

Horticulture, PhD

Program Description

The PhD program in Horticultural Sciences exists to provide an advanced science-based education for students through innovative teaching and directed horticultural research experiences. The program encompasses basic genetic, physiology, production, processing and utilization of horticultural products including fruits, vegetables, flowers, and landscape plants. The overall goal is to provide the student with a strong science-based background in the areas of horticulture, physiology, genetics, production, etc. for a future in research either in industry, academia or government positions.

Outcome 1 – Effective Communication

Graduates will be able to effectively communicate, both orally and in written form, the results of horticultural research and experiences as it relates to their specific field of horticulture.

Measure 1.1 – Annual Graduate Student Assessment

Each academic year, an assessment between the graduate chair and student will occur to assess yearly course progress, dissertation research results and set goals/benchmarks for the coming year. *[Attached a standard evaluation form with items for assessing each PLO on a 4-point Likert scale; Below Minimum Expectations to Exceeds Expectations]*

Target 1.1

This measure examines all of our students who are at various stages within their program. Some of the students have only been through 1 semester of the program while others are close to completion. Due to the stage of where each student currently is within the program, we believe not all students will meet expectations for effective communication, especially our international students where English is not their native language. Therefore we have set a target of 75% of PhD graduate students will obtain a minimum of "meets expectations" on questions 3 and 4 on the Annual Assessment of Graduate Student form by their faculty adviser.

Finding 1.1: Met

100% of Doctoral graduate students earned a "meets expectations" or better on question 3 & 4 of annual graduate student assessment. It is clear that our faculty advisors believe their PhD students are meeting expectations with regards to their students communication skills although discussions have centered around providing the students with more formal writing opportunities which has been incorporated into our data-driven action plan. This trend has been seen over several assessment cycles, however, adding a new writing course was still seen as a positive curricular improvement.

Use of Results 1.1

Although the target was met, we believe our students need additional opportunities to improve on both their oral and written communication skills as many of our PhD students

intend to stay in academia where writing is critical. To this end, one of our faculty members submitted a course entitled "Competitive Proposal Writing in Agriculture" through CARS for addition to the 2021-2022 catalog. Our plan is to heavily advertise this course to our PhD students each fall when it is taught and to discuss the importance of writing intensive courses to our graduate faculty at our yearly graduate faculty retreat. Our graduate faculty retreat will be held in spring 2021 and this new course should be offered beginning in fall 2021.

Measure 1.2 – Committee Evaluation of Graduate Learning Outcomes

At the final defense each committee member will complete a Graduate Student Evaluation to assess the student's performance relative to the COALS learning outcomes for graduate students. The student will perform their own assessment as well. [See rubric under *Supporting Documentation*.]

Target 1.2

This target is assessing our PhD candidates at the completion of their program. Thus we believe at this stage of their program 100% of PhD candidates demonstrate an average of at least "meets expectations" on learning objectives 4, 5 and 10 on the graduate student evaluation form.

Finding 1.2: Met

100% of doctoral students earned a "meets" on learning outcome 4, 5, and 10 of graduate student assessment form. We have consistently seen that our doctoral students meet expectations on these learning outcomes over several of the past assessment cycles. However, our faculty believe that having more formal writing opportunities including the addition of a proposal writing course will still be valuable to our students as they progress through their degree.

Use of Results 1.2

Although the target was met, we believe our students need additional opportunities to improve on both their oral and written communication skills as many of our PhD students intend to stay in academia where writing is critical. To this end, one of our faculty members submitted a course entitled "Competitive Proposal Writing in Agriculture" through CARS for addition to the 2021-2022 catalog. Our plan is to heavily advertise this course to our PhD students each fall when it is taught and to discuss the importance of writing intensive courses to our graduate faculty at our yearly graduate faculty retreat. Our graduate faculty retreat will be held in spring 2021 and this new course should be offered beginning in fall 2021.

Outcome 2 – Written Communication – COVID

Graduates will be able to effectively communicate, both orally and in written form, the results of horticultural research and experiences as it relates to their specific field of horticulture.

Measure 2.1 – Written Communication Program Assessment Toolkit

The Written Communication Program Assessment Toolkit was developed by OIEE. It was designed as a structured, facilitated approach to assessing written communication skills in the context of an academic program and was open to all programs and academic certificates, regardless of level. The program submitted student written work to OIEE for scoring on a comprehensive written communication rubric. The criteria (sub-skills) on the rubric are: Context and Purpose for Writing; Content Development; Organization; and Conventions and Style. The Horticulture PhD program was assessed using this Toolkit. [See rubric under *Supporting Documentation*.]

Target 2.1

For doctoral level students nearing the end of their academic program, the following two targets indicate the expected level of performance on this rubric:

1. The overall average score of each criterion is 8 or higher.
2. At least 60% of students will achieve a score of 8 or higher on all four criteria.

Finding 2.1: Not Met

The expected performance for doctoral level graduate students, collectively, is an average score of 8 or higher for each criterion. The criterion averages ranged from 5.8 to 7.3. This target is Not Met. Context and Purpose and Content Development, with scores of 7.3 and 7.1, respectively, fell between Proficient and Advanced. Performance on Conventions and Style was Proficient (6.2). Performance on Organization (5.8) fell just below the Proficient level.

At least 60% of student artifacts were expected to earn a score of 8 or higher across all four criteria. No artifacts met this goal, therefore the target is Not Met. 50% of artifacts earned a 4 or 5 on Organization.

Use of Results 2.1

This activity was added to the 2019-2020 cycle due to COVID. Writing samples from six PhD students were assessed by OIE&E using a rubric. Based on their findings, our PhD students are struggling with organization in their written communication samples as 50% of artifacts in this sample did not exceed a score of 5 on this criterion. This will require follow up with our graduate faculty at our yearly retreat. Although we have added a new course called "Competitive Proposal Writing in Agriculture" to our graduate course listing for the 2021-2022 graduate catalog, we will need to stress to those faculty who incorporate writing into their courses, that organization needs to be a focus area when discussing proposal writing to the students and within their rubrics. Additionally, we will discuss including University Writing Center workshops within these courses to include topics on writing organization. We believe these actions will help improve our students' ability to properly organize their written artifacts. We will have a graduate faculty retreat in spring 2021 to discuss this issue and will ask our faculty to examine their evaluation rubrics for writing samples at that time to see what changes need to be implemented with regards to evaluating the student's organization skills within their writing samples.

Status Update on a Previous Action

The specific learning outcome we addressed was written communication because at the time we felt that our students didn't have many courses that included a writing component and we wanted to ensure that they were well prepared to write their research proposal and eventually their dissertation. This wasn't really based on quantitative findings as we weren't measuring written communication skills using a defined rubric. It was more from discussions with faculty members who chaired these student's committees who indicated their students didn't have strong writing skills. Therefore, two years ago we added a requirement that our students write a literature review in HORT 690. This course is our Professional Development course and is required for all incoming students. To aid the students in this writing assignment, we also had the Writing Center come and give two presentations to the class early in the semester. These are presentations on Writing Clearly and Concisely and then a special presentation on Writing Literature Reviews.

The data gathered was the literature review written by the students. An evaluation of the 13 student's work over this 2-year period by the course instructor, showed that the student's did have weak written communication skills based on a rubric developed by OIE&E. This rubric examines context of and purpose for writing, content development, organization and conventions and style. Although in some of the 4 areas the students did show proficiency (context of and purpose for), in other areas they were weaker (organization and conventions and style). Because this assignment and change was implemented in a course that is taken in a student's first or second semester in graduate school it may be too early to adequately assess the student's written communication skills. Therefore, going forward it may be better to obtain writing samples from coursework taken later in the student's degree program to assess their written communication skills using OIE&E's rubric as we did for the 2019-2020 assessment cycle. Additionally, these results suggest we may need to develop more courses within the program that have a writing component within them to ensure that the students have ample opportunity to strengthen their written communication skills. This is especially true since the results from the Written Communication Program Assessment Toolkit for the 2019-2020 cycle that was performed by OIE&E showed that our PhD students did not meet the expected performance on the rubric. In particular our PhD students received lower scores on Organization and Conventions and Style, suggesting these are two areas we should focus on. The graduate faculty will discuss these findings at our next graduate faculty retreat to see how we can incorporate discussion of these skills into those classes that contain a writing assignment.

Supporting Documentation

Measure 1.2 Rubric

Student Name: _____ Student UIN: _____ Dept/Major: _____ Degree Being Pursued: _____ Distance Education Student (Circle One): Yes / No Product of Research, if Applicable (Circle One): Thesis / Dissertation / Record of Study	Faculty Name: _____ Committee Role: (Co-)Chair _____, Member _____ Dept Affiliation: Inside _____, Outside _____	Faculty Evaluation of Graduate Student Learning Outcomes				
USE THIS DESCRIPTION TO CALIBRATE EXPECTATIONS						
How well does the student meet your expectations in the following areas?	Well Above (5)	Above (4)	Meets Expectations (3)	Below (2)	Well Below (1)	Not Observable
1 Exhibits a coherent understanding of discipline-specific knowledge?	Ideal clarity on critical concepts <input type="checkbox"/>	Strong clarity on critical concepts <input type="checkbox"/>	Articulates foundational concepts across the breadth of the discipline; distinguishes between opposing theoretical frameworks; some clarity <input type="checkbox"/>	Poor clarity on critical concepts <input type="checkbox"/>	No clarity on critical concepts <input type="checkbox"/>	<input type="checkbox"/>
2 Applies discipline-specific knowledge in a range of contexts to solve problems and make decisions?	Applies all relevant info; ideal resolution <input type="checkbox"/>	Applies most relevant info; strong resolution <input type="checkbox"/>	Applies relevant concepts to justify decisions; may not apply all relevant information; may not come to the ideal resolution <input type="checkbox"/>	Relies on some irrelevant info; poor resolution <input type="checkbox"/>	Relies on irrelevant info; incorrect resolution <input type="checkbox"/>	<input type="checkbox"/>
3 Uses a variety of sources and alternative views when critically evaluating ideas and information?	Ideal sources; considers all views; critical evaluation <input type="checkbox"/>	Strong sources; considers most views; some critical eval <input type="checkbox"/>	Sources used to evaluate are both relevant and applicable; student seeks multiple perspectives; information considered is generally thorough; some critical thought applied <input type="checkbox"/>	Mediocre sources; lacking viewpoints; little critical eval <input type="checkbox"/>	Poor sources; missing critical viewpoints; no critical eval <input type="checkbox"/>	<input type="checkbox"/>
4 Communicates effectively?	Crystal clear; seamless transitions <input type="checkbox"/>	Very clear; smooth transitions <input type="checkbox"/>	Central message is clear and consistent in written and oral form; ideas presented in logical order; transitions between ideas are adequate <input type="checkbox"/>	Lacking clarity or order; poor transitions <input type="checkbox"/>	Unclear; illogical; no transitions <input type="checkbox"/>	<input type="checkbox"/>
5 Teaches or explains the subject matter in their discipline to a range of audiences?	Ideal delivery; ideal for audience <input type="checkbox"/>	Strong delivery; well designed for audience <input type="checkbox"/>	Delivery techniques and language choices are appropriate for the audience; student has the ability to transition between different audiences; may not be flawless or smooth <input type="checkbox"/>	Mediocre delivery; somewhat appropriate for audience <input type="checkbox"/>	Poor delivery; inappropriate for audience <input type="checkbox"/>	<input type="checkbox"/>
6 Exhibits proficiency in technology appropriate to solve problems in their discipline?	Expert proficiency <input type="checkbox"/>	Advanced proficiency <input type="checkbox"/>	Demonstrates basic knowledge of, and basic proficiency in technology and tools specific to the discipline; may rely on others for some guidance <input type="checkbox"/>	Lacking proficiency <input type="checkbox"/>	No proficiency <input type="checkbox"/>	<input type="checkbox"/>
7 Chooses ethical courses of action in research or practice?	Addresses all ethical questions <input type="checkbox"/>	Addresses most ethical questions <input type="checkbox"/>	Recognizes ethical questions; attempts to apply ethical perspectives & concepts to research and practice <input type="checkbox"/>	Doesn't recognize all ethical questions <input type="checkbox"/>	Doesn't recognize any ethical questions <input type="checkbox"/>	<input type="checkbox"/>

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Measure 1.2 Rubric (cont.)

INSTRUCTIONS: The following section should be completed for MS-Thesis Option students & Doctoral Students completing a dissertation.

		USE THIS DESCRIPTION TO CALIBRATE EXPECTATIONS				Not Observable	
How well does the student meet your expectations in the following areas?		Well Above (5)	Above (4)	Meets Expectations (3)	Below (2)		Well Below (1)
8	Develops clear, hypothesis-driven, or data supported research plans?	Ideal clarity; well supported by data <input type="checkbox"/>	Strong clarity; well supported by data <input type="checkbox"/>	Articulates research questions supported by data, or relying on clear hypotheses; may not identify all complexities and nuances inherent to the proposed research <input type="checkbox"/>	Somewhat clear; mildly supported by data <input type="checkbox"/>	Unclear; unsupported by data <input type="checkbox"/>	<input type="checkbox"/>
9	Conducts valid, data-supported and theoretically consistent research?	Ideal controls, quality or reproducibility; ideal analysis <input type="checkbox"/>	Strong controls, quality or reproducibility; strong analysis <input type="checkbox"/>	Executes research with appropriate controls, sufficient quality and reproducibility, and valid analysis using methods appropriate to the discipline <input type="checkbox"/>	Poor controls, quality or reproducibility; Poor analysis <input type="checkbox"/>	No controls, quality or reproducibility; Incorrect analysis <input type="checkbox"/>	<input type="checkbox"/>
10	Effectively disseminates research results in appropriate contexts?	Expertly conveys relevance or applicability <input type="checkbox"/>	Conveys relevance or applicability with skill <input type="checkbox"/>	Information presented attempts to distill a large body of knowledge into relevant points; demonstrates relevance of completed research; articulates broader applicability of research <input type="checkbox"/>	Poor ability to convey relevance or applicability <input type="checkbox"/>	Unable to convey relevance or applicability <input type="checkbox"/>	<input type="checkbox"/>
11	Did this student pass his/her final defense? (Circle One)						No
12	Would you recommend that this student go on to a Ph.D. program or pursue a post-doc position? (Circle One)						No

Measure 2.1 Rubric

	Exemplary 10	9	Advanced 8	7	Proficient 6	5	Sufficient 4	3	Beginner 2	1	Not Present 0
Context of and Purpose for Writing	The writer demonstrates a complete understanding of the context, audience, and purpose of the work; tone enhances the purpose of the work by drawing the reader in	The writer demonstrates a clear understanding of the context and purpose throughout the work without irrelevant digressions; tone suits the purpose and complements the purpose of the work	The writer demonstrates a clear understanding of the context and purpose of the intended audience	The writer demonstrates a general understanding of the context and purpose of the work; tone is generally appropriate for the intended audience	The writer identifies a purpose and/or provides some context but is not always consistent throughout the work or may wander; tone is inconsistent	The purpose of the work is unclear/nonresponsive to the assignment/context; tone is inappropriate					
Content Development	Central subject is thoroughly explored and expanded upon through the synthesis of compelling ideas/independent reasoning which are supported with examples, details and evidence	Central subject is easily identified and clearly emphasized throughout the work through the synthesis of original ideas/independent reasoning; content/ideas are clear and supported with details, examples, or evidence	Central subject is easily identified and emphasized; independent reasoning and/or original ideas are supported with evidence, details, or examples	Central subject is easily identified; existing evidence/details are stated but may not be explored; independent reasoning/original ideas, if included, are not supported with evidence, details, or examples; may lack a sense of completeness	Central subject is identifiable but oversimplified; development may be attempted but is unsuccessful; lacks sense of completeness	Central subject is difficult to identify					
Organization	Organization is thoughtful and each paragraph serves a clear purpose; paragraph structure is always logical, cohesive and coherent; transitions add to the overall structure of the work, which is sophisticated and compelling, such that the reader moves through the work easily	Organization is clear and controlled; paragraph structure is logical and ideas are appropriately connected; clear, appropriate transitions are evident throughout the work; overall structure is straightforward and compelling	Organization is clear and controlled; paragraphs generally follow a logical progression; clear transitions are evident throughout the work; overall structure is straightforward and clearly presented	Organization is coherent but may be choppy; transitions are attempted and may be executed well in some areas but may still jump from one idea to the next with no clear purpose or may be repetitive; overall structure is straightforward and simple	There is evidence of a logical organizational strategy but some aspects may be confusing; transitions may be attempted but not skillfully executed or the writer may jump topics; overall structure may be confusing	Organization is haphazard; may lack transitions; difficult to follow					
Conventions and Style	Word choice is precise, artful, and appropriate; handling of grammar and mechanics enhances the reader's understanding and is virtually error-free; sentence structure varies appropriately; if sources are used, they are effectively integrated into the body of the work	Word choice is precise and appropriate to the writing task; handling of grammar and mechanics enhances the reader's understanding, though it may contain the occasional minor error; sentence structure varies appropriately; if sources are used, they are effectively integrated into the body of the work	Word choice is straightforward, controlled, and appropriate for the task; contains few if any significant grammar or mechanical errors; sentence structure varies appropriately; if sources are used, they are effectively integrated into the body of the work with only minor errors	Word choice is appropriate for the task, though it may be less (or more) 'wordy' than necessary; grammar and mechanics may contain errors but they do not interfere with readability; sentence structure may be repetitive at times; if sources are used, an effort is made to integrate them into the body of the work	Word choice may be simplistic; grammar and mechanics contain several errors which may interfere with the reader's comprehension; sentence structure is basic and unvaried; if sources are used, they are not integrated well	Word choice is simplistic and inappropriate; there are frequent errors interfering with the reader's comprehension; if sources are used, they are not integrated well					