts of horticulture on people and culture. Students overall performed much better on their ability to master discipline specific skills with twenty-five out of twenty-eight reaching benchmark 3 and 4. See Table 3.

Table 1. Overall assessment data covering written, oral, and critical thinking components for student learning outcome scoring data for HORT 4720V Internship Assessment during the fall semester of the 2024-2025 academic year.

Course Assessed: HORT 4720V Internship Assessment	Number of Students Assessed	Overall Average Assessment Score*	Minimum Score Assessed	Maximum Score Assessed
Written Communication Component	28	2.15	1.0	3.3
Oral Communication Component	28	2.85	1.0	3.0
Critical Thinking Component	28	2.65	1.0	3.0

*Average assessment score for this course is the overall course average based on a rubric rating scale of 0 (does not meet the minimum student learning outcome goals for the written, oral, or critical thinking component, or the student failed to present a seminar for assessment) to 4 (mastery of the student learning outcome goals for written, oral, or critical thinking component).

Table 2. Horticulture Discipline Specific Skills student learning outcome scoring data for HORT 4720V Internship Assessment (n= 28 students).

Benchmark Level Distribution	Number of students at this benchmark	Percentage of class at this benchmark
Benchmark 4	10	35.7 %
Benchmark 3	13	46.4 %
Benchmark 2	5	17.8 %
Benchmark 1	0	0 %
Benchmark 0	0	0 %

Percentage assessment score for this course is the overall course average based on a rubric rating scale of 0 (does not meet minimum student learning outcome goals) to 4 (mastery of the student learning goals for discipline specific skills).

Table 3. Horticulture Discipline Specific Skills student learning outcome scoring data for HORT 31103 Herbaceous and Indoor Plants (n= 28 students).

Benchmark Level Distribution	Number of students at this benchmark	Percentage of class at this benchmark
Benchmark 4	15	53.5 %
Benchmark 3	10	35.7 %
Benchmark 2	3	10.7 %
Benchmark 1	0	0 %
Benchmark 0	0	0 %

Percentage assessment score for this course is the overall course average based on a rubric rating scale of 0 (does not meet minimum student learning outcome goals for discipline specific skills) to 4 (mastery of the student learning goals for discipline specific skills).

Recommendations / Actions

HORT4720V Internship Assessment

This course was restructured into a traditional classroom setting whereby the students met at an assigned time as a group. Course content was established with more emphasis on professional development. Since this course was almost ad hoc because of scheduling problems and students not knowing what to expect, there was a learning curve. Overall, the course was successful, and the format and structure will continue going forward. As mentioned, expectations and standards were increased to establish new baseline metrics. Recommendations are that students be required to submit draft presentations and a practice run for class/instructor critique and feedback prior to giving the final formal presentation. Feedback from their peers and the instructor will increase student awareness of expectations and opportunities to address deficiencies in written and oral presentation skills. This may also reduce student anxiety before the formal presentation as they get more comfortable with the course format and addressing their peers in class. The course content will be reviewed and modified as deemed necessary by the instructor.

HORT 31103 Herbaceous and Indoor Plants

Generally, students did very well in this course. A recommendation going forward is to identify students early who are at risk taking weekly plant ID quizzes to attempt to identify causes for poor performance that might be related to dysgraphia or dyslexia conditions as opposed to not devoting time and effort. Since the weekly plant ID quizzes constitute the majority of the points given in this class, identifying at risk students can improve their chances of success in class.

ATTACHMENT 1

Table 2. Oral Communication VALUE Rubric: The definition of oral communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors (*for more information, please contact value@aacu.org*).

	Capstone 4	Milestones		Benchmark 1
		3	2	
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the

	supports the presentation or establishes the presenter's credibility/authority on the topic.	establishes the presenter's credibility/authority on the topic.	establishes the presenter's credibility/authority on the topic.	presentation or establishes the presenter's credibility/authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced, but is not explicitly stated in the presentation.

**Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.*

ATTACHMENT 2

Table 3. Critical Thinking VALUE Rubric: The definition of critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion, and can be demonstrated in assignments that require students to complete analyses of text, data, or issues (*for more information, please contact value@aacu.org*).

	Capstone 4	3	Milestones 2	Benchmark 1
Explanation of issues	Issue/problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown.	Issue/problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective,	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position	Specific position (perspective, thesis/hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/hypothesis) is stated, but is simplistic and obvious.

	thesis/hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/hypothesis).	(perspective, thesis/hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

**Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.*

ATTACHMENT 3

TABLE 4. HORTICULTURE DISCIPLINE SPECIFIC SKILLS RUBRIC: After completing the Horticulture B.S. students will have a technical Knowledge of horticulture, professional skills of communication, leadership, computing, critical thinking, problem solving, business, and analysis, and have perspectives related to horticulture.

Discipline Specific Skills	Level 1	Level 2	Level 3	Level 4
Acquire, integrate, and apply knowledge of plant science to managed systems	Develop working knowledge of multiple sources, including current and older literature, to find, evaluate, organize, and manage information related to horticultural systems.	Demonstrate competence with both laboratory and field-based technologies used in modern horticulture.	Apply concepts of plant biology, systematics, ecology, and genetics to manage and improve plants and their products.	Apply scientific methods to test hypothesis.
Demonstrate interdisciplinary knowledge and competency in managing horticultural system.	Assess soils, soil health, plant fertility, water and site limitations.	Assess potential and evaluate realized interactions with the abiotic and biotic environment in which plants are grown.	Recommend and use appropriate application methods, materials, and diagnostic skills for addressing soil constraints and irrigation, nutrient, stress, and pest management issues.	Apply principles of accounting, business law, labor, marketing and personnel management to a horticultural business and contribute to developing the various components of a business plan.
Synthesize knowledge and use insight and creativity to better understand and improve plant systems.	Anticipate and recognize problems, identify causes of those problems, identify viable solutions to the problems and evaluate actions and consequences of treatments and interventions.	Develop, identify and employ best management practices that lead to sustainable solutions and outcomes.	Understand how global issues including climate change, energy use, water availability, and/or food safety impact on sustainability of horticultural systems locally, regionally and globally.	
Appreciate and communicate the diverse impacts of horticulture on people.	Describe the various ways plants impact human well-being (mental: psychological and restorative; and physiological).	Describe and assess the influence of plants and their management on environmental sustainability habitat restoration or low-impact development. Quantify the economic importance of plants in managed ecosystems and the impact of horticultural crops in food system.	Describe the social, spiritual and cultural importance of plants to historical and contemporary communities of people.	Communicate effectively with various audiences using oral, written and visual presentation skills and multi-media techniques
Demonstrates professionalism and proficiency in skills that relate to horticulture.	Acquire knowledge of a range of cultures, values, and political perspectives relevant for living in a global community.	Demonstrate a high level of personal and social responsibility.	Demonstrate leadership and the ability to collaborate and work in teams.	Plan, engage and learn from actions that demonstrate civic responsibility to community and society. Develop a plan for life-long learning as it relates to career choice and professionalism.

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet Level 1 performance.

ATTACHMENT 4

Table 5. Benchmarks for achieving discipline specific skills.

Modified from: Pritts, M.P. and T. Park. 2013. Proposed Learning Outcomes for Four-year Horticulture Programs in the United States. HortTech. 23(2): 237-240.

Goals	Benchmarks			
	4	3	2	1
Learning outcome 1: Acquire, integrate, and apply knowledge of plant science to managed systems				
Goal 1. Use multiple sources, including current and older literature, to find, evaluate, organize, and manage information related to horticultural systems.	Publish an article on a plant based system with a thorough literature review.	Write a thorough literature review about a specific topic for classroom credit.	Write a term paper utilizing primary resources related to a horticultural topic.	Be able to identify primary and secondary information sources and differentiate between referred and non-referred sources.
Goal 2. Demonstrate competence with both laboratory and field-based technologies used in modern horticulture.	Present research findings at regional or national meetings / competitions.	Participate in faculty directed research programs incorporating laboratory or field technology.	Gain competence operating laboratory/ field technology through internships or work-related activities.	Perform laboratory exercises using laboratory equipment/ technology in horticulture courses.
Goal 3. Apply concepts of plant biology, systematics, ecology, and genetics to manage and improve plants and their products.	Conduct capstone research projects related to genetics, plant breeding, genomics, plant identification, and cultivar performance.	Develop a plant selection guide for use in specific horticultural systems as part of an in-class assignment.	Complete courses in fruit/vegetable crops, or landscape/ turf management and understand the selection and appropriate use of plant species or cultivars unique to those courses.	Complete at least one course in plant identification, taxonomy/systematics or genetics.
Goal 4. Apply scientific methods to test hypotheses.	Write, submit to peer or instructor evaluation, defend, a capstone research thesis. Give a public presentation of the work.	Write a research proposal and conduct a research project leading to a published or presented paper.	Write a research proposal and conduct a research project leading to a summary paper as a special topic.	Conduct classroom laboratory experiments with hypothesis testing, data collection and analysis and conclusions.
Learning outcome 2: Demonstrate interdisciplinary knowledge and competency in managing horticultural systems				
Goal 1. Assess soils, soil health, plant fertility, water, and site limitations.	Conduct capstone or special problems research related to soil-plant interaction, plant nutrition, plant-water relations including abiotic	Participate in projects related to landscape management, or crop production practices. Internship focus on soil management, soil	Complete classes that include site analysis and management for crop production systems. Complete classes in landscape planning	Complete a soil science or soil physics course.

Goals	Benchmarks			
	4	3	2	1
	stress on site management.	fertility, site assessment and design, or irrigation management.	and landscape/turf management which includes site assessment.	
Goal 2. Assess potential and evaluate realized interactions with the abiotic and biotic environment in which plants are grown	Conduct a capstone or special problems research project focused on plant-pest interactions or abiotic stressors.	Complete assigned classroom projects developing integrated pest management strategies.	Identify key insect pests and diseases associated with limitations to plant growth and development. Identify abiotic factors critical in production and landscape/turf management systems.	Complete principles of horticulture course. Complete courses in entomology, weed science or plant pathology.
Goal 3. Recommend and use appropriate application methods, materials, and diagnostic skills for addressing soil constraints and irrigation, nutrient, stress, and pest management issues	Complete a capstone or special problems research project related to soil management, remediation, landscape management, crop fertility, or pest management.	Participate in an internship focused on substrate/soil or pest management, irrigation design/ installation or product testing and sales.	Complete classroom projects in soil/substrate management, soil fertility and applying fertilizers, irrigation design and management, plant protection strategies and schedules.	Complete classes in principles of horticulture, soil science, soil fertility, entomology, weed science, or plant pathology. Student complete class in landscape management, greenhouse management, fruit production or vegetable production.
Goal 4. Apply principles of accounting, business law, labor, marketing, and personnel management to a horticultural business and contribute to developing the various components of a business plan.	Conduct a capstone or special problems research project developing a business plan for a start-up horticultural enterprise.	Conduct classroom projects related to developing the various components of a business plan.	Understand business models. Develop start-up and financing strategies, personnel management policies, marketing and sales strategies.	Complete courses in business management, business law, finance, marketing or entrepreneurship
Learning outcome 3: Synthesize knowledge and use insight and creativity to better understand and improve plant systems				
Goal 1. Anticipate and recognize problems, identify causes of those problems, quantify potential impacts, analyze options, identify viable solutions to the problems, and evaluate actions and consequences of treatments and interventions	Conduct a capstone or special problems research project related to testing or proposing a management system.	Participate in a service learning activity related to horticulture involving a multi-faceted approach to system management.	Complete classroom assignments related to critical analysis and decision making protocols on production or management systems.	Complete courses in plant pathology, entomology, weed science, soil fertility, landscape/turf management or controlled environments.
Goal 2. Develop, identify, and employ best management	The SUST minor capstone project is a horticulture related	Enroll in and complete the SUST or ENSC minor.	Complete a project or term assignment related	Complete a course related to horticultural or system sustainability.

Goals	Benchmarks			
	4	3	2	1
practices that lead to sustainable solutions and outcomes.	project; project is presented to the department.		to sustainable management plan development; develop a best practices management plan.	
Goal 3. Understand how global issues including climate change, energy use, water availability, and/or food safety impact the sustainability of horticultural systems locally, nationally, and globally.	Complete a SUST capstone project, an honors project, or special topic research project related to climate change, and the FEWS nexus of horticulture production.	Enroll in and complete the SUST or ENSC minor.	Complete a project or term assignment related to the impacts of climate change on horticulture production systems.	Complete a course related to horticultural or system sustainability.
Learning outcome 4. Appreciate and communicate the diverse impacts of horticulture on people				
Goal 1. Describe the various ways plants impact human well-being (mental: psychological and restorative; physical: medicinal and physiological).	Complete a research project investigating the relationship or influence of horticulture on human well-being.	Participate in a service learning project focused on human-plant interaction or recreational or sports fields.	Complete a course in environmental sociology or ethno-horticulture.	Complete a general survey class in horticulture.
Goal 2. Describe and assess the influence of plants and their management on environmental sustainability, habitat restoration or low-impact development (LID).	Complete a capstone project, honors project or special research project related to sustainability, habitat restoration or low-impact development.	Participate in classroom projects focused on sustainable practices and implementation.	Complete a course in environmental restoration, ecosystem assessment or landscape/turf management.	Complete a class assignment or learning module focused on restoration or sustainable practices related to horticulture.
Goal 3. Quantify the economic importance of plants in managed ecosystems and the impact of horticultural crops in food systems.	Complete a capstone project, honors project or special problems course investigating the production and post-harvest economics of a horticultural food crop.	Complete a written or visual presentation comparing and contrasting various worldwide food production systems focusing on horticultural crops.	Complete a course in environmental economics or food and agricultural marketing.	Complete a learning module focused on economically important food crops and associated production and distribution systems.
Goal 4. Describe the social, spiritual, and cultural importance of plants to historical and contemporary communities of people.	Complete and present a capstone, honors or special problems project investigating in role of plants in human culture.	Write a research paper on a specific culture or community and how plant interaction and use affected or influenced that culture.	Complete a learning module on the role of ornamental, spiritual and medicinal plants in early and modern human culture.	Complete a general survey class in horticulture.
Goal 5. Communicate effectively with	Create and publish content on a	Prepare and present horticulturally	Complete a project or term	Complete a communication intensive course.

Goals	Benchmarks			
	4	3	2	1
various audiences using oral, written, and visual presentation skills, and contemporary networking/social media technologies.	horticulture related topic using digital media.	related content at a professional or industry meeting/conference.	assignment which is presented orally, written or through digital media.	
Learning outcome 5. Demonstrate professionalism and proficiency in skills that relate to horticulture				
Goal 1. Acquire knowledge of a range of cultures, values, and political perspectives relevant for living in a global community.	Complete a study abroad experience or international internship.	Participate in a department or college associated international travel opportunity.	Complete a research paper on a topic associated with human-plant interactions and the effect on culture.	Complete a course in world or regional geography.
Goal 2. Demonstrate a high level of personal and social responsibility.	Leadership position in a collegiate organization involved in local community interactions.	Develop an action plan using horticulture to engage a local or regional community.	Complete a research project investigating the role of horticulture in modern urban and rural society.	Complete a humanities course in ethics or social work.
Goal 3. Demonstrate leadership and the ability to collaborate and work in teams.	Election to a regional or national undergraduate organization associated with a professional society.	Leadership position in a student club or university related organization.	Active participation in an undergraduate related club or collegiate organization.	Demonstrate leadership in class group projects or team building activities.
Goal 4. Plan, engage, and learn from actions that demonstrate civic responsibility to community and society.	Propose, design and implement a project relating to a socio-horticulture topic such as a community/school garden or horticulture therapy program.	Write a research paper evaluating the effectiveness and/or impact of a school or community garden on the targeted community.	Complete a course with a service learning component.	Complete a course module on horticulture-based outreach activities, opportunities and responsibilities on a local, regional or national level.
Goal 5. Develop a plan for life-long learning as it relates to career choice and professionalism.	Postgraduate involvement and leadership in professional or trade organizations.	Participate in regional or national professional meetings as an undergraduate.	Participate in extracurricular activities; attend seminars, trade shows or industry meetings relating to a career choice.	Student membership in a profession-related organization.