

**HLTSBS Program Assessment Report
Horticulture Department
University of Arkansas
Academic Year 2020-2021**

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 the 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.

Student Learning Outcomes Being Assessed in This Report:

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.

Assessment Measures for General Skills:

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 a 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: Oral Communication Benchmarks for achieving discipline specific skills

Discipline Specific Skills Student Learning Outcome 5: Demonstrates 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.

Goal 2: Demonstrate a high level of personal and social responsibility.

Goal 3: Demonstrate leadership and the ability to collaborate and work in teams.

Goal 4: Plan, engage and learn from actions that demonstrate civic responsibility to community and society.

Goal 5: Develop a plan for life-long learning as it relates to career choice and professionalism.

Assessment Measures for Discipline Specific Skills: Critical Thinking Skills Benchmarks for achieving discipline specific skills

Discipline Specific Skills Student Learning Outcome 1: Acquire, integrate, and apply knowledge of plant science to managed systems.

Goal 1: Develop working knowledge of multiple sources, including current and older literature, to find, evaluate, organize, and manage information related to horticultural systems.

Goal 2: Demonstrate competence with both laboratory and field-based technologies used in modern horticulture.

Goal 3: Apply concepts of plant biology, systematics, ecology, and genetics to manage and improve plants and their products.

Goal 4: Apply scientific methods to test hypothesis.

See Attachments 1 through 4 for rubrics used to assess these learning outcomes.

Methodology:

For this assessment report, two courses were identified. HORT 2003 Principles of Horticulture, and HORT 472 V (2 hrs) HTLS Internship Assessment. HORT 2003 is made up of primarily underclassmen, or transfer students within the first year of their matriculation at the University of Arkansas, and is taught both in the fall and spring semesters. This assessment report uses data from the fall 2020 semester. HORT 472 V is our capstone course composed of upper level students, normally seniors within their last two semesters of completing their degree. HORT 472 V Internship Assessment is a new course that was separated from HORT 462V Internship Experience last year (2019), and is now the capstone course used for departmental assessment to satisfy the General Education Capstone Course Requirement 6.1. As such, HORT 472V will be assessed yearly going forward. HORT 2003 Principles of Horticulture has not been assessed in the past.

HORT 2003 Principles of Horticulture was assessed using the General Outlook Skills Student Learning Outcome 3: Critical Thinking Skills, with the discipline specific skills defined by student learning outcome 1: acquire, integrate, and apply knowledge of plant science to managed systems.

HORT 472V Internship Assessment was assessed using the General Outlook Skills Student Learning Outcome 2: Oral Communication Skills, with the discipline specific skills defined by student learning outcome 5: Demonstrates professionalism and proficiency in skills that relate to horticulture.

Oral Communication Components Assessed:

HORT 472V HTLS Internship Assessment: Students are required to prepare a professional formal seminar based on their internship experience. The expected time duration is about 12 minutes and 3 minutes for questions. Three faculty members were randomly asked to evaluate and score each undergraduate presentation using a grading rubric developed to match the assessment plan criteria. The overall average score is was reported in Table 1.

Acceptable and Ideal Targets for the Discipline Specific Skills: Student Learning Outcome- Oral Communication.

- (1) Acceptable target: Graduating 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 demonstrate skills outlined in the Capstone column for oral communication.

Critical Thinking Skills Components Assessed:

HORT 2003 Principles of Horticulture: Students are required to apply scientific methods and hypothesis testing to classroom and laboratory activities. Students are expected to demonstrate competencies in both laboratory and field-based technologies used in modern horticulture. The overall average score is reported in Table 2.

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) 3 and 4.
- (2) Ideal target: Students will be able to demonstrate skills outlined in Levels (Milestones) 1 and 2.

Summary of Findings:

Covid-19 Pandemic Impact Statement

The Covid-19 Pandemic continued to disrupt normal campus operations during the 2020-2021 academic year. The fall semester was particularly impacted as both instructors and students faced challenges adapting to new technologies, teaching methods, social isolation, stress, and anxieties. It was often a case of “keeping the wheels on the cart”, and many normal classroom activities were cancelled, and content in many cases had to be streamlined to meet the circumstances, which seemed to evolve daily. Both students and instructors were under tremendous stress to make the courses successful. Especially problematic were laboratory sections associated with lectures. In the case of HORT 2003 Principles of Horticulture, it was quickly learned that trying to remote in lab projects was an unmitigated disaster. As a result, the number of lab sections were doubled in the spring to accommodate social distancing and allow for face to face lab sections. While this addressed many of the problems faced during the fall semester, it did at least double the teaching load on the instructor.

The COVID -19 restrictions impact on HORT 472V, while not as dramatic, did necessitate all the student seminars being delivered remotely via the ZOOM platform. Considering the newness of this limitations of this medium, the students overall adapted quickly, and were able to deliver their seminars with minimum disruption. For all courses taught remotely, the main problem was students often lacked reliable internet connections, or reliable audio/ video capabilities at their residences.

Oral Communication Assessment:

Students assessed in HORT 472V were all upperclassmen and within one or two semesters from graduation. Summarized data for HORT 472V Internship Assessment is given in Table 1. While all students improved in assessment ratings for oral communication from the 2019-2020 assessment report (3.3 to 3.6) and met the Horticulture Department’s target rating of 2 to 3 (see above), areas for continual improvement were identified and will be discussed under the recommendation section. All student met the acceptable target of milestones 2 and 3.

Table1. Oral communication student learning outcome scoring data for HORT 472V Internship Assessment during the fall semester of the 2020-2021 academic year.

Course Assessed	Number of Students Assessed	Overall Average Assessment Score*	Minimum Score Assessed	Maximum Score Assessed
Hort 472V Internship Assessment	12	3.62	2.0	4.0

*Average 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 oral communication or the student failed to present a seminar for assessment) to 4 (mastery of the student learning outcome goals for oral communication).

Critical Thinking Assessment:

Students assessed in HORT 2003 Principles of Horticulture were a diverse group with incoming freshmen, recent transfers into the HLTS program, or students from other colleges and departments using the course as an elective. Out of the sixteen students, five were from outside the Bumpers College AFLS (4 Fulbright, 1 Fay School). Within the Bumpers College, three students were from AECT, and one student was from AEAB. This is the first report to assess HORT 2003 Principles of Horticulture, so no previous data are available for comparison. Summarized data for HORT 2003 Principles of Horticulture is given in Table 2.

The COVID-19 Pandemic Effect on Critical Thinking Assessment.

The COVID-19 protocols established on campus for the 2020-2021 academic year had a significant negative impact on course content, delivery, and assessment. The course was set up to be a hybrid course with the lectures having staggered attendance requirements, the laboratory section had an optional face to face attendance policy, with students electing to remote in for lab being responsible for completing the laboratory projects at home, this became logistically untenable, and one of the lessons learned that remote labs for such a course in horticulture is problematic at best. The laboratory assessment component is reported separately to reflect the lack of students meeting critical thinking skills as part of the student learning outcomes.

Table 2. Critical Thinking Skills student learning outcome scoring data for HORT 2003 Principles of Horticulture during the fall semester of the 2021-2021 academic year.

Student Learning Outcome for HORT 2003 Principles of Horticulture	Number of Students Assessed	Average Assessment Score*	Minimum Score Assessed*	Maximum Score Assessed
Lecture Component: Acquire, integrate, and apply knowledge of plant science to managed systems	16	3.18	0.0	4.0
Lab Component: Acquire, integrate, and apply knowledge of plant science to managed systems	16	1.81	0.00	3.0

Average 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 critical thinking skills) to 4 (mastery of the student learning goals for critical thinking skills).

Recommendations

HORT472V Internship Assessment: Oral Communication.

As stated above, the average assessment score for oral communication in the 2020-2021 academic year increased from 3.3 to 3.6 over the 2019-2020 academic year. Notwithstanding Covid restrictions, this increase can be attributed to actions taken by the seminar instructor and the internship coordinator to hold a practice session via Zoom before the student's scheduled seminar. This action allowed the instructors to identify weaknesses in presentations. If campus fully re-opens for the fall semester, this academic coaching on seminar presentations will be further developed.

HORT 2003 Principles of Horticulture: Critical Thinking Skills.

The main recommendation for this course is to return to a normal course with face to face lectures and labs. One area identified for improvement is more instruction on scientific method and hypothesis testing. Although students learn these methodologies in other science-based courses, more horticulture-based practice is recommended.

Action Plan:

HORT472V Internship Assessment. General Skills: Oral Communication. Discipline. Specific Skills Student Learning Outcome 5: Demonstrates professionalism and proficiency in skills that relate to horticulture.

Actions for Oral Communication.

The internship coordinator and the instructor of record for HORT 472V will increase efforts to work more closely with students on their internship presentations, particularly in the area of professionalism in the discipline. Presentation formats also need to be improved, but this was difficult to work on this past year since students were not on campus.

HORT 2003 Principles of Horticulture. General Skills: Critical Thinking Skills. Discipline Specific Skills Student Learning Outcome 1: Acquire, integrate, and apply knowledge of plant science to managed systems.

Actions for Critical Thinking Skills.

Laboratory session topics will be overhauled to include modules related to the scientific method as applied to horticulture, and hypothesis testing. A new instructor taught this course for the first time, and the pandemic had a significant impact on the ability to teach the lab in any sort of a conventional manner. The chair of the undergraduate program committee will work with the instructor over the summer term of 2021 to review and revise the laboratory component of this course.

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	Milestones		Benchmark 1
		3	2	
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.